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Original Research Article

A Time Series Study of Financial Sector Development and Original Sin in Nigeria

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Abstract

This study examined financial sector development and original sin in Nigeria financial market. Time series data was sourced from Central Bank of Nigeria Statistical Bulletin from 1990-2023. Original sin measured by Nigeria external debt per exchange rate, Capital market development as market capitalization to gross domestic product, Foreign exchange market as variation in naira exchange rate per US Dollar, banking sector development as percentage total bank assets to gross domestic product, money market development as insurance total assets to gross domestic product, Money market development as value of money market instrument to gross domestic product. The study employed descriptive statistics and multiple regression models to estimate the relationship that exists between the dependent and independent variables. The null Hypotheses (H_0) were tested at 0.05 level of significance, Ordinary Least Square (OLS), Augmented Dickey Fuller Test, Johansen Co-integration test, normalized co-integrating equations and parsimonious vector error correction model were used to conduct the investigations and analysis. The study found that 57.0% variation on original sin can be traced and explained by variation on the independent variables as formulated in the regression model. However, the F-Statistics and the F-probability justifies that the model is significant and adequate in explaining variation on the dependent variable. The β coefficient shows that capital market development have negative effect on original sin, foreign exchange market have positive effect on original sin, banking sector development have negative effect on original sin, insurance sector development and money market development have positive effect on original sin. From the findings, the study concludes that the independent variables determine positively and negatively original sin in Nigeria. We recommend that the need for policies to deepen the capital market as this can cushion the effect of the negative effect of external borrowing and domiciled in Nigeria currency rather than international currency. There should be institutionalized policies to enhance the value of the naira against other international currencies as this can reduce the pressure of exchange rate variation in international debt and international monetary environment. Public expenditure should be directed to the productive sector of the economy as this can enhance the productive capacity of the economy and reduce the negative effect on balance of payment and other macroeconomic variables. Policies should be advanced to reduce external borrowings; this can reduce the debt burden and reduce the incidence of original sin in the financial market.

Keywords: Original Sin, Financial Sector Development.

INTRODUCTION

Original sin phenomenon is first introduced by Eichengreen and Hausmann (1999) to define the situation of inability of countries to borrow abroad in their own currency or to borrow long term even domestically. After its introduction, consequences, determinants and the possible solutions of the problem are widely discussed in the international finance literature. Original sin has important consequences that lead to economic instability for emerging countries. It results in mismatches on the national balance sheets, hence movements in exchange rates and interest rates have aggregate wealth effects. The wealth effects limit the effectiveness of monetary policy (Aghion, Bacchetta & Banerjee, 2001; Cespedes, Chang & Velasco, 2002).

In the existence of high levels of foreign debt, central bank tries to limit the exchange rate volatility. Emerging financial markets cannot benefit from the exchange rate flexibility compared to their advanced counterparties.

Financial markets with original sin are more vulnerable to economic shocks and effects of shocks are more persistent for these countries. In addition, original sin is associated with lower credit ratings that limit the access to capital markets or aggravate the terms of borrowing. All of these factors adversely affect the growth prospects and results in higher volatility of output and capital flows (Eichengreen, Hausmann & Panizza, 2007). One important consequence of original sin is the resulting currency and maturity imbalances in the economy. In the countries with original sin, the economic agents could not find sufficient long-term local currency sources to fund their investments. This results in reliance on short term or foreign currency denominated debt to finance these investments (Burger & Warnock, 2003). Foreign currency debt may lead to significant currency mismatches in the balance sheets of the agents given that the revenues arising from investments undertaken are generally in local currency. If most of the economic agents face with currency mismatches in their balance sheets then the country may accumulate net foreign debt (Burger & Warnock, 2003). On the other hand, if a firm chooses to finance its needs using short-term local currency funds, another source of vulnerability could arise: maturity mismatches.

It is well established in both theoretical and empirical literature that financial development is generally good for growth. It entails the wider use of existing financial instruments as well as the creation and adoption of new ones for intermediating funds and managing risk (Chami, Fullenkamp & Sharma 2010). With external demand and financing conditions significantly worsening, and a much less favorable growth outlook for the country, identifying untapped or underutilized sources of growth and reducing the volatility of that growth have become even more urgent. While debates have revolved around whether financial development is an engine for growth or just a lubricant, any factor that can significantly ameliorate growth prospects for the country is worth examining in detail. Theoretically, financial development positively affects growth through several channels that are important for Nigeria. First, it helps catalyze savings into more usable forms, and supports efficient allocation of capital and enhancement of total factor productivity. Second, it supports diversification and management of risk. Third, it reduces information asymmetries, and transaction and monitoring costs. Fourth, it can reduce volatility of the economy by providing a variety of instruments and information to help households and firms cope with adverse shocks through consumption and investment smoothing. Levine (2005), in a comprehensive review of the literature, found a robust linkage between financial development and growth.

Furthermore, the index combines an assessment of countries' financial institutions such as banks, insurance companies, mutual funds, and pension funds and financial markets (stock and bond markets). It therefore captures the fact that financial services are provided by a multitude of financial institutions, and that markets have developed in a way that allows individuals and firms to diversify their savings, and that allows enterprises to raise capital beyond bank loans. As financial markets are relatively underdeveloped and institutions are dominated by banks in many countries of the region, the index therefore captures the gap in financial services better than a one-dimensional measure such as private credit to gross domestic products. Both financial institutions and markets are assessed based on depth (size and liquidity of markets), access (ability of individuals and companies to access financial services), and efficiency (ability of financial institutions to provide financial services at low cost and with sustainable revenues, and at the level of activity of capital markets). By including indicators of profitability, the efficiency dimension of the index captures that, despite strong growth in assets, the financial system in sub-Saharan Africa still lags behind other regions in terms of competition (World Bank 2012). This dimension, along with the aspect of access, therefore gives an indication of the quality of the financial sector. This composite index suggests that financial development in sub-Saharan Africa has been lackluster over the past three decades, although there has been some modest acceleration over.

