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Simplice A. Asongu

Nicholas M. Odhiambo

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Simplice A. Asongu
Department of Economics
University of South Africa
P. O. Box 392, UNISA
0003, Pretoria
South Africa
Emails: asongusimplice@yahoo.com /
asongus@afridev.org

Nicholas M. Odhiambo
Department of Economics
University of South Africa
P. O. Box 392, UNISA
0003, Pretoria
South Africa
Emails: odhianm@unisa.ac.za /
nmbaya99@yahoo.com

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Governance quality and trade performance in Sub-Saharan Africa

Simplice A. Asongu¹ and Nicholas M. Odhiambo²

Abstract

In this study, nexuses between governance and trade performance in terms of natural resource rents are assessed in 44 sub-Saharan African countries. The empirical evidence is based on Tobit regressions. The findings show that political governance (entailing “voice & accountability” and political stability) and institutional governance (consisting of the rule of law and corruption control) have a negative effect on trade performance. The findings are consistent with the perspective that resources rents are linked to inefficiencies in governance which are further detrimental to trade performance within the remit of natural resource rents on the one hand and, on the other, the premise of the prevailing weak institutions in the region less likely to boost trade performance.

Keywords: Natural Resources; Economic Growth; Governance; Sub-Saharan Africa

JEL Classification: H10;Q20; Q30; O11; O55

¹ Corresponding author[Senior Researcher]; Department of Economics, University of South Africa, P.O. Box 392, UNISA 0003, Pretoria, South Africa. Email: asongusimplice@yahoo.com

²Professor; Department of Economics, University of South Africa, P.O. Box 392, UNISA 0003 Pretoria, South Africa. Email: odhianm@unisa.ac.za

1. Introduction

The main purpose of this study is to assess nexuses between governance and trade performance in terms of natural resource rents in developing countries with specific reference to Sub-Saharan Africa (SSA), where concerns of governance and the natural resource curse are most apparent (Shaxson, 2007; Bhattacharyya & Hodler, 2014; Badeep, Lean & Clark, 2017; Ajide & Raheem, 2016a, 2016b; Asongu & Nnanna, 2019; Asongu & Odhiambo, 2021). In order to clarify the contribution of this study to the attendant literature, it is worthwhile to: (i) articulate the debate on the nexus between governance and natural resource rents; and (ii) clarify the contribution to the literature. The two points are expanded in the same chronology as they have been highlighted.

First, there is a longstanding debate on the effects of institutions on resource rents and vice-versa. One strand of the debate maintains that rents from natural resources are linked to a multitude of unfavourable socio-economic and institutional externalities, *inter alia*: political strife, violence, and poor governance (Imi, 2007; Hodler, 2006; Frankel, 2012). Some notable findings include: (i) Sala-i-Martin and Subramanian (2013), who conclude that natural resources negatively influence economic growth because of their unfavourable incidence on institutional quality. (ii) The Nigerian experience articulated by Sala-i-Martin and Subramanian (2013) is corroborated by Arezki and Galyfason (2011) in a panel of 29 nations in Sub-Saharan Africa. (iii) According to Bhattacharyya and Hodler (2010), in states that are not democratic, corruption is positively influenced by natural resource rents. This finding corroborates those of Arezki and Brückner (2011) on the nexus between corruption and political instability in a panel of 31 oil-wealthy countries. Bhattacharyya and Hodler (2010) also investigate the nexus between natural resources and corruption to conclude that the incidence is contingent on the quality of democratic institutions.

Contrary to the main strand of literature on the unfavourable incidence of natural resource rents on institutions, there is another strand of literature supporting the position that institutions do not exert a significant causal effect on natural resource rents (Sachs & Warner, 1995; Brunnschweiler, 2008). Accordingly, Brunnschweiler (2008) revisits the conclusions of Sachs and Warner (1995) on the linkage between natural resources and economic growth and establishes that no evidence is apparent on the negative indirect impact of natural resources via the institutional mechanism. The second strand is close to studies that have concluded that natural resource dependence/abundance tends to be linked with low levels of democracy and a strong likelihood of authoritarian governments (Karl, 1997; Ross, 2001; Wantchekon, 2002; Tsui, 2011). However, a third strand of the debate argues that institutions are fundamental in

determining how natural resources affect economic prosperity (Mehlum, Moene & Torvik, 2006; Torvik, 2009; Mavrotas, Murshed & Torres, 2011; Sarmidi, Law & Jafari, 2014). To put this third strand into more perspective, Sarmidi et al. (2014) and Torvik (2009) opine that the negative incidence of natural resource rents on economic prosperity can be mitigated by the enhancement of institutional quality: a thesis that is broadly consistent with Mehlum et al. (2006) and Mavrotas et al. (2011) who have argued that the performance of economic growth in resource-rich countries depends on how the underlying resources are distributed through institutional settings.

Second, in spite of the substantially documented literature on the role of institutions in economic development (Robinson, Torvik & Verdier, 2006; Mehlum et al., 2006; Tella & Ades, 1999; Barro, 1999; Ross, 2001; Jensen & Wantchekon, 2004; Collier & Hoeffler, 2005; Boschini, Pettersson & Roine, 2007; Horvath & Zeynalov, 2014; Frankel, 2012), with contrasting views on the insignificant role of institutions (Sachs & Warner, 1995) versus institutions playing a fundamental role in alleviation the resource curse (Mehlum et al., 2006; Collier & Hoeffler, 2009), it is important to revisit the debate within the remit of SSA by assessing nexuses between governance and trade performance in terms natural resource rents, not least because the sub-region is characterised by comparatively weak institutions and high dependence on natural resource rents.

