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Bank Lending and Output Growth in Nigeria

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Abstract
This paper examines the relationship between bank lending and output growth in Nigeria over the period 1981 to 2012 using annual data obtained from secondary sources. Specifically, the study examines the impact of sector level bank lending on output growth of three selected sectors measured by index of production. Using the Johansen-Fisher combined panel cointegration methodology and panel Fully Modified Ordinary Least Squares (FMOLS) as a method of estimation, the results provide evidence of a negative significant relationship between bank lending and output growth of the sectors under consideration (namely, agriculture, manufacturing, and mining and quarrying). However, a positive significant relationship is found between human capital measured by secondary school enrolment and output growth of the sectors. This study concludes that the expansion needed to boost output growth in these sectors is hampered by financial constraints made possible by high interest rates charged by financial institutions and that output growth is not only a function of finance as most firms do show but also a function of human capital (that is, labour embodied with knowledge). Therefore, to ensure output growth, there is the need for government intervention to increase the volume of credit that goes to these sectors and enforcement of compliance with monetary policy guidelines. Furthermore, labour needs to be retrained on relevant skills required and there is the need for reduction in budget or current account deficit in order to drive interest rates down.
Keywords: Bank lending, Output growth, Nigeria

1. Introduction

The Nigerian economy comprises six main sectors which relate with one another using the stock of capital and other factors of production within the economy to produce the desired output of goods and services. Capital is important in the process of production in these sectors as it helps the producers to procure the necessary inputs of production and thereby helps in the expansion of production capacities. Therefore, availability or non-availability of capital explains, to a greater extent, the growth process in the various sectors and hence the economy as a whole.

Owing to abject poverty, low savings capacity and consequent low capital formation, entrepreneurs in developing countries such as Nigeria are unable to finance their production activities and as such have to depend on external sources of funding. According to Uma (2001), availability of external funding, especially access to long-term credit influences firms' investments level in any economy. Policy makers believe that credit is a productive input and therefore, it is possible to promote specific economic activities by delivering specific amounts of loans to producers. Hence, bank lending has become an essential feature in output growth process in Nigeria. Availability of bank credit enables producers to harness innovations by bringing about new combinations of productive resources and employing hitherto unemployed resources.

The Nigerian banking system has been in existence prior to her independence in October 1960 and has played crucial role in the economic development of the country. Organized banking began in Nigeria in 1892 with the establishment of the African Banking Corporation (ABC) in Lagos. From Nigeria's colonial era to present day, the banking sector has witnessed vast changes in character, structure and organization with the primary aim of promoting a more efficient allocation of funds and ensuring that financial intermediation occurs as efficiently as possible thereby enhancing funds mobilization and accessibility, which are necessary ingredients for output growth.

Economic literature contains discussions by several authors on the importance of bank lending in generating output growth within an economy. Early economists such as Schumpeter (1934), McKinnon (1973) and Shaw (1973) identified banks' role in facilitating technological innovation through their intermediation role. This role according to them is performed through the process of channeling funds in the form of credit or loan for investment to those deficit spending units put them into the most productive use. Thus, lending which is defined in this context, as the link through which resources are transferred for capital formation, facilitates investment which leads to output growth. Several scholars thereafter, such as Fry (1988), King & Levine (1993), Levine (2004) and De Serres, Kobayakawa, Slok & Vartia (2006), have supported the above assertion about the importance of bank lending in output growth process of any economy.

Although there exit many studies on the role of bank lending in output growth, it is important to note here that most of these studies were conducted in the developed economies. Limited studies exist in the developing/ emerging economies (especially in Nigeria), thereby creating a huge knowledge gap. To our

knowledge, earlier studies on the role of bank lending in output growth in Nigeria were carried out by Haruna, Yahya & Nasiru (2013), Oluitan (2007), and Josephine (2009). However, there is still unclearness about the effect of different sector level bank credit on output growth of the various sectors of a developing economy like Nigeria.

The present study intends to reduce this unclearness by examining the impact of bank lending on output growth in Nigeria (using sector level productivity and bank lending data), specifically to ascertain whether sector level bank lending has any impact on output growth in the various sectors (specifically; agriculture, manufacturing, and mining & quarrying sectors). We therefore hypothesize that bank lending to the various economic sectors enhances output growth in those sectors.