There is growing awareness that a major reason why emerging economies are more prone to financial crises than mature economies is the atypical composition of their debt. Many emerging economies are bound indeed to borrow in foreign currency, short-term or at indexed interest rates. In this respect, literature has focused mainly on external debt composition, especially the inability of emerging economies to borrow in international capital markets in their domestic currency, the so-called international dimension of "original sin".1. However, domestic debt has also become increasingly instrumental in assessing the financial vulnerability of emerging economies owing to its sheer size and swift growth. Indeed, some of the major financial crises affecting emerging economies in recent years have been linked to risky domestic debt composition pertaining to, inter alia, maturity mismatches, rollover risks and contingent interest payments. For these reasons, risky domestic debt composition in emerging economies is increasingly high on the policy agenda.

The domestic dimension of original sin, namely the inability of emerging economies to borrow domestically in local currency at long maturities and fixed interest rates, which makes domestic debt composition risky, has received little attention. The literature on risky domestic debt composition in emerging economies remains scant, indeed, and data availability is poor. Hausmann and Panizza (2003)

examined financial vulnerabilities arising from domestic original sin. They find that monetary credibility, as measured by lower inflation and the imposition of capital controls helps explain domestic original sin. However, their empirical analysis is based on a theoretical framework originally developed to explain international original sin only and on a small sample of country-observations. Determinants at work in shaping the composition of public debt in emerging economies are multifaceted. They pertain to the soundness of macroeconomic policies (both on the fiscal and monetary front), to sovereign debt management (namely the slope of the yield curve) and to the financial environment including the size of the local investor base as well as political economy considerations.

Original sin results in currency mismatches that increase the vulnerability of countries to external shocks and it diminishes the effectiveness of monetary policy during these shocks. High level of foreign currency debt lowers the reputation of countries which is reflected in the lower credit ratings. Investors hesitate to lend those lower rated countries in local currencies due to inherited currency risks. Hence, the problem creates a vicious cycle which is more difficult to overcome. Almost all countries around the world suffer from the problem to some extent. Thus, it is important to determine the reasons for the phenomenon. In the economy literature different theories are discussed in order to identify underlying reasons of the phenomenon. The first set of explanations focus on weaknesses in policies and institutions. It is argued that countries without strong institutions and policies have difficulties in terms of satisfying investor`s confidence.

The first set of explanations focus on weaknesses in policies and institutions. It is argued that countries without strong institutions and policies have difficulties in terms of satisfying investor`s confidence. The second hypothesis suggests that countries with higher level of development suffer less from the phenomenon. Third theory uses monetary credibility to explain the original sin problem. Expectancy of high inflation diminishes the willingness of investors to invest in the local currency instruments. Choice of exchange rate policy is also given as a reason for the original sin. There are two different approaches to link the exchange rate policy with original sin. Some researchers argued that flexible exchange rate results in higher original sin for the countries while others support that fixed exchange rate regime creates moral hazard problem that leads to higher original sin.

Another approach is originated from fiscal solvency perspective. According to this school of thought, countries that face high levels of indebtedness have difficulties in finding local currency external debt. Another school of thought suggests that financially underdeveloped countries have difficulties to build good reputation for their currencies. Hence it is difficult for them to find local currency debt in the international markets. According to some other discussions in the literature, past and current trade volumes of the countries determine the preferred currencies. Therefore, there should be a link between trade volume and original sin. Other studies focus on credit market imperfections and poor contract enforcement. In these studies it is argued that investors hesitate to take currency risks of countries that do not have strong legal infrastructure or do not establish creditor rights. Real exchange misalignments can be an indicator of government incentives to manipulate exchange rate. Therefore investors are reluctant to lend in local 70 currencies where there is a possibility of exchange manipulation. Financial integration is considered as another plausible explanation for the phenomenon. Since financial integration enables circulation of local currencies, higher integration may lead to lower original sin. Finally, absolute size of the country is linked to original sin phenomenon by some researchers. This study focused on financial sector development and original sin in Nigeria.

LITERATURE REVIEW

Original sin

Original sin phenomenon is first introduced by Eichengreen and Hausmann (1999) to define the situation of inability of countries to borrow abroad in their own currency or to borrow long term even domestically. After its introduction, consequences, determinants and the possible solutions of the problem are widely discussed in the international finance literature. Original sin has important consequences that lead to economic instability for emerging countries. It results in mismatches on the national balance sheets, hence movements in exchange rates and interest rates have aggregate wealth effects. The wealth effects limit the effectiveness of monetary policy (Aghion, Bacchetta and Banerjee, 2001; Cespedes, Chang and Velasco, 2002). In the existence of high levels of foreign debt, central banks try to limit the exchange rate volatility. Therefore, emerging countries could not benefit from the exchange rate flexibility compared to their advanced counterparties.

Countries with original sin are more vulnerable to economic shocks and effects of shocks are more persistent for these countries. In addition, original sin is associated with lower credit ratings that limit the access to capital markets or aggravate the terms of borrowing. All of these factors adversely affect the growth prospects and results in higher volatility of output and capital flows (Eichengreen, Hausmann and Panizza, 2007). One important consequence of original sin is the resulting currency and maturity imbalances in the economy. In the countries with original sin, the economic agents could not find sufficient long-term local currency sources to fund their investments. This results in reliance on short term or foreign currency denominated debt to finance these investments (Burger and Warnock, 2003). Foreign currency debt may lead to significant currency

mismatches in the balance sheets of the agents given that the revenues arising from investments undertaken are generally in local currency. If most of the economic agents face with currency mismatches in their balance sheets then the country may accumulate net foreign debt (Burger and Warnock, 2003). On the other hand, if a firm chooses to finance its needs using short-term local currency funds, another source of vulnerability could arise: maturity mismatches.