The positioning of this study departs from extant contemporary literature, which has focused on, *inter alia*, the nexuses between natural resource rents, economic growth and human development (Sinha & Sengupta, 2019; Mohamed, 2020); the challenge of governance in the light of natural resources rents (Fagbemi & Adeoye, 2020); the effect of natural resources on labour shares (Al-Marhubi, 2021); connections between natural resources, institutional quality, indebtedness and manufacturing (Amiri, Samadian, Yahoo & Jamali, 2019; Muhanji, Ojah & Soumaré, 2019); insights into the natural resource curse (Henri, 2019); secession with natural resources (Dhillon, Krishnan, Patnam & Perroni, 2020); how oil wealth affects development in the long term (Cassidy, 2019); intensive and extensive margins of mining and development (Mano, Bhattacharyya & Moradi, 2019) and the nexus between resource discovery and the political fortunes of national leaders (Bhattacharyya & Keller, 2020).

The rest of the study is organised in the following manner. The next section provides the theoretical underpinnings, which are followed by a section on the data and methodology. The third section provides and discusses the empirical results, while the last section concludes with future research directions.

2. Theoretical underpinnings and stylized facts

The theoretical consideration on the relationship between governance and economic development is in accordance with the corresponding literature related to how governance systems affect outcomes of economic development (McGuire & Olson, 1996; Zureiqat, 2005). Building on the theoretical insights, three main forms of governance organization are apparent, notably, those articulating, anarchy, dictatorship and democracy. Accordingly, these three principal governance forms are consistent with the governance measurements used in this study to appreciate political governance and institutional governance. According to the attendant literature: *“The first concept is about the process by which those in authority are selected and replaced (Political Governance): voice and accountability and political stability. ... The last, but by no means least, regards the respect for citizens and the state of institutions that govern the interactions among them (Institutional Governance): rule of law and control of corruption”* (Andres, Asongu & Amavilah, 2015:1041).

The three main forms of governance above (i.e. anarchy, dictatorship and democracy) can be clarified within the framework of the conceptions and definitions of political governance and institutional governance used in this study in the light of Andrés et al. (2015). Unfortunately, while these definitions of governance variables from the World Bank normatively reflect positive governance signals, not all the three forms of governance identified in the theoretical framework are positive governance signals. In other words, the premise of the prevailing weak institutions in a region is less likely to boost trade performance in terms of natural resource rents.

First, on the front of anarchy, governance is characterized by “roving bandits” who take laws into their hands in disrespect to existing institutions (Zureiqat, 2005). This directly affects both political governance and institutional governance in the perspectives that such anarchy can compromise: (i) political governance or the election and replacement of political leaders, which is captured by political stability and “voice & accountability” and (ii) institutional governance or the respect by the State and citizens of institutions that govern interactions between them, captured by corruption control and the rule of law.

Second, as argued by McGuire and Olson (1996), “stationary bandits” often create autocracies with the main objective of monopolising theft. Such a characteristic of autocracy can severely constrain both political and institutional governance. Accordingly, in the light of the premise that the laws in place affect how corporations and people are productive, autocratic leaders are constrained by taxpayers who are only prepared to pay more taxes in exchange for better political and institutional governance standards (Eubank, 2012; Asongu,

2015). Hence, a direct consequence is that citizens and corporations are left with less production incentives which could affect trade and rents corresponding to the production of natural resources. However, compared to anarchy, when such production incentives are not apparent, in autocracies, conditions are created to increase the income of citizens and corporations as well as provide a favourable environment for the extraction of rents through taxation.

Among the identified three forms of governance, democracy seems to be the most effective in being positively associated with political and institutional governance. As argued by McGuire and Olson (1996), democratic institutions are linked with relatively more availability of public goods and trade, compared to the previous two forms of governance (i.e. anarchy and autocracy). Moreover, democratic forms of organisation have been established to be associated with higher standards of institutional and economic governance (Keefer, 2007). Hence, such comparatively higher standards can improve conditions for international trade and, by extension, the trade in natural resources.

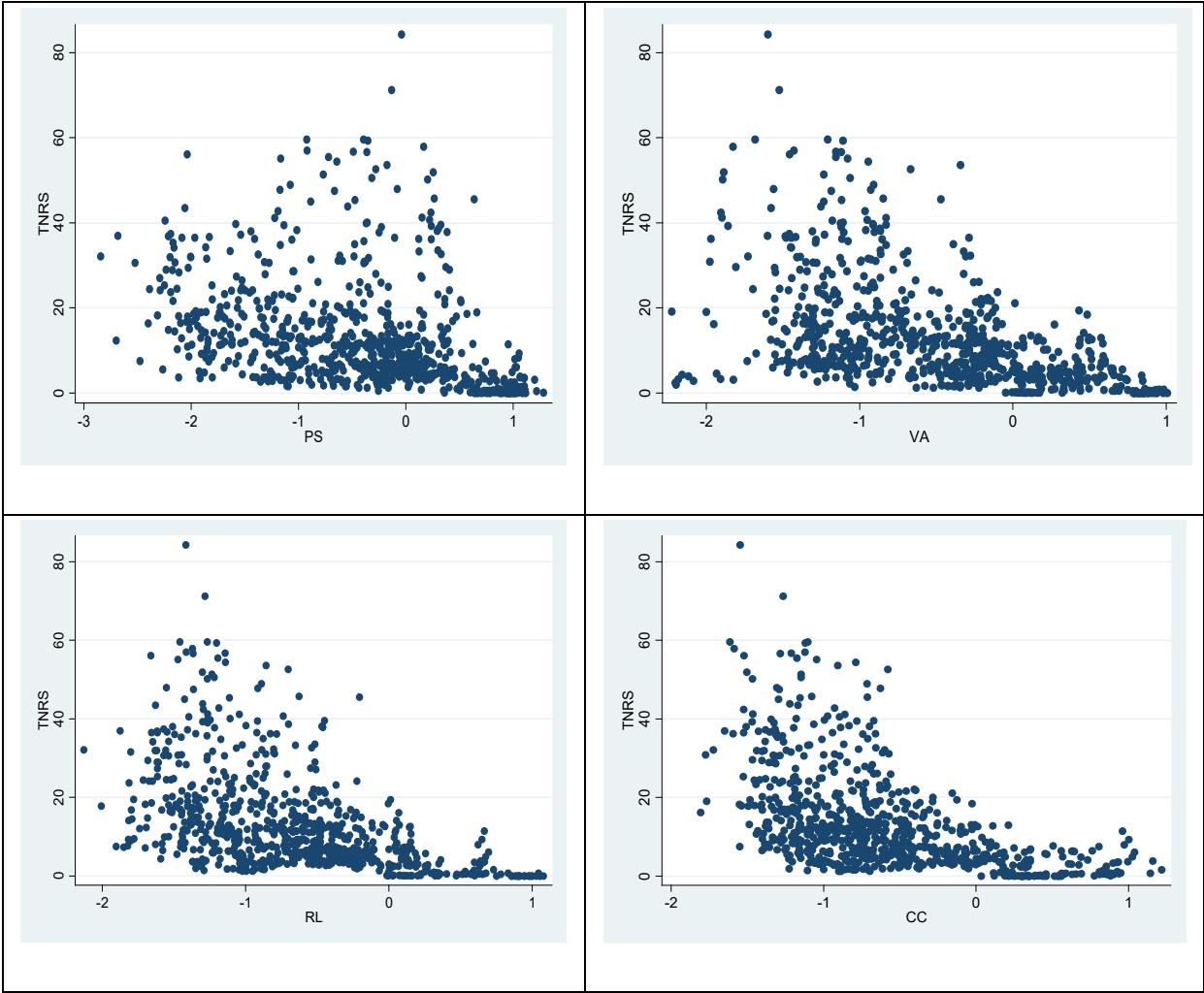
In the light of the above, linkages between the engaged forms of governance and trade are tailored such that some forms of governance provide more conducive conditions for trade activities than others. This theoretical nexus between governance and international trade (which subsequently drives economic development) is articulated in Olson (1991). Accordingly, the attendant literature is consistent with the position that poor governance is negatively linked with development outcomes while good governance is linked to the opposite effect (De Haan & Siermann, 1996; Alesina, Ozler, Roubini & Swagel, 1996).