The rest of this paper is organized as follows: section two is sectoral distribution of commercial bank loans and advances in Nigeria. Section three is literature review and discusses the theoretical and empirical evidence of the effect of bank lending on output growth. Section four specifies the model used to investigate the hypothesis that bank lending enhances output growth of the various sectors while section five discusses the results and policy implications of findings. Sixth section is the summary and conclusion.

2. Sectoral Distribution of Commercial Bank Loans and Advances in Nigeria

Table. 1: Sectoral Distribution of Commercial Bank Loans and Advances in Nigeria: 1981 – 2012 (N' Million)

Period	Agriculture	Manufacturing	Mining & Quarrying	Real Estate & Construction	General Commerce	Services	Total
1981 – 1985	4,680	15,066	703	10,963	8,903	13,311	53,626
1986 – 1990	15,016	30,070	1,316	15,178	18,469	20,754	100,803
1991 – 1995	65,781	142,340	14,797	13,038	53,044	89,462	378,462
1996 – 2000	160,459	508,849	115,481	0	123,217	750,945	1,658,950
2001 – 2005	294,099	1,418,825	540,211	0	153,483	4,050,162	6,456,781
2006 – 2010	569,433	3,847,266	3,957,963	1,915,246	2,527,579	18,938,273	31,755,760
2011 – 2912	489,128	2,101,859	2,866,295	1,086,627	1,759,563	6,897,454	15,200,927
1981 – 2012	1,598,596	8,064,275	7,496,766	3,041,052	4,644,258	30,760,361	55,605,308

Source: Researchers' computations based on data from CBN Bulletin (various issues)

The sectoral distribution of commercial bank loans and advances in Nigeria is summarized in Table 1 above.

A total of N55, 605,308m of credit was disbursed by deposit money banks in Nigeria during the period 1981 to 2012. Out of this amount, about N1,598,596m went to agriculture, N8,064,275m went to the manufacturing sector, N7,496,766m was for the mining and quarrying sector, N3,041,052m was disbursed to real estate and construction sector, N4,644,258m went to general commerce and N30, 760,361m to the service sector including government services. These represent about 2.87 percent, 14.50 percent, 13.48 percent, 5.47 percent, 8.35 percent and 55.32 percent respectively, of the total sum disbursed over the period 1981 to 2012. Thus during the period under review, the service sector including government services was the most preferred sector while the agricultural sector was the least preferred sector in the distribution of credit by deposit money banks in Nigeria.

3. Literature Review

The allocation of financial resources in every economy follows not only economic reasoning but also sectoral considerations. In the course of ensuring efficient allocation of funds, the Central Bank through credit guidelines, directs credit to certain sectors of the economy. Schumpeter (1934) argues that efficient allocation of savings through the identification and extension of credit to entrepreneurs with the best chances of successfully implementing innovative products and production process accelerates output growth in the long-run. To Schumpeter, financial intermediation serves as a useful tool for increasing the productive capacity of the economy.

Through bank lending, the financial institutions play a major role of mobilizing domestic savings and fostering investment thereby promoting productivity. Financial institutions help mobilize savings and provide payments services that facilitate the exchange of goods and services. In addition, they produce and process information about investors and investment projects to enable efficient allocation of funds; to monitor investments and exert corporate governance after those funds are allocated; and to help diversify, transform, and manage risk (World Bank, 2008). Through the various mechanisms provided by financial institutions and markets there is increase in output and income in the economy. A vital ingredient for output growth in an economy is the availability of credit which is through the intermediation role provided by the financial system. Bank lending is the amount of loans and advances given by the banking sector to economic agents. It is the most profitable source of income to banks since the interest rates realized on loans are above those realized on investments.