Determinants of Original Sin

Level of the debt burden

Public indebtedness gives rise to a time inconsistency problem, as governments may have an incentive to reduce debt service costs by reneging on their promise to pay back investors, either through inflation, unexpected changes in interest rates, explicit taxation, or outright default. However, the maturity and composition of debt can help enforce time consistency. Clearly, issuance of inflation-indexed domestic debt reduces incentives to inflate debt obligations away (Leong, 1999). Relatedly, Missale and Blanchard (1994) argued that governments may be reluctant to inflate their debt away if reputation costs are high. Given that the gain from inflating debt away increases with both the level of debt and its maturity, they show that the maximum maturity consistent with a credible pledge to price stability decreases with the level of debt. In other words, governments will tend to have a shorter maturity debt composition to enhance credibility when the debt burden is high, but not necessarily at low levels. In a similar vein, Drudi and Giordano (2000) developed a model where the relation between the level and maturity of debt depends on both inflation and default risk. The relation is negative at low levels of debt, reflecting lender concerns that debt may be inflated away as it becomes larger, but also at high levels, because the default risk premium becomes then too large for governments to issue long-term debt. In the intermediate range, the relation is positive, as governments try to reduce refinancing risk by lengthening debt maturity.

Monetary Credibility

Monetary credibility is conducive to the deepening of domestic debt markets, as suggested by Burger and Warnock (2003), who find that the ratio of domestic debt to total (including international) debt is higher in countries with lower and less volatile inflation. There is additionally evidence that price stability can change the composition of public debt and make it less risky. Indeed, Falcetti and Missale (2002) attribute the rise in the share of fixed rate bonds and loans in central government debt of twenty OECD countries from the mid-1980s to increased central bank independence, in turn reflecting growing investor confidence in long-run price stability. Likewise, Hausmann and Panizza (2003) find that monetary credibility, as measured by lower inflation and the imposition of capital controls are associated with lower domestic original sin in emerging economies. The possible persistence of domestic original sin long after disinflation has been achieved suggests, however, that monetary credibility is not necessarily restored immediately. Persistence of creditor fears that debt might be inflated away can prevent governments from issuing long-term bonds durably, thereby pointing to a potential "credibility barrier" (Jeanne, 2003). Turning to capital controls, the negative correlation with domestic original sin found by Hausmann and Panizza (2003) – albeit in a small sample of 21 country-observations – suggests that such restrictions may force residents to hold longterm domestic currency denominated bonds by narrowing the range of alternative funding or investment opportunities. However, this may not be so clear cut. Indeed, the lifting of capital controls could also be expected to help reduce domestic original sin, for instance, by contributing to a widening of the investor base to foreigners.

Slope of the Yield Curve

An important objective of a large number of public debt managers is to ensure that government financing needs and payment obligations are met at the lowest possible cost over the medium to long run in line with a prudent degree of risk (IMF and World Bank, 2003; see also Missale, 1999, Leong, 1999, as well as Wolswijk and de Haan, 2005). The trade-off between costs and risks is familiar to private sector portfolio managers. Admittedly, there are a number of considerations specific to governments which make it difficult to use corporate finance theory as a framework, not least because they may have other objectives than wealth maximization. This notwithstanding, many countries have explicitly adopted private sector practices in government debt management (Leong, 1999). In theory, and given the existence of term premia, issuing short-term debt is cheaper than issuing long-term debt. As a result, taking a short-run cost perspective, an optimal policy is to borrow short-term and rollover debt (ibid.). In particular, an upward-sloping yield curve (i.e. a lower cost of funding at its short end than at its long end) tends to be associated with higher short-term borrowing and, hence, higher original sin. This said, refinancing risk is higher for short-term debt and frequent refinancing implies a larger risk of facing higher interest rates. Therefore, governments face a trade-off between cheaper funding costs, which tilts the duration towards short-term maturities, on the one hand, and refinancing risk, which tilts the duration towards longer-term maturities, on the other (Broner, Lorenzoni and Schmukler, 2004).

Size of the Investor Base

A larger local base of institutional investors, as a result of pension system and capital market reforms, can contribute to the deepening of domestic debt security markets (IMF, 2002 and 2003). The introduction of a fully-funded pension system is of particular relevance in this regard, as pension funds have an interest in debt securities carrying low default risk and denominated in domestic currency (Borensztein *et al*., 2004). This may

also apply, to some extent, to domestic mutual funds. Reflecting these considerations, Claessens, Klingebiel and Schmukler (2003) found that countries with larger domestic investor bases have larger domestic currency bond markets, while smaller economies rely more on foreign currency bonds. A larger investor based can therefore be expected to contribute to lessen domestic original sin.

Political Economy Considerations

There is evidence that political stability and respect for the rule of law tend to be associated with a larger share of domestic public debt in GDP (Borensztein *et al*., 2004). This is in line with studies pointing to a correlation between the size of the domestic bond market and variables pertaining to political economy considerations, including rule of law and democracy (Claessens, Klingebiel and Schmukler, 2003; Burger and Warnock, 2003). This suggests that democracy is important in the eyes of investors, perhaps as it is associated with greater public credibility, better decision-making and wider acceptance of the overall policy-making process, including at the macroeconomic level. More specifically, Miller (1997) showed that political instability triggers inflation uncertainty and a steeper slope of the yield curve, ultimately leading to a reduction in debt maturity. In this respect, political stability can therefore be expected to help lower domestic original sin.