When the attendant theoretical underpinnings are narrowed to the concept of international trade and, by extension, natural resource rents, Alesina et al. (1996) and Asongu and Nnanna (2019) argue that poor governance is linked to uncertainties for incentives and, by extension, fewer opportunities for natural resource rents. The underlying association is essentially premised on the evidence that economic agents (including those exploiting and exporting natural resources) prefer macroeconomic environments that are more stable (Kelsey & le Roux, 2017, 2018). The arguments of DeHaan and Siermann (1996) are broadly aligned with the theoretical underpinnings of this study because governance standards determine the demand and supply of capital and labour, which are naturally associated with levels of trade and exports of natural resources. The authors substantiate that poor governance is linked to, *inter alia*, capital flight, less domestic investment, capital loss and brain drain, which are essential in trade and economic productivity. The narratives in this section motivate the formulation of the following testable hypothesis, which is investigated in the next sections.

Hypothesis 1: Political and institutional governance increase trade performance in terms of natural resource rents in Sub-Saharan Africa.

While the underlying hypothesis builds from a strand of the literature, it is important to balance the narrative by articulating that resource rents create inefficiencies by enabling politicians to facilitate public employment provision in return for political support, increased competition over resource revenues, and creating incentives for rent-seeking and corruption. These underpinning conditions subsequently create a situation where the corresponding poor governance quality can negatively affect trade performance in terms of natural resource rents. It follows that in countries characterised by comparatively poor governance standards, the testable hypothesis may not withstand empirical scrutiny.

Figure 1: Political governance, institutional governance and natural resource rents



Notes. TNRS: Natural resource rents. PS: Political stability. RL: Rule of law. CC: Corruption-Control.

Figure 1, which shows the correlation between governance and natural resource rents, suggests that there is consistently a negative nexus between governance and natural resource rents. Accordingly, the schematic depiction showing a negative nexus between governance and trade performance in terms of resource rents is apparent from a dotted diagonal tendency from the left-hand side to the right-hand side of the graphs. This is the case with political stability (top left), voice and accountability (top right), the rule of law (bottom left), and corruption control (bottom right). The natural resource rent proxy is on the vertical axis, while the governance variables are on the horizontal axis. It is apparent from the Figure that the correlations are contrary to the stated hypothesis. However, it is relevant to assess whether the correlations withstand empirical scrutiny through a robust empirical analysis.

It is important to note that the discussion about the three forms of governance (i.e. anarchy, dictatorship and democracy) is within the remit of theoretical underpinnings and the intension here is to articulate a theoretical link between forms of governance and natural resources rents. However, in terms of conception and measurement, only governance indicators (i.e. political and institutional governance) that are measurable or for which data are readily available are employed for the empirical analysis.

3. Data and methodology

3.1 Data

In order to investigate the tested hypothesis formulated in the previous section, the study focuses on 44 countries in SSA for the period 1996-2016³. The focus on SSA is because the concerns of governance and the natural resource curse are comparatively more apparent in the sub-region compared to other regions and continents in the world (Tadadjeu, Njangang, Ningaye & Nourou, 2020; Mignamissi & Kuete, 2021). The main sources from which the data are obtained are: (i) World Governance Indicators (WGI) of the World Bank from which the governance or independent variables of interest are gathered and (ii) World Development Indicators (WDI) of the World Bank from which the outcome and control variables are obtained.

The outcome variable is trade performance in terms of total natural resources rents (% of GDP), in the light of contemporary natural resource rents literature (Henri, 2019; Guan,

³The sampled 44 countries are: “*Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; Congo Democratic Republic; Republic of Congo; Cote d'Ivoire; Equatorial Guinea; Eritrea; Ethiopia; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Mauritius; Mozambique; Namibia; Niger; Nigeria; Rwanda; Sao Tome and Principe; Senegal; Seychelles; Sierra Leone; South Africa; Tanzania; Togo; Uganda; Zambia and Zimbabwe*”.