Considering the relationship between bank lending and output growth such as finance-led growth, it is

well known that through bank lending, savings are channeled into productive investments thereby facilitating output growth. King and Levine (1993) show that finance seems important to lead economic growth. Other studies have also confirmed the relationship between finance and economic growth (Levine, 2004; Franklin & Oura, 2004; Eatzaz & Malik, 2009). In a study by Habibullah and Eng (2006) using 13 Asian developing countries, they lend support to the old Schumpeterian hypothesis and agree with other causality studies by Calderon & Liu (2003), Fase & Abma (2003) and Christopoulos & Tsionas (2004). Despite a handful of studies that confirm the relationship between finance and growth some studies report otherwise. Lucas (1988) argues that economists have exaggerated the role of finance in economic growth. In his view, banks only respond inactively to industrialization and economic growth. Favara (2003) using panel estimation technique reports that the relationship between financial development and economic growth is at best weak because finance does not have a first order effect on economic growth. Oluitan (2007) examines the significance of bank credit in stimulating output and the factors that prompt financial intermediation within the Nigerian economy over the period 1970-2005. She uses the Johansen Cointegration and Error Correction Model to provide evidence that although, a long run equilibrium relationship exists between private sector credit and economic growth, real output causes financial development, but not vice versa.

The importance of efficiency of the allocation of credit rather than an all bank intermediation have been stressed by studies such as Demirguc-Kunt & Levine, 2008; Beck, Rioja & Valev, 2009; Levine, 2002; and Boyreau-Debray, 2003. They emphasized that lending to the public sector is prone to waste and politically motivated programmes which may not serve the interest of the populace, it is weak in generating growth in an economy.

It is worthwhile to note that most of the studies on the role of bank lending in output growth were conducted in the developed economies. Limited studies exist in the developing/ emerging economies (especially in Nigeria), thereby creating a huge knowledge gap. Also, previous studies on the impact of bank lending on output growth in Nigeria have neglected the sectoral allocation of bank credit in their analysis. This study intends to reduce these knowledge gaps by examining the impact of bank lending on output growth in Nigeria (using sector level productivity and bank lending data), specifically to ascertain whether bank lending has any impact on output growth of the various sectors (namely; agriculture, manufacturing, and mining and quarrying sectors).

4. Model, Data and Estimation Technique

4.1 *Model and Data*

The main objective of this study is to examine the impact of bank lending on output growth in Nigeria, specifically to ascertain whether sector level bank lending has any impact on output growth of the various sectors (specifically; agriculture, manufacturing, and mining & quarrying sectors). For this purpose we adopt a modified model in Shabri, M. and Majid, A. (2008). Our preferred model is represented as equation 1 below:

$$gr_{it} = a_o + a_1 BNK_{it} + a_2 CTR_{it} + \varepsilon_{it} \qquad (1)$$

Where gr is output growth measured by industrial production index, BNK is bank lending measured as ratio of commercial bank loans and advances to Gross Domestic Product (GDP), CTR is the control variables like inflation rate, human capital and interest rate, 'i' is the activity sector (namely; agriculture, manufacturing, mining and quarying),'t' is the time period, a_0 is the constant term while the random error term ε captures the impact of other variables not included in the model. Theoretically, we expect the sign of α_1 to be positive *w*hile α_2 is be negative for inflation, positive or negative for interest rates, and positive for human capital. Data for this study were obtained from secondary sources. Specifically, data on the hypothesized variables from 1981 to 2012 were obtained. They were collected from the various issues of the Central Bank of Nigeria's (CBN's) Statistical Bulletin and publications of the National Bureau of Statistics.

4.2 *Panel unit root test*

In trying to establish the long run relationship among the variables of equation (1), we use annual data from three selected sectors over the period 1981 to 2012 periods. Since the model uses panel data, in order to avoid spurious results obviously we must establish the stationary properties of the variables using panel unit root tests and the long run relationship among all the variables using panel cointegrating tests. Different types of panel unit root tests are used. Levin, Lin and Chu (2002) (LLC) test assumes a common unit root process, $\rho_i = \rho \forall_i$. Im, Pesaran, and Shin (2003) (IPS) test, Fisher type ADF and PP tests, presented by Maddala and Wu (1999), and Pesaran (2007) test allow for an individual unit root processes. The Levin, Lin and Chu (2002) panel unit root test model is specified as;

$$\Delta y_{it} = \alpha_i + \tau_t + \rho y_{it-1} + \varsigma_{it} + v_{it} \qquad (2)$$

The equation (2) can be augmented to account for serial correlation assuming that all series have the same ρ under the alternative hypothesis. The augmented equation is as:

$$\Delta y_{it} = \alpha_i + \tau_t + \rho y_{it-1} + \sum_{i=0}^{n} \lambda_{ij} \Delta y_{it-j} + \varsigma_{it} + v_{it} \qquad (3)$$