International Dimension of Original Sin

In the previous section the discussions indicate that most of the countries issue debt securities in one of the top five currencies. In other words, most of the countries have difficulties to issue debt in their own currencies. This phenomenon is commonly regarded as the international original sin. Measuring International Original Sin: Eichengreen, Hausmann and Panizza (2005) developed three indexes in order to measure the international dimension of the original sin. First indicator of original sin is:

$$\text{OSIN 1} = \text{N1}\ \frac{\text{security issued by country in currency}}{\text{Security issued by country}}$$

This index takes values between zero and one. If a country issues all of its securities in foreign currency then it would get one, if a country issues all of its securities in domestic currency then it would get zero. This index only covers the debt securities. It does not include any hedging instrument. Hedging instruments enable countries to change the original terms of their debt securities. For example if a country issues a bond in foreign currency and swaps it into the local currency, the resulting net cash flows will be in the local currency for 37 the issuer. Hence the currency risk is hedged, and adverse effects of borrowing abroad in foreign currency no longer exist. Therefore an index that captures hedging instruments is a better indicator in terms of measuring original sin. In order to address these problems the authors have developed two other indexes. The coverage problem is handled by introducing Index A.

$$\text{Index A: } \frac{\text{Security and loans issued by country in major currencies}}{\text{Security and loan issued by country}}$$

Index A includes also the debt in the form of loans. The main assumption in this calculation is that all the debt issued in currencies other than five major currencies is denominated in local currency. In order to capture hedging instruments, the authors introduced Index B.

$$\text{Index B: } \frac{\text{security in currency}}{\text{Security issued by country}}$$

However, this measure can take negative values for the countries where the debt issued in local currency is more than the debt issued by the residents of that country. Therefore, the authors developed OSIN3 index where all negative values are substituted with zero.

$$\text{OSIN 3} = \text{MAX}(0, 1)\ \frac{\text{security in currency}}{\text{Security issued by country}}$$

$$\text{OSIN 2} = \frac{\text{index use index a and OSIN3 MEASURES}}{\text{Major currencies are euro, Japanese, yen, Swiss, franc, pounds}}$$

Although this measure has a wider coverage, it is a less precise measure due to data limitations on bank loans. Therefore OSIN1 and OSIN3 are widely used in the related literature. In the following section and rest of this study OSIN3 measure is used for the calculation of original sin and OSIN refers to the OSIN3.

Financial Sector Development

According to Ikikii and Nzomoi (2013) financial development can be understood as a process of financial innovations, and institutional and organizational improvements in the financial system. Combined, the process have the effect of reducing asymmetric information, increasing the completeness of markets and contracting possibilities, reducing transaction costs and increasing competition. Inanga and Emenuga (2007) showed that, the main channel through which the removal of barriers to integration can spur domestic financial development is increased competition with more sophisticated or lower-cost foreign intermediaries. This competitive pressure drives down the cost of financial services for the firms and households of countries with less developed financial systems, and thus expands local financial markets. In some cases, the foreign entrants themselves may supply the additional financial services. The link between financial development and financial integration is of utmost importance, as there is strong evidence that financial development is linked with economic growth (Atoyebi, 2013).

In the literature the term ‘financial development’ is defined as the improvement in quantity, quality and efficiency of financial intermediary services. Financial intermediary means institution that helps

channeling funds between lenders to borrowers. In a broader sense financial development signifies development of the overall financial sector. Financial development and economic growth are thus clearly related, and this relationship has occupied the minds of economists from Smith to Schumpeter, although the channels and even the direction of causality have remained unresolved in both theory and empirics. The majority of this attention has been on its empirical aspect.

The Dual Gap Theory

This theory was propounded by Chenery (1966) who postulates that economic growth depends on investment and that is a function of savings. Omoruyi (2005) stated most economies have experienced a shortfall in trying to bridge the gap between the level of savings and investment and have resorted to external borrowing in order to fill this gap. Ayadi and Ayadi (2008) argue that acquisition of external fund depends on the relationship between domestic savings, foreign funds, investment and economic growth. The dual gap theory is coined from a national income accounting identity which connotes that excess investment expenditure (investment- saving gap) is equivalent to the surplus of imports over export (foreign exchange gap).

Dependency Theory

The dependency theory seeks to outline the factors that have contributed to the development of the underdeveloped countries. This theory is based on the assumption that resources flow from a "periphery" of poor and underdeveloped states to a "core" of wealthy states thereby enriching the latter at the expense of the former. The phenomenon associated with the dependency theory is that poor states are impoverished while rich ones are enriched by the way poor states are integrated into the world system (Todaro, 2003; Amin, 1976).

Dependency theory states that the poverty of the countries in the periphery is not because they are not integrated or fully integrated into the world system as is often argued by free market economists, but because of how they are integrated into the system. From this standpoint a common school of thought is the bourgeoisie scholars. To them the state of underdevelopment and the constant dependence of less developed countries on developed countries are as a result of their domestic mishaps. They believe this issue can be explained by their lack of close integration, diffusion of capital, low level of technology, poor institutional framework, bad leadership, corruption, mismanagement (Momoh and Hundeyin, 1999).

Overhang Debt Theory

This theory was propounded by Krugman (1982) who explained that debt overhang as one whereby the expected repayment amount of debt exceeds the actual amount at which it was contracted. Myer (1977) presented debt overhang as excessive debt that inhibits investment, arising from the fact the benefits derived by the firm using high risky financing accrue largely to existing debt holders instead of shareholders. This theory is built on the principle that if the level of debt will surpass the country's ability to repay with some probability in the future, estimated debt service is expected to be a growing function of the country's output level. Therefore some of the returns obtained through investing in the domestic economy are efficiently taxed away by current foreign creditors and the investment made by domestic and new foreign investors is not encouraged.