Kirikaleli, Bibi & Zhang, 2020). It is important to note that resource rents account for the export part of trade. This is essentially because it captures only part of countries' export earnings, mainly from the export of hard commodities. According to the definition in the WDI database, natural resource rent is the sum of oil rent, natural gas rent, coal rent (hard and soft), mineral rents, and forest rent. The choice of political governance and institutional governance as the independent variables of interest is consistent with the motivation of the study, the theoretical underpinnings in Section 2 as well as contemporary African governance literature (Pelizzo, Araral, Pak & Xun, 2016; Ajide & Raheem, 2016a, 2016b; Amavilah et al., 2017; Asongu & Kodila-Tedika, 2017; Pelizzo & Nwokora, 2016, 2018; Nwokora & Pelizzo, 2018; Opeyemi, Uchenna, Asongu & Osabuohien, 2019).

In order to take on board the concern of variable omission bias, three controls are considered in the study, namely: inflation, trade openness and foreign direct investment. Inflation is measured as the annual rate of growth in the GDP implicit deflator, and it shows the rate of price change in the whole economy, while trade openness is the sum of exports and imports of goods and services (i.e., commodities) in the economy (% of GDP). Foreign direct investment net inflow (% of GDP) measures net inflow (new investment inflow less disinvestment) in the reporting economy from foreign investors and is divided by GDP. The selection of these indicators builds on the attendant literature on international trade (Cipollina et al., 2016; Asongu & Kodila-Tedika, 2017; Fonchamnyo & Akame, 2017; Dary & James, 2018; Bahmani-Oskooe & Gelan, 2018; Blanas & Seric, 2018; Uysal & Mohamoud, 2019; Kaminchia, 2019). Concerning the anticipated signs, inflation is expected to negatively influence rents obtained from natural resources, whereas trade openness and FDI are anticipated to have the opposite or positive effect. This is essentially because FDI and trade openness are directly connected with the exploitation and exportation of natural resources, while high prices (i.e., inflation) could decrease the demand for resources, on the one hand, and, on the other, mitigate incentives for investment in the sector because investors have been documented to be privileged with economic environments with less macroeconomic uncertainty (Kelsey & le Roux, 2017, 2018). Moreover, the choice of three control variables is motivated by the need to avoid instrument proliferation in the GMM specification, as in the contemporary GMM-centric literature, even when the option of collapsing instruments is taken on board in the estimation exercise (Tchamyu, 2019, 2020). To put this point into perspective, some GMM-oriented studies include zero control variable (Osabuohien & Efobi, 2013) or two control variables (Bruno, De Bonis & Silvestrini, 2012; Asongu & Odhiambo, 2020a) in order to avoid the proliferation of instruments and the bias of estimated results.

Appendix 1 provides the definitions and sources of variables; Appendix 2 discloses the summary statistics, while the correlation matrix is presented in Appendix 3.

3.2 Methodology

3.2.1 GMM: specification, identification and exclusion restrictions

The choice of the empirical strategy adopted in this study is motivated on two fronts, notably, the attendant literature on the requirement for the adopted estimation technique to be in line with the data behavior (Kou, Chao, Peng & Alsaadi, 2019; Kou, Yang, Xiao, Chen & Alsaadi, 2019; Kou, Lu, Peng & Shi, 2012; Kou, Ergu, Chen, Lin, 2016; Kou, Peng & Wang, 2014). On the other hand, there are four main GMM specific insights that further motivate the choice of the adopted estimation strategy. Consequently, in the light of attendant GMM-oriented studies, there is a fourfold motive for adopting the underlying estimation approach (Tchamyou, 2019, 2020). (i) The N>T condition for the adoption of the estimation strategy is consistent with the data structure of this study, given that the numerical value of cross sections (i.e., N) is superior to the attendant years characterizing the time series in every cross section (i.e., T). In other words, 44 countries>21 years contained in each cross section. (ii) Natural resource rents are persistent, given that the correlation between the level and first lag series is greater than an established rule of thumb which is 0.800 (Meniago & Asongu, 2018; Tchamyou et al., 2019a, 2019b). (iii) With regard to the panel nature of the dataset, it is apparent that cross sectional differences are considered within the analytical framework. (iv) The empirical approach is tailored to account for endogeneity on two fronts by, on the one hand, considering the unobserved heterogeneity by controlling for time-invariant variables and, on the other, engaging internal instruments to account for reverse causality or simultaneity. The empirical approach considered in this study is the Roodman (2009a, 2009b) improvement of Arellano and Bover (1995) which is increasingly being employed in the literature because of its advantage of limiting instrument proliferation and providing more robust estimates (Boateng *et al.*, 2018).

The following equations in level (1) and first difference (2) summarise the standard *system* GMM estimation procedure.

$$R_{i,t} = \sigma_0 + \sigma_1 R_{i,t-\tau} + \sigma_2 G_{i,t} + \sum_{h=1}^3 \delta_h W_{h,i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$R_{i,t} - R_{i,t-\tau} = \sigma_1 (R_{i,t-\tau} - R_{i,t-2\tau}) + \sigma_2 (G_{i,t} - G_{i,t-\tau}) + \sum_{h=1}^3 \delta_h (W_{h,i,t-\tau} - W_{h,i,t-2\tau}) + (\xi_t - \xi_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}) \quad (2)$$

where, $R_{i,t}$ denotes natural resources rents of country i in period t , σ_0 is a constant, σ_1 is the parameter related to natural resource rents, G represents political (“voice & accountability” and political stability/no violence) and institutional (corruption control and the rule of law) governance, σ_2 is the parameter corresponding to governance dynamics, W is the vector of control variables (inflation, trade openness and foreign direct investment), δ_h represents parameters corresponding to the adopted three control variables considered and therefore, h varies from 1 to 3 (i.e. δ_1 for inflation, δ_2 for trade openness and δ_3 for foreign direct investment), τ represents the coefficient of auto-regression which is one in this study because a year lag is enough to capture information of the past, ξ_t is the time-specific constant, η_i is the country-specific effect and $\varepsilon_{i,t}$ is the error term.