The null hypothesis is $H0: \rho = 0$ and alternative hypothesis is $H1: \rho < 0$

Pesaran's (2007) test is based on a regression

$$\Delta y_{it} = \rho y_{i,t-1} + \eta_i t + \alpha_i + \delta_i \theta_t + \varepsilon_{it} \qquad (4)$$

Where $\alpha_i s$ are individual constants, $\eta_i t$ are the individual time trends, θ_t is common time effect, whose coefficients (δ_i) are assumed to be stochastic and they measure the impact of the common time effect on the series i. $\varepsilon_{it} \sim i.i.d.N(0, \sigma^2)$, over time and ε_{it} is independent of ε_{js} and θ_s for all $i \neq j$ and s, t.

Cross-sectional dependence is allowed through the common time effects which are proxied by the cross-section mean of y_{it} ($\bar{y}_t = N^{-1} \sum_{j=1}^{n} y_{it}$) and its lagged values, $\bar{y}_{t-1}$, $\bar{y}_{t-2}$ etc. The null hypothesis is that $Ho: \rho_i = 0 \forall_i$ and alternative hypothesis allows for some of the tested series to be non-stationary.

4.3 *Panel cointegration test*

The panel unit root tests aim to assess the order of integration of the variables. If the main variables are found to be integrated of order one, then we should use panel cointegration tests to address the non-stationarity of the series. Some of these tests were developed as extensions of earlier tests for time series data. Pedroni (1999, 2004) provides cointegration tests for heterogeneous panels based on the two-step cointegration approach of Engle and Granger (1987). Pedroni uses the residuals from the static (long-run) regression and constructs seven panel cointegration test statistics: four of them are based on pooling (within-dimension or 'panel statistics test'), which assumes homogeneity of the AR term, whilst the remaining are less restrictive (between-dimension or 'group statistics test') as they allow for heterogeneity of the AR term. The assumption has implications on the computation of the second step and the specification of the alternative hypothesis. The *v*-statistic is analogous to the long-run variance ratio statistic for time series, while the *rho*-statistic is equivalent to the semi-parametric 'rho' statistic of Phillips and Perron (1988). The other two are panel extensions of the (non-parametric) Phillips-Perron and (parametric) ADF *t*-statistics, respectively. These tests allow for heterogeneous slope coefficients, fixed effects and individual specific deterministic trends, but are only valid if the variables are I(1). Pedroni (1999) derived critical values for the null hypothesis of no cointegration.

Kao (1999) proposes residual-based DF and ADF tests similar to Pedroni's, but specifies the initial regression with individual intercepts ('fixed effects'), no deterministic trend and homogeneous regression coefficients. Kao's tests converge to a standard normal distribution by sequential limit theory (Baltagi, 2008). Both Kao and Pedroni tests assume the presence of a single cointegrating vector, although Pedroni's test allows it to be heterogeneous across individuals.

Maddala and Wu (1999) propose a Fisher cointegration test based on the multivariate framework of Johansen (1991). They suggest combining the *p*-values of individual (system-based) cointegration tests in order to obtain a panel test statistic. Moreover, Larsson, Lyhagen and Löthgren (2001) suggest a likelihood ratio statistic (LR-bar) that averages individual rank trace statistics. However, the authors find that the test requires a large number of temporal observations. Both of these tests allow for multiple cointegrating vectors in each cross-section. The Johansen –Fisher combined cointegration allows using a mixture of I(1) and I(0) variables in the test (Johansen, 1995). Hence, this may indicate that conducting the panel cointegration test, using a set of panel data variables which have different orders of integration, would not create biased results. Fisher-type test can be defined as

$$-2\sum_{i=1}^{N} \log(\theta_i) \rightarrow \chi^2 2N \qquad (5)$$

Where θ_i is the p-value from an individual Johansen cointegration test for cross-section i.