Empirical Review

Ettore, Maria and Vinícius (2019) empirical analyzed of 'original sin' for six Latin American countries based on the index (OSIN3) developed by Haussmann and Panizza (2003). This paper finds that the situation for some countries have been improving reflecting a reduction of the index. This fact could be related to recent economic policies related to an 'abstinence' rather than 'redemption', an attitude seen as a response to the debt crisis. Finally, the paper focuses on possible policy alternatives that could be adopted to overcome the 'original sin' phenomenon it includes North-South and South-South cooperation and a multilateral arrangement. However, such alternatives are limited to feasibility mainly due to the turbulent political and economic scenario in the region.

Ocampo (2009) shows how Latin American countries tried to strengthen their external balance sheet from adverse shocks by building up reserves and lowering its levels of debt securities. Brazil and Colombia, for example, went from having 18.1% and 78.8% of reserves as a percentage of liabilities in 2001 to 35.4% and 114.6% respectively. Furthermore, these two countries lowered significantly their liabilities to GDP ratio in their external balance sheets (34.9% to 28.9% for Brazil; 13.8% to 0.9% for Colombia). Both these actors heavily impacted on the OSIN3 index, after all, these countries showed the lowest level of 'original sin' according to our data. This argument reinforces the idea of "abstinence" rather than "redemption", as said before. Also, Liberato, Holland and Vieira (2012) state this downward trend to the OSIN3 index might be due to higher levels of liquidity after the 2001 crisis in the U.S. The authors explain the phenomena relating it to new financial instruments created in response to the low levels of interest rates, both in the U.S. and globally. This scenario enabled emerging countries to issue debt in their own currencies in the international market, which moves through the logic of "money chasing yield". Looking deeply at Argentina, for being the most extreme case in our analysis, Ocampo (2009) also shows how the reverse situation contributed to a stagnation of the Argentinian index. Its liabilities to GDP ratio increased from -0.3% to 29% (2001-2007). The Argentinean case, in particular, due to the crisis that has hit the country in 2001-2002 (the exact period when the liabilities to GDP ratio presented

the biggest increase: from -0.3% in 2001, 19.8% 2002 and 20.1% in 2003).

Gegenfurtner (2021) investigated empirically whether the rather orthodox explanations of Original Sin as examined by Eichengreen *et al.*, (2002) and Hausmann and Panizza (2003) remain invalid, even when investigating a greater timeframe with different trends and, second, elaborates an alternative explanatory approach following Fritz *et al.,* (2018) and de Paula *et al.,* (2017, 2020). The empirical analysis confirms that rather orthodox theories have difficulties in explaining the increased exposure of EMD countries to Original Sin. However, the concept of a currency hierarchy sheds light on the phenomenon. Differences in the liquidity premium between northern and southern currencies and the liquidity preference of investors explain the constraints of southern countries to borrow internationally in their own currency. To climb up the hierarchy of currencies by increasing their liquidity premium is a lengthy and arduous undertaking. One way to achieve this could be by uniting with economic partners, especially in its ultimate form as a currency union.

Du and Schreger (2016b) analyzed the effects of private sector currency mismatches on local currency sovereign debt. They find in their sample of 14 major emerging markets that although sovereigns are increasingly able to borrow internationally in local currency, the private sector remains exposed to Original Sin. Du and Schreger (2016b) therefore argue that the exposure of the private sector forces the sovereign to stabilize the real exchange rate to avoid an increasing real value of the private sector's external debt. This 'fear of floating comprehensively analyzed in Calvo and Reinhart (2000) even goes so far that sovereigns are more inclined to explicitly default than to inflate away the debt because of the effect of depreciation on the private sector" (Du & Schreger, 2016b, p. 2). According to these findings, Original Sin should be correlated with rather *de facto* fixed exchange rate regimes; however, the direction of impact needs to be identified.

Eichengreen *et al.,* (2002) and Hausmann and Panizza (2003) analyze most of these theories dealing with relationships between Original Sin and macroeconomic variables. In their empirical investigation, the potential correlations between Original Sin and the level of development, the economic size of a country, monetary stability, contract enforcement, the quality of institutions, the openness for trade, financial development, domestic credit market imperfections, exchange rate regimes and credit ratings are analyzed. According to the results of both studies, out of all these theories, only economic country size is robustly significantly correlated with the Original Sin index *OSIN* 3. Seeking an explanation, Eichengreen *et al.,* (2002) developed a further theory which states that the portfolio diversification of international investors has an optimum of different currencies. Taking on an additional currency would increase investors' portfolio diversification, though with decreasing marginal benefits (Eichengreen *et al.*, 2002). As a result, there is a limited group of currencies on the international level. Lahet and Prat (2020) further investigate the relationship between Original Sin and the economic size in emerging market countries. To identify non-linearity in the relationship they use a threshold empirical analysis `a la Hansen (1999). Indeed, results indicate non-linearity between the economic size and Original Sin, however, with barely significant threshold values.

Lahet and Prat (2020) were interested in the effects of FX turnovers on Original Sin. Following their argumentation, FX turnovers are a strong indicator for the use of a currency and its internationalization. However, the empirical analysis delivers no significant threshold value. The studies by Fritz *et al.,* (2018) and de Paula *et al.,* (2017, 2020) are distinguished from previous ones. In contrast to most, these studies do not build upon potential relationships between Original Sin and macroeconomic variables. de Paula *et al.,* (2020) try to explain changes in emerging economies' vulnerabilities due to currency mismatches with the help of the concepts of financialization and currency hierarchy. According to the latter concept, most currencies are incapable of performing the basic functions of money (medium of exchange, denomination of contracts and international reserve currency) at the international level (de Paula *et al.*, 2020). Global investors' liquidity preference and the liquidity premium of a currency are thus decisive for the choice of a currency in international debt securities.6 In addition, de Paula *et al.,* (2020) find that temporary overcoming Original Sin due to the seek for attractive yields generates further vulnerabilities. Debt denominated in domestic currency leads in times of distress to capital outflows when the local currency depreciates. The corresponding fall in asset prices increases domestic interest rates which in turn further deteriorates the fiscal situation (de Paula *et al.*, 2020). BIS economists recently labeled this phenomenon as Original Sin redox. Although this is a very interesting field for quantitative research, it is out of the scope of this article.