3.2.2 Identification and exclusion restrictions

It has been substantially documented that in a GMM specification, a narrative on identification and exclusion restrictions is worthwhile for a robust empirical analysis. Some contemporary studies informing this position are: Tchamyu and Asongu (2017), Tchamyu (2019, 2020), Boateng et al. (2018) and Tchamyu et al. (2019b). In accordance with the underlying literature, in the identification process, the: (i) outcome variable is natural resource rents; (ii) endogenous explaining or predetermined variables are the independent variables interest (i.e., governance) and elements in the conditioning information set (or set of control variables) and (iii) years or time-invariant variables are considered as strictly exogenous⁴. Still consistent with the attendant literature, the exclusive restriction assumption holds if the selected strictly exogenous variables influence the outcome variable exclusively via the predetermined variables.

The criterion employed to assess the validity of the underpinning exclusion restriction test is the Difference in Hansen Test (DHT). Building on these insights, in the findings that are reported in the empirical results section, the validity of the exclusion restriction assumption is contingent on a failure to reject the null hypothesis of the DHT. It follows that the alternative hypothesis of the DHT should be rejected in order for the exclusion restriction assumption to withstand empirical scrutiny. This procedure of the DHT withstanding empirical scrutiny

⁴ It is imperative to clarify that Roodman (2009b) is sympathetic to the identification strategy with the argument that it is not likely for years to be endogenous after a difference. It follows that the procedure for treating *ivstyle* (years) is ‘iv (years, eq(diff))’ whereas the *gmmstyle* is employed for predetermined variables.

within a GMM framework is consistent with a more traditional (IV) estimation approach in which the null hypothesis surrounding over-identification restrictions should not be rejected in order for the identified instruments to elicit the outcomes variable exclusively via the proposed mechanisms or endogenous explaining variables (Beck et al., 2003).

3.2.3 Tobit regressions

In the light of information disclosed in the abstract, the natural resource rents variable is defined in the specific percentage interval (i.e., 0% to 100%). Hence, in the light of contemporary literature, given that the outcome variable is within a specified range (Ajide et al., 2019), this study employs a double-censored Tobit empirical strategy to further assess the incidence of political and institutional governance on natural resource rents. In essence, the double-censored Tobit approach has been established to be convenient when the dependent variables are within minimum and maximum intervals (Kumbhakar & Lovell, 2000; Koetter et al., 2008; Ariss, 2010). In addition, when the two likelihood functions converge, the Tobit approach is the same as estimating a linear regression (Coccoresse & Pellecchia, 2010).

In accordance with some authoritative studies on the subject (Tobin, 1958; Carson & Sun, 2007), a standard Tobit model is as follows:

$$y_{i,t}^* = \alpha_0 + \beta X_{i,t} + \varepsilon_{i,t}, \quad (3)$$

where $y_{i,t}^*$ is a latent response variable, $X_{i,t}$ is an observed $1 \times k$ vector of explanatory variables and $\varepsilon_{i,t} \approx \text{i.i.d.N}(0, \sigma^2)$ and is independent of $X_{i,t}$. Instead of observing $y_{i,t}^*$, we observe $y_{i,t}$:

$$y_{i,t} = \begin{cases} y_{i,t}^*, & \text{if } y_{i,t}^* > \gamma \\ 0, & \text{if } y_{i,t}^* \leq \gamma, \end{cases} \quad (4)$$

where γ is a non-stochastic constant. In other words, the value of $y_{i,t}^*$ is missing when it is less than or equal to γ .

4. Empirical results

4.1 Presentation of results

The empirical results are disclosed in this section in Tables 1-3. While Tables 1-2 are concerned with GMM-centric estimations, Table 3 focuses on Tobit-oriented estimations. Concerning the first set of results, Tables 1-2 are divided into four main categories: each representing a governance variable, with political governance (consisting of two categories)

captured in Table 1, while institutional governance (i.e., also entailing two categories) is captured in Table 2. In each category, three specifications are apparent. From the left-hand side to the right-hand side of each category, the elements in the conditioning information set (i.e., control variables) are increased. In other words, the first specifications entail one control variable, while the second and third are respectively characterized by two and three control variables.

Table 1: Political governance and natural resource rents

	Dependent variable: nature resource rents					
	Political Stability/ No violence			Voice & Accountability		
Constant	-0.382 (0.200)	-2.166*** (0.000)	-1.273*** (0.005)	-0.449 (0.147)	-1.738** (0.013)	-0.917 (0.137)
Resource rents (-1)	1.039*** (0.000)	1.029*** (0.000)	0.967*** (0.000)	1.055*** (0.000)	1.019*** (0.000)	0.941*** (0.000)
Political Stability	-0.090 (0.693)	-0.565** (0.023)	-0.769*** (0.000)	---	---	---
Voice & Accountability	---	---	---	0.336 (0.309)	-0.912** (0.025)	-1.479*** (0.001)
Inflation	-0.007*** (0.000)	-0.007*** (0.000)	-0.007*** (0.000)	-0.008*** (0.000)	-0.007*** (0.000)	-0.008*** (0.000)
Trade Openness	----	0.023*** (0.001)	0.017*** (0.003)	----	0.020*** (0.007)	0.014** (0.031)
Foreign Direct Investment	----	---	0.035** (0.025)	----	---	0.047*** (0.002)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AR(2)	(0.260)	(0.243)	(0.253)	(0.264)	(0.252)	(0.261)
Sargan OIR	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hansen OIR	(0.013)	(0.067)	(0.033)	(0.015)	(0.037)	(0.060)
DHT for instruments						
(a) Instruments in levels						
H excluding group	(0.002)	(0.008)	(0.002)	(0.002)	(0.004)	(0.002)
Dif(null, H=exogenous)	(0.534)	(0.723)	(0.737)	(0.713)	(0.688)	(0.913)
(b) IV (years, eq(diff))						
H excluding group	---	(0.069)	(0.191)	---	(0.249)	(0.150)
Dif(null, H=exogenous)	---	(0.116)	(0.041)	---	(0.037)	(0.091)
Fisher	2979.64***	1743.96***	4047.29***	1593.39***	1764.52***	1399.85***
Instruments	22	26	30	22	26	30
Countries	44	43	43	44	43	43
Observations	735	699	696	735	699	696