Westerlund (2007) suggests four cointegration tests that are an extension of Banerjee, Dolado and Mestre (1998). These tests are based on structural rather than residual dynamics and allow for a large degree of heterogeneity (e.g. individual specific short-run dynamics, intercepts, linear trends and slope parameters). All variables are assumed to be I(1). Moreover, bootstrapping provides robust critical values in cases of cross-section dependence. The tests assess the null hypothesis that the error correction term in a conditional ECM is

zero – i.e. no cointegration ((Baltagi, 2008). Although, these tests allow for cross-sectional dependence via the effects of short-run dynamics, they do not consider long-run dependence, induced by cross-sectional cointegration (Banerjee, Marcellino and Osbat; 2004). In that case, panel cointegration tests may be significantly oversized (Baltagi, 2008). Moreover, most cointegration tests may be misleading in the presence of stationary data, as they require all data to be I(1).

In estimation of Cointegrated Panel data, several estimators have been proposed. Probably the most commonly used estimators have been the fully-modified OLS (FMOLS) proposed by Phillips and Moon (1999) and Pedroni (2000), and the dynamic OLS (DOLS) proposed by Kao and Chiang (2001). The major problem for estimators in cointegrated panel data has been the modeling of simultaneous cross- sectional and time series dependence (Phillips and Moon, 1999).

5. Results and Discussion

5.1 *Unit root test*

To determine the stationarity of the data we utilize the Levin, Lin and Chu (LLC) and Im Pesaran and Shin (IPS) panel unit root test procedures. The results are reported in Table 2.

Table 2: Panel Unit Root Test Results

	LLC			
	Level		First Difference	
Variables	No Trend	With Trend	No Trend	With Trend
$\ln IPI$	0.07397 [0.4705]	0.34334 [0.6343]	-3.39505 [0.0003]	-2.01542 [0.0219]
$\ln BNK$	-0.18360 [-0.4272]	-0.66259 [0.2538]	-4.50401 [0.0000]	-3.84141 [0.0001]
$\ln \text{inf}$	-6.03187 [0.0000]	-5.59904 [0.0000]	-10.0349 [0.0000]	-8.69695 [0.0000]
$\ln \text{int}\, r$	-5.58684 [0.0000]	-5.59904 [0.0000]	-8.34097 [0.0000]	-6.6974 [0.0000]
$\ln hc$	0.52255 [0.6994]	1.84855 [0.9677]	-5.97875 [0.0000]	-4.7346 [0.0000]
	IPS			
$\ln IPI$	0.80631 [0.7900]	-0.20275 [0.4197]	-5.47375 [0.0000]	-4.3941 [0.0000]
$\ln BNK$	1.17966 [0.8809]	-0.83909 [0.2007]	-4.3219 [0.0000]	-3.11253 [0.0009]
$\ln \text{inf}$	-4.24798 [0.0000]	-3.78116 [0.0000]	-9.28492 [0.0000]	-8.2742 [0.0000]
$\ln \text{int}\, r$	-4.22265 [0.0000]	-3.98190 [0.0000]	-9.37567 [0.0000]	-8.40483 [0.0000]
$\ln hc$	1.72065 [0.9573]	0.79843 [0.7877]	-5.24994 [0.0000]	-4.08109 [0.0000]

From the Table 2, it can be seen that all the variables with the exception of inflation and interest rates are stationary at the first difference in both test procedures. This indicates that there is evidence of long run relationship. However, we cannot rely on unit root test for long run relationship, we need to conduct panel cointegration test with the procedure that combine the variables that are integrated of order one and zero. For this, we rely on Johansen Fisher combined panel cointegration tests to test for long-run relationship among the variables. The Johansen –Fisher combined contegration test allows for mix order of integration which tests the null hypothesis of r-cointegration relationships against the alternative of (r+1) relationships (Mitze, 2010). This allows us to study more carefully the likely number of cointegrated variables in the system compared to residual based single equation approaches as in Kao (1999). Depending on the results, we are then able to move on and specify different regression models which are capable of estimating non-stationary panel data models including information in levels and first differences. The lag selection is determined by AIC and the maximum length is 3. The results of this test are reported in Table 3.