Gallo *et al.*, (2019) used a similar approach as Fritz *et al.,* (2018) and de Paula *et al.,* (2017, 2020). According to their descriptive analysis and theoretical elaborations, the hierarchy of currencies and the liquidity preference of investors are responsible for Original Sin. Their solution to overcome Original Sin is international monetary co-operation in its ultimate form as a currency union. The stronger and more powerful the currency and the higher the position in the currency hierarchy, the less a country is exposed to Original Sin.

Literature Gap

Ettore, Maria & Vinícius (2019) empirical analyzed of 'original sin' for six Latin American

countries based on the index (OSIN3) developed by Haussmann and Panizza (2003). Ocampo (2009) showed how Latin American countries tried to strengthen their external balance sheet from adverse shocks by building up reserves and lowering its levels of debt securities. Liberato, Holland and Vieira (2012) stated this downward trend to the OSIN3 index might be due to higher levels of liquidity after the 2001 crisis in the U.S. Gegenfurtner (2021) investigated empirically whether the rather orthodox explanations of Original Sin as examined by Eichengreen *et al.*, (2002) and Hausmann and Panizza (2003) remain invalid, Du and Schreger (2016b) analyzed the effects of private sector currency mismatches on local currency sovereign debt. They find in their sample of 14 major emerging markets that although sovereigns are increasingly able to borrow internationally in local currency, the private sector remains exposed to Original Sin. All the above empirical reviews are foreign studies, this study examined factors that determine original sin in Nigeria.

METHODOLOGY

This study adopted the ex-post facto research design approach in analyzing data. Ex-post facto research is systematic empirical inquiry in to a research problem which the researcher does not have direct control of the independent variables because their manifestations have already occurred. Onwumere, (2005) opined that the ex-post facto research design is appropriate when the researcher does not intend to control the variables and as such those variables must have been in existence and had already existed in published form. This study employed secondary data sourced mainly from the Central Bank of Nigeria (CBN) statistical bulletin. The data for the study comprises annual time series data over the periods covered in this study 1990-2022.

Model Specification

The study models are specified below:

OSIN= f (BSD, INSD, FXMD, MMD, CMD) …… (1)

$$OSIN = \alpha + \beta_1 BSD + \beta_2 INSD + \beta_3 FXMD + \beta_4 MMD + \beta_5 CMD + e_i \quad \text{.............................. (2)}$$

Where:

- OSIN = Original sin measured by Nigeria external debt per exchange rate
- BSD = Banking sector development as total bank assets to gross domestic product
- INSD = Insurance sector development as total assets to gross domestic product
- FXMD = Foreign exchange market as variation in naira exchange rate per US Dollar
- CMD = Capital market development as market capitalization to gross domestic product
- MMD = Money market development as value of money market instrument to gross domestic product

Data Analysis Procedure

The main tool of analysis is the Ordinary Least Squares (OLS) using the multiple regression method for a period of 34 years, annual data covering 1990– 2023. Statistical evaluation of the global utility of the analytical model, so as to determine the reliability of the results obtained were carried out using the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test.

Stationarity (Unit Root) Tests

The study investigates the stationarity properties of the time series data using the Augmented Dickey Fuller (ADF) test. According to Nelson and Plosser (1982) and Chowdhury (1994) there exists a unit root in most macroeconomic time series. Therefore subject all the variables to unit root test using the augmented Dickey Fuller (ADF) test specified in Gujarati (2004) as follows.

$$\Delta y_t = \beta_1 + \beta_2 + \delta y_{t-1} + \alpha i \sum_{i-1}^{m} \Delta y_{t-1} + Et \quad \text{.......... (3)}$$

Where:

Δy_t = Change time t

Δy_{t-1} = The lagged value of the dependent variables

Σ_t = White noise error term

If in the above δ =0, then we conclude that there is a unit root. Otherwise there is no unit root, meaning that it is stationary. The choice of lag will be determined by Akaike information criteria.

Co-integration Test (The Johansen' Test)

It has already been warned that the regression of a non-stationary time series on another non stationary time series may lead to a spurious regression. The important contribution of the concept of unit root and co-integration is to find out if the regression residual are stationary. Thus, a test for co-integration enables us to avoid spurious regression situation. This approach is based on conducting unit root test on residual obtained from the estimated regression equation. If the residual is found to be stationary at level, we conclude that the variables are co-integrated and as such has long-run relationship exists among them.

$$OSIN_t = w_O + \sum_{i=1}^{i} \vartheta_t \, CMD_{t-i} + \sum_{i=1}^{j} \varpi_i \, FXM_{jt-i} + \mu_{1t} \quad \text{... (4)}$$

Granger Causality Test

The null hypotheses is rejected if the probability of F* statistic given in the Granger causality result is less than 0.05. Therefore, in this study, we will carry out a granger causality between an independent variables

monetary policy and the dependent variables private sector funding in Nigeria from 1990– 2023.

The pair-wise granger causality test is mathematically expressed as:

$$Y_t \pi_o + \sum_{i=1}^{n} x_1^{\ y}\ Y_{t-1} \sum_{i=1}^{n} \pi_1^{\ x}\ x_{t-1} + u_1 \ldots\ldots\ldots (5)$$

and

$$x_t dp_o + \sum_{i=1}^{n} dp_1^{y}\ Yt-1 \sum_{i=1}^{n} dp1^{x}\ x_{y-1} + V_1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where x_t and y_t are the variables to be tested white u_t and v_t are the white noise disturbance terms. The null hypothesis $\pi_1^y = dp_1^y = 0$, for all I's is tested against the alternative hypothesis $\pi_1^x \neq 0$ and $dp_1^y \neq 0$. if the co-efficient of π_1^x are statistically significant but that of $dp1y$ are not, then x causes y. If the reverse is true then y causes x. however, where both co-efficient of π_1^x and dp_1^y are significant then causality is bi – directional.