***, **, *: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests.

Source: Authors

Table 2: Institutional governance and natural resource rents

	Dependent variable: nature resource rents	
	Rule of Law	Corruption control

Constant	-0.330 (0.161)	-2.284*** (0.003)	-1.709** (0.010)	0.005 (0.979)	-1.991** (0.012)	-1.481*** (0.007)
Resource rents (-1)	1.004*** (0.000)	0.978*** (0.000)	0.909*** (0.000)	1.014*** (0.000)	1.024*** (0.000)	0.946*** (0.000)
Rule of Law	-0.668 (0.228)	-1.961*** (0.000)	-2.350*** (0.000)	---	---	---
Corruption control	---	---	---	0.015 (0.974)	-0.789 (0.125)	-1.726*** (0.000)
Inflation	-0.007*** (0.000)	-0.007*** (0.000)	-0.007*** (0.000)	-0.006*** (0.000)	-0.007*** (0.000)	-0.007*** (0.000)
Trade Openness	---	0.023*** (0.006)	0.021*** (0.002)	---	0.021*** (0.004)	0.016*** (0.002)
Foreign Direct Investment	---	---	0.034*** (0.003)	---	---	0.045*** (0.001)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	(0.256)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
AR(2)	(0.001)	(0.246)	(0.257)	(0.272)	(0.245)	(0.253)
Sargan OIR	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hansen OIR	(0.008)	(0.071)	(0.058)	(0.007)	(0.036)	(0.053)
DHT for instruments						
(a) Instruments in levels						
H excluding group	(0.001)	(0.004)	(0.003)	(0.001)	(0.004)	(0.003)
Dif(null, H=exogenous)	(0.661)	(0.939)	(0.883)	(0.480)	(0.647)	(0.839)
(b) IV (years, eq(diff))						
H excluding group	---	(0.195)	(0.211)	---	(0.174)	(0.175)
Dif(null, H=exogenous)	---	(0.079)	(0.069)	---	(0.042)	(0.072)
Fisher	2447.64***	1369.52***	1707.22***	2069.24***	1674.14***	2174.46***
Instruments	22	26	30	22	26	30
Countries	44	43	43	44	43	43
Observations	735	699	696	735	699	696

***, **, *: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests.

Source: Authors

To confirm the validity of the estimated models, four main information criteria are used in conformity with contemporary GMM-centric literature⁵. In the light of these

⁵ “First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR (2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second, the Sargan and Hansen over-identification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the

information criteria, all estimated models are not valid because the null hypothesis of the Hansen test is overwhelmingly rejected. It is worthwhile to clarify that the Hansen test is robust but weakened by instrument proliferation, whereas the Sargan test is not robust but not weakened by the proliferation of instruments. Hence, a means of addressing the issue is to prefer the Hansen (which is robust) and control for the concern of instrument proliferation by ensuring that for each specification, the number of instruments is lower than the corresponding number of cross sections.

Having clarified the reasons for the unexpected findings, the reason for disclosing them nonetheless in this section is to avoid the concern of publication bias in social science in which strong, expected and significant findings are preferred over weak, unexpected and insignificant results (Rosenberg, 2005; Franco, Malhotra & Simonovits, 2014; Boateng et al., 2018; Ejemeyovwi & Osabuohien, 2020).

It is apparent from the Tobit results disclosed in Table 3 that the governance variables have a negative effect on trade performance in terms of natural resource rents. Moreover, from the marginal effects, on average for the sampled countries, a unit increase in each governance dynamic consistently decreases natural resource rents. It is also worth noting that the main impacts and marginal effects are respectively higher from the institutional governance predictors than they are for the political governance predictors. Moreover, all the significant control variables have the expected signs.

Table 3: Governance and natural resource rents (Tobit regressions)

	Dependent variable: nature resource rents							
	Political Governance				Institutional Governance			
	Political Stability		Voice & Accountability		Rule of Law		Corruption control	
	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx
Constant	1.884 (0.142)	---	1.046 (0.335)	---	-2.012 (0.123)	---	-2.613** (0.043)	---
Political Stability	-6.185*** (0.000)	-5.326*** (0.000)	---	---	---	---	---	---
Voice & Account	---	---	-9.118***	-7.832***	---	---	---	---

Hansen OIR is robust but weakened by instruments. In order to restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, the Difference in Hansen Test (DHT) for exogeneity of instruments is also employed to assess the validity of results from the Hansen OIR test. Fourth, a Fisher test for the joint validity of estimated coefficients is also provided" (Asongu & De Moor, 2017, p 200).

			(0.000)	(0.000)				
Rule of Law	---	---	---	---	-10.791***	-9.278***	---	---
					(0.000)	(0.000)		
Corruption control	---	---	---	---	---	---	-11.746***	-10.109***
							(0.000)	(0.000)
Inflation	-0.0002 (0.955)	-0.0002 (0.955)	0.0004 (0.932)	0.0003 (0.932)	-0.0007 (0.867)	-0.0006 (0.867)	0.0003 (0.930)	0.0003 (0.930)
Trade Openness	0.106*** (0.000)	0.091*** (0.000)	0.091*** (0.000)	0.078*** (0.000)	0.103*** (0.000)	0.089*** (0.000)	0.110*** (0.000)	0.094*** (0.000)
Foreign Investment	0.090* (0.076)	0.078* (0.076)	0.107** (0.023)	0.092** (0.023)	0.067 (0.158)	0.057 (0.158)	0.090* (0.050)	0.077* (0.050)
Fisher	45.99***		68.50***		99.37***		99.35***	
Observations	735	735	735	735	735	735	735	735

***, **, *: significance levels at 1%, 5% and 10% respectively. Voice & Account: Voice and Accountability.

Source: Authors

Given that compared to the standard Tobit regressions, the GMM technique controls for simultaneity (i.e., through internal instruments) and the unobserved heterogeneity (i.e., year fixed effects) dimensions of endogeneity, we extend the Tobit regression to account for simultaneity (i.e. using lagged independent variables) and the unobserved heterogeneity (i.e., using time fixed effects). Table 4 summarizes these new findings that are consistent with those of Table 3.