Table 3: Panel Cointegration results (1981 -2012)

Johansen-Fisher Combined Test (Maximum lag = 3)				
Hypothesized No. of Ces	Fisher Stat* (from trace test)	P-value	Fisher stat (from max-eigen test	P-value
$r \leq 0$	114.4*	0.0000	88.17*	0.0000
$r \leq 1$	76.44*	0.0000	69.11*	0.0000
$r \leq 2$	29.10*	0.0001	20.04*	0.0027
$r \leq 3$	14.84**	0.0216	11.69***	0.0682
$r \leq 4$	13.36**	0.0377	13.36**	0.0377

Note: r = rank, *, **and, *** denote significance level at 1%, 5% and 10%

From Table 3, it can be seen that the Johansen-Fisher combined (trace test) test rejects the null hypothesis and shows that there is evidence of stable cointegration relationship for the variables. However, looking at the p-value of based Fisher statistics for Johansen maximum eigenvalue test the results are not ambiguous indicating statistical support for the existence of cointegration relationship between the four variables.

5.2: *Estimated Coefficients of Cointegrated Panel Data*

In this section we utilize panel FMOLS estimation technique. The FMOLS adjusts for the temporal dependencies of the data by directly estimating the various nuisance parameters semi-parametrically. The presence of autocorrelation is tested and it is found that there is no presence of first order autocorrelation and the residual is not normally distributed (Jaqua-Berra statistics is 6.677360 with p-value 0.035484). In the estimation we used weighted estimation, Bartlett kernel and integer Newey-West fixed bandwidth. The results are reported in Table 4.

Table 4: Long run Estimates

Variables	Coefficients	P-values
$\ln BNK$	-0.08557	-3.54208 [0.0006]
$\ln \inf$	0.030010	0.858651[0.3929]
$\ln \text{int}\, r$	0.135631	2.982209 [0.0037]
$\ln hc$	0.017727	9.009891 [0.0000]
$R^2 = 0.66$	$\overline{R}^2 = 0.64$	

Note: the figures in bracket are the p-values.

In Table 4 it is seen that bank lending impacts negatively on the sectors under consideration namely agriculture, manufacturing and mining and quarrying. This indicates that bank lending to these sectors is less, or not enough to improve output of these sectors during the period under review. This is probably because; the banks are not complying with monetary policy or government objectives. The total loan to the three sectors was 30.86% of the loan to all the sectors between the period 1981- 2012. The loan to these sectors is much smaller compared to loan for service sector alone. Inflation rate has positive effect on output growth of the sectors but not significant. Interest rate's effect on output growth is indeterminate (i.e. it can be negative or positive). As the demand for output grows the more the firms demand for loan to meet the increasing demand for their output rises and so is the rise in interest rate. Also, as the demand decreases, the demand for loan also declines. The positive impact of interest rate on the output of these sectors can be explained by the fact the small volume of loan available attracts high interest rate as the demand for it increases. This is coupled with the fact that the banks do not meet the monetary policy objectives on sector lending. The coefficient of human capital measured by secondary school enrolment agrees with theory and is highly significant at 1% level. This indicates that output growth is not only the function of finance as most firms do show but also a function of human capital (i.e. labour embodied with knowledge). Mere finance cannot perform magic without the human capital which manages the finance and other materials to produce the desired output.

This study has some policy implications. The expansion needed to boost output growth is hampered by financial constraints. The financial institutions are not much willing to advance loans to the manufacturing, agriculture and mining and quarrying sectors. This limits the productivities of these sectors and thus low economic growth in general. The only way out is the government intervention to increase the volume of credit that goes to these sectors and persuade the financial institutions to comply with monetary policy objectives. As agriculture is not supported financially, means more food insecurity and hunger ahead. More food importation is expected in the future leading to depletion in foreign reserve. Also low productivity in manufacturing and mining and quarrying means that our export base is limited instead. This makes Nigeria to be consuming nation rather than exporting nation.

The high interest rates on loans do also limit the productivity of these sectors as investors may not ask for higher volume loan. The higher interest rates may be due to high budget deficit or current account deficit in economy leading to crowding out of private sectors, where most of productivity is being expected. Reduction in budget or current account deficit will drive interest rates down and allows the private sectors to actively participate in productivity growth.

6. Summary and Conclusion

The objective of this paper is to examine the impact of bank lending on the output growth in Nigeria. The analysis does indicate that the bank loan to the sectors considered is small to lead to output growth or productivity in Nigeria. This inability of these sectors to expand productivity is due to financial constraints made possible by high interest rates charged by financial institutions. Human capital seems to be the only driver of the productivity or output growth in Nigeria. This knowledge is very important to all the sectors for productivity growth. To ensure continuous productivity growth labour needs to be retrained on relevant skills required.

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