Vector Error Correction (VEC) Technique

The presence of co-integrating relationship forms the basis of the use of Vector Error Correction Model. E-views econometric software used for data analysis, implement vector Auto-regression (VAR)-based co-integration tests using the methodology developed by Johansen (1991,1995), the non-standard critical values are taken from Osterward Lenun (1992).

ANALYSIS AND DISCUSSION OF FINDINGS

Table 1: Presentation of Autocorrelation Test

D.W Coefficient	Critical Value	Relationship	Nature of Relationship	Decision
1.207642	1.83 < 2.50	Presence	Negative relationship	Reject H_0

Source: Computed by researcher from E-View Windows (9.0)

E-Views report the Durbin-Watson (DW) statistic as a part of the standard regression output. The Durbin-Watson statistic is a test for first-order serial correlation. More formally, the DW statistic measures the linear association between adjacent residuals from a regression model. If there is no serial correlation, the DW statistic will be around. The DW statistic will fall below if there is positive serial correlation in the worst case, it will be near zero. If there is negative correlation, the statistic will lie somewhere between 2 and 4. Positive serial correlation is the most commonly observed form of dependence. As a rule of thumb, with 50 or more observations and only a few independent variables, a DW statistic below about 1.5 is a strong indication of positive first order serial correlation.

There are three main limitations of the DW test as a test for serial correlation. First, the distribution of the DW statistic under the null hypothesis depends on the data matrix. The usual approach to handling this problem is to place bounds on the critical region, creating a region where the test results are inconclusive. Second, if there are lagged dependent variables on the right-hand side of the regression, the DW test is no longer valid. Lastly, you may only test the null hypothesis of no serial correlation against the alternative hypothesis of first-order serial correlation. The table above test the autocorrelation of the models examined in this study, the shows the presence of negative autocorrelation.

Table 2: Regression Results

Variables	β Coefficient	Std Error	T-Statistics	Prob.
BSD	-0.260022	0.251797	-1.032667	0.3116
INSD	1.386840	0.834636	1.661610	0.0091
FXMD	-0.775371	0.789994	-0.981490	0.3358
CMD	1.620369	0.767639	2.110847	0.0450
MMD	0.090186	0.145356	0.620450	0.5406
C	19.32993	22.22679	0.869668	0.3928
R^2	0.570829	-	-	-
ADJ.	0.484995	-	-	-
F-STATISTICS	6.650363	-	-	-
F-PROB.	0.000459	-	-	-
F-PROB.	0.032180			

Source: Computed by researcher from E-View Windows (9.0)

Analyses of Regression Results

Results proved that 57.0% variation on original sin can be traced and explained by variation on the independent variables as formulated in the regression model. However, the F-Statistics and the F-probability justifies that the model is significant and adequate in explaining variation on the dependent variable. The β coefficient shows that capital market development have negative effect on original sin, foreign exchange market have positive effect on original sin, banking sector have negative effect on original sin, insurance and money market have positive effect on original sin.

Table 3: Unit Root Test Level Series

Variables	ADF	Critical Value			Order of Integration	Prob.	Decision
		1%	5%	10%			
BSD	-5.893036	-3.679322	-2.967767	-2.622989	1(1)	0.0000	Stationary
INSD	-6.586042	-3.689194	-2.971853	-2.625121	1(1)	0.0000	Stationary
FXMD	-6.935697	-3.689194	-2.971853	-2.625121	1(1)	0.0000	Stationary
CMD	-5.549168	-3.679322	-2.967767	-2.622989	1(1)	0.0001	Stationary
MMD	-8.634975	-3.679322	-2.967767	-2.622989	1(1)	0.0000	Stationary
BSD	-10.61917	-3.679322	-2.967767	-2.622989	1(1)	0.0000	Stationary

Source: Computed by researcher from E-View Windows (9.0)

Weak stationarity requires that the mean (first moment) and variance/covariance (second moments) are independent of time. To confirm these informal checks, formal unit root tests are applied. However, the unit root results above proved that all the variables are stationary at first difference. This means the rejection of null hypotheses of non stationarity and acceptance of null hypotheses of null stationarity.

Table 4: Co Integration Test Using Johansen

Hypothesized	Eigen value	Trace Statistics	5%	Prob.	Decision
None *	105.1502	55.27259	95.75366	0.0096	Reject H_0
At most 1 *	69.87763	43.42400	69.81889	0.0495	Reject H_0
At most 2*	56.45363	20.85593	47.85613	0.0173	Reject H_0
At most 3*	35.59770	18.48067	29.79707	0.0412	Reject H_0
At most 4	7.117030	6.527373	15.49471	0.5641	Accept H_0
At most 5	0.589657	0.589657	3.841466	0.4426	Accept H_0

Source: Computed by researcher from E-View Windows (9.0)

The cointegration test result found at least three cointegrating equation from model cointegrating equations. From the above, the study concludes that there is the presence of long run relationship that exists between the dependent and the independent variables.

Table 5: Diagnostic Test

Wald Test				
Test Statistics	**Value**	**df**	**Prob.**	**Decision**
F-Statistics	982984.7	(2, 25)	0.0000	Reject H_0
Chi-square	1965969	2	0.0000	Reject H_0
Breuch – Godfrey Serial Correlation Test				
Test Statistics	**Value**	**df**	**Prob.**	**Decision**
F-Statistics	3.461629	(2, 23)	0.0485	Reject H_0
Chi-square	7.866483	(2)	0.0196	Reject H_0

Source: Computed by researcher from E-View Windows (9.0)

The Wald test approximates the lr test, but with the advantage that it only requires estimating one model. The Wald test works by testing the null hypothesis that a set of parameters is equal to some value. In the model being tested here, the null hypothesis is that the two coefficients of interest are simultaneously equal to zero. If the test fails to reject the null hypothesis, this suggests that removing the variables from the model will not substantially harm the fit of that model, since a predictor with a coefficient that is very small relative to its standard error is generally not doing much to help predict the dependent variable. The difference is that the Wald test can be used to test multiple parameters simultaneously, while the tests typically printed in regression output only test one parameter at a time. The results shows rejection of null hypotheses at the probability value is less than the critical value of 0.05 at 5% level of significance.