Table 4: Extended Tobit regressions (addressing simultaneity and unobserved heterogeneity)

	Dependent variable: nature resource rents							
	Political Governance				Institutional Governance			
	Political Stability		Voice & Accountability		Rule of Law		Corruption control	
	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx	Coefficient	dy/dx
Constant	3.093** (0.032)	---	2.324* (0.057)	---	-0.684 (0.628)	---	-1.719 (0.227)	---
Political Stability (-1)	-5.777*** (0.000)	-4.982*** (0.000)	---	---	---	---	---	---
Voice & Account (-1)	---	---	-8.800*** (0.000)	-7.572*** (0.000)	---	---	---	---
Rule of Law (-1)	---	---	---	---	-10.329*** (0.000)	-8.894*** (0.000)	---	---
Corruption control (-1)	---	---	---	---	---	---	-11.334*** (0.000)	-9.767*** (0.000)
Inflation (-1)	0.003 (0.193)	0.003 (0.192)	0.004 (0.182)	0.003 (0.182)	0.003 (0.281)	0.002 (0.280)	0.003 (0.166)	0.003 (0.165)
Trade Openness (-1)	0.090*** (0.000)	0.077*** (0.000)	0.076*** (0.000)	0.066*** (0.000)	0.090*** (0.000)	0.077*** (0.000)	0.096*** (0.000)	0.083*** (0.000)
Foreign Investment (-1)	0.151*** (0.003)	0.130*** (0.003)	0.159*** (0.001)	0.137*** (0.001)	0.123*** (0.008)	0.106*** (0.008)	0.151*** (0.001)	0.130*** (0.001)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fisher	16.06***		21.16***		28.83***		29.02***	
Observations	692	692	692	692	692	692	692	692

***, **, *: significance levels at 1%, 5% and 10% respectively. Voice & Account: Voice and Accountability. (-1): lagged or non-contemporary by one year.

Source: Authors

In the light of the findings above, the tested hypothesis is not validated, possibly because resource rents engender inefficiencies by enabling politicians to, *inter alia*, facilitate public employment provision in return for political support, increased competition over resource revenues, and incentives for rent-seeking and corruption. Accordingly, such underlying conditions eventually produce a tendency whereby the corresponding poor quality of governance affects trade performance in terms of natural resource rents negatively. This is traceable to countries in SSA which are characterised by comparatively low standards of governance and high dependence on natural resource rents. By extension, the findings can also be understood in the light of the failure of governance arrangement in SSA countries to adequately ensure that the utilization and management of natural resources are effective.

4.2 Further discussion of results

The negative nexus is clarified with inefficiencies in governance. Hence though governance is established to negatively affect resource rents, the attendant governance can either be good governance or poor governance. In the case of countries in SSA, such is poor governance. In this section, the study clarifies why poor political and institutional governance can be associated with a reduction in natural resource rents. This clarification is broadly consistent with the narrative of Asongu and Odhiambo (2019) on linkages between governance and industrialization.

First, with respect to poor political governance, it should be noted that it has been substantially documented that such lack of good political governance is associated with diminished prospects of industrialization (Collier, Hoeffler & Pattillo, 2004; Davies, 2008; Ndikumana, Boyce & Ndiaye, 2015) owing to, *inter alia*: capital flight and loss/damage of assets which can be very unfavorable to domestic economic growth especially if the underlying losses/damages are associated with the natural resource sector of a resource-wealthy country. It is worthwhile to substantiate the above perspective by decoupling poor political governance into its constituent components: political instability/ violence and “lack of voice & accountability”.

(i) When political instability and violence are apparent in a resource-wealthy economy, it is highly probable that investors in the resource-rich sector would decrease their investments in the corresponding sector and, by extension, a reduction in natural resource rents.

Contemporary case studies that can be used to illustrate this tendency include: (i) Nigeria with the attacks of the Movement for the Emancipation of the Niger Delta (Yeeles & Akporiaye, 2016; Ezirim, 2018) and (ii) South Sudan with the recent political crisis owing to a power dispute (Grigoli, Herman & Swiston, 2019).

(ii) On the front of the absence of “voice & accountability”, the political strife and violence underlying the poor political governance is linked with the absence of executive accountability and competitive elections which only motivate investors in the natural resource sector to reduce their investments in the sector because such investments are deemed as more risky (Lensink, Hermes & Murinde, 2000; Le & Zak, 2006). Consequently, such investments are transferred to countries in which political institutions are more credible and stable because investors have been documented to prefer investing in macroeconomic environments that are characterized by less ambiguity (Kelsey & le Roux, 2017, 2018).

In the light of the above, the absence of political stability and “voice & accountability” can severely constrain the ability of investors to carry on with their investment activities and, by extension, natural resource rents associated with the fruits of such investments in countries rich in natural resources would naturally decrease. It follows that, like most investors, natural resource investors react negatively to events that are unfavorable to their return on investments.

Second, on the front of poor institutional governance (i.e., composed of the absence of a stringent rule of law and lack of corruption control), it should be expected that when the citizens and the State do not respect institutions that govern interactions between them, investors in the natural resource sector (as well as the confidence of investors) are unfavourably affected and by extension, investments from these corresponding investors are bound to substantially decrease and hence the associated natural resource rents. There is a substantial body of literature on the position that, in the absence of stringent laws, elite corruption decreases investments owing to state predation, regardless of whether or not investors are directly related to such corruption and predation. In essence, the mainstream perspective that investors prefer investing in countries with better accounting standards (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1998), more effective courts (Djankov, La Porta, Lopez-de-Silanes & Shleifer, 2003), good institutions characterised by less corruption (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1999), have been confirmed in contemporary African institutional literature (Asongu, 2012; Fowowe, 2014; Ibrahim & Alagidede, 2017).

It follows from the above arguments that the rule of law facilitates the protection of private property and, by extension, provides some guarantee against the expropriation of investors and corresponding invested assets. The risks of such expropriation can substantially undermine investors in the natural resource sector of resource-wealthy countries. Moreover, the negative reaction of investors and corresponding unfavourable incidence on natural resource rents can be more apparent when such expropriation is compounded by corrupt executives owing to the absence effective measures of corruption control.

Overall, the findings are consistent with time and level underpinnings for the benefit of governance in developing countries (Sung, 2004; Keefer, 2007; Back & Hadenius, 2008; Asongu, 2014). According to the attendant underpinnings, governance in Africa is poor because democracies in the continent are still weak (i.e., level view) and young (i.e., time perspective).

5. Conclusion and future research directions

This study assesses nexuses between governance and trade performance natural resource rents in 44 countries in Sub-Saharan Africa using data for the period 1996-2016. The empirical evidence is based on Tobit regressions and the Generalised Method of Moments. The GMM results are reported essentially for the purpose of avoiding publication bias: a practice of preferring strong, significant and expected results over weak, insignificant and unexpected results. The Tobit findings show that political governance (entailing “voice & accountability” and political stability) and institutional governance (consisting of the rule of law and corruption control) have a negative effect on trade performance. Why the established findings are contrary to the tested hypothesis has been discussed in Section 4.2.

The study has also established that the main impacts and marginal effects are respectively higher from the institutional governance predictors than they are for the political governance predictors. This tendency for institutional governance to comparatively have a higher incidence on outcome variables is consistent with contemporary literature on fighting software piracy in Africa (Andrés & Asongu, 2013) and mitigating conflicts and crimes in the same continent (Asongu & Kodila-Tedika, 2016). Institutional governance is more relevant than political governance in determining natural resource rents because the former is a kind of “last resort” in boosting natural resource rents from resource-wealthy countries. In essence, government officials can be elected to office by means of a majority vote through various unhealthy mechanisms such as vote-buying and intimidation (i.e., poor political governance); however, the effect on natural resources rents is more apparent when those elected into office

and other government officials do not respect government institutions (i.e., poor institutional governance) that govern interactions between these citizens and the government. The main policy implication is that political and institutional governance standards in the sampled countries should be improved in order for attendant countries to further benefit from the favorable externalities of trade performance in terms of resource rents.

Future studies can extend the findings established in this study by assessing whether/how they withstand empirical scrutiny within country-specific frameworks. This future research direction is also motivated by the fact that cross-country differences existing in terms of governance and initial conditions of some countries may reflect different tendencies in terms of the response of natural resource rents to governance measures. Moreover, the concern of whether African states are developmental or predatory should also be considered as a future research direction.

Appendices

Appendix 1: Definitions of Variables

Variables	Signs	Definitions of variables (Measurements)	Sources
Resources rents	Rrents	Total natural resources rents (% of GDP). It is the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.	WDI
Political Stability	PS	“Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional and violent means, including domestic violence and terrorism”	WGI
Voice & Accountability	VA	“Voice and accountability (estimate): measures the extent to which a country’s citizens are able to participate in selecting their government and to enjoy freedom of expression, freedom of association and a free media”	WGI
Rule of Law	RL	“Rule of law (estimate): captures perceptions of the extent to which agents have confidence in and abide by the rules of society and in particular the quality of contract enforcement, property rights, the police, the courts, as well as the likelihood of crime and violence”	WGI
		“Control of corruption (estimate): captures perceptions of the extent to which public power is	

Corruption control	CC	exercised for private gain, including both petty and grand forms of corruption, as well as ‘capture’ of the state by elites and private interests”.	WGI
Inflation	Infl	Inflation, GDP Deflator (% of annual)	WDI
Trade	Trop	Imports plus Exports of Commodities (% of GDP)	WDI
Foreign Investment	Fodi	Foreign direct investment, net inflows (% of GDP)	WDI

WGI: World Governance Indicators. WDI: World Bank Development Indicators of the World Bank.
Source: Authors

Appendix 2: Summary statistics (1996-2016)

	Mean	SD	Minimum	Maximum	Observations
Resources rents	12.864	12.520	0.001	84.239	906
Political Stability	-0.455	0.879	-2.844	1.282	792
Voice & Accountability	-0.529	0.720	-2.226	1.007	792
Rule of Law	-0.663	0.644	-2.129	1.077	792
Corruption control	-0.598	0.623	-1.805	1.216	792
Inflation	19.436	184.903	-31.565	4800.532	908
Trade Openness	55.716	29.290	7.805	225.412	910
Foreign Investment	5.045	10.430	-8.589	161.823	906

S.D: Standard Deviation.
Source: Authors

Appendix 3 : Correlation matrix (uniform sample size: 735)

	Rents	PS	VA	RL	CC	Inflation	Trade	Foreign I.
Rents	1.000							
PS	-0.341	1.000						
VA	-0.482	0.644	1.000					
RL	-0.508	0.771	0.830	1.000				
CC	-0.526	0.667	0.721	0.877	1.000			
Inflation	0.040	-0.127	-0.092	-0.104	-0.084	1.000		
Trade	0.214	0.307	0.175	0.211	0.241	-0.038	1.000	
Foreign I.	0.156	0.061	0.041	0.012	0.050	-0.018	0.363	1.000

Rents : Natural resource rents. PS : Political Stability. VA : Voice & Accountability. RL : Rule of Law. CC: Corruption control. Foreign I: Foreign Investment.

Source: Authors

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