Godfrey Test

Breusch–Godfrey test is used to assess the validity of some of the modeling assumptions inherent in applying regression-like models to observed data series.

In particular, it tests for the presence of serial correlation that has not been included in a proposed model structure and which, if present, would mean that incorrect conclusions would be drawn from other tests, or that sub-optimal estimates of model parameters are obtained if it is not taken into account. The regression models to which the test can be applied include cases where lagged values of the dependent variables are used as independent variables in the model's representation for later observations. The results shows rejection of null hypotheses at the probability value is less than the critical value of 0.05 at 5% level of significance.

Hetrodsaticity Test

The concept of **heteroscedasticity** the opposite being **homoscedasticity** is used in statistics, especially in the context of linear regression or for time series analysis, to describe the case where the variance of errors or the model is not the same for all observations, while often one of the basic assumption in modeling is that the variances are homogeneous and that the errors of the model are identically distributed. In linear regression analysis, the fact that the errors of the model (also named residuals) are not homoskedastic has the consequence that the model coefficients estimated using ordinary least squares (OLS) are neither unbiased nor those with minimum variance. The estimation of their variance is not reliable. The result shows that model is significant.

Table 6: Parsimonious Error Correction Results

VARIABLE	COEFFICIENT	STD ERR.	T-STATISTICS	PROB.
C	4.314971	2.260018	1.909264	0.0769
D(OSIN(-1))	0.139581	0.347316	0.401885	0.6938
D(OSIN(-2))	-0.062994	0.283612	-0.222115	0.8274
D(CMD(-2))	-0.670830	0.516980	-1.297594	0.2154
D(CMD(-3))	0.255081	0.299090	0.852857	0.4081
D(FXMD(-1))	-0.021266	0.920499	-0.023102	0.9819
D(FXMD(-2))	-0.760936	1.109671	-0.685731	0.5041
D(FXMD(-3))	1.774851	2.505592	0.708356	0.4904
D(INSD(-1))	3.361612	1.152788	2.916072	0.0113
D(INSD(-2))	1.407248	1.141525	1.232779	0.2380
D(BSD(-3))	-1.161134	1.124922	-1.032191	0.3195
D(MMD(-1))	0.051082	0.150262	0.339950	0.7389
ECM(-1)	-0.436647	0.383965	-1.137206	0.2745
R2	0.618667			
ADJ	0.291811			
F-STAT	1.892780			
F-PROB	0.127309			

Source: Extracts from E-view print out and Author's computation

The corresponding sign of Error Correction Term (ECT) is negative but not significant. The negative sign of (ECT) indicates a move back towards equilibrium following a shock to the system in the previous year. The adjusted R^2 from the model proved that the independent variables can explain 61 percent changes on the dependent variables. The models are statistically significant from the value of f-statistics and probability. However, the ECM coefficient indicates that the models can adjust at the speed of 43.6 percent annually. The coefficient of the variables defines the effect of the independent variables on the dependent variables at various lags.

DISCUSSION OF FINDINGS

The study found that 57 percent variation in original sin in Nigeria could be traced to variations in the variables as formulated in the model. The β coefficient shows that capital market development have negative effect on original sin, foreign exchange market have positive effect on original sin, banking sector development have negative effect on original sin, insurance sector development and money market have positive effect on original sin. The negative effect of the variables confirms the debt burden the theory. Empirical the findings is in line with the findings of Ettore, Maria and Vinícius (2019), Haussmann and Panizza (2003) that could be adopted to overcome the 'original sin' phenomenon it includes North-South and South-South cooperation and a multilateral arrangement, the findings of Ocampo (2009) showed how Latin American countries tried to strengthen their external balance sheet from adverse shocks by building up reserves and lowering its levels of debt securities, Liberato, Holland and Vieira (2012) stated this downward trend to the OSIN3 index might be due to higher levels of liquidity after the 2001 crisis in the U.S. Ocampo (2009) showed how the reverse situation contributed to a stagnation of the Argentinian index. Its liabilities to GDP ratio increased from -0.3% to 29% (2001-2007), Gegenfurtner (2021) investigated empirically whether the rather orthodox explanations of Original Sin as examined by Eichengreen *et al.*, (2002) and Hausmann and Panizza (2003), Fritz *et al.*, (2018) and de Paula *et al.*, (2017,

2020), Du and Schreger (2016b), Du and Schreger (2016b) argued that the exposure of the private sector forces the sovereign to stabilize the real exchange rate to avoid an increasing real value of the private sector's external debt, Calvo and Reinhart (2000) that sovereigns are more inclined to explicitly default than to inflate away the debt because of the effect of depreciation on the private sector, the findings of Lahet and Prat (2020) Fritz *et al.,* (2018) and de Paula *et al.,* (2017, 2020) de Paula *et al.,* (2020) find that temporary overcoming Original Sin due to the seek for attractive yields generates further vulnerabilities.

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

This study examined financial sector development and original sin in Nigeria financial market. The study found that 57.0% variation on original sin can be traced and explained by variation on the independent variables as formulated in the regression model. However, the F-Statistics and the F-probability justifies that the model is significant and adequate in explaining variation on the dependent variable. The β coefficient shows that capital market development have negative effect on original sin, foreign exchange market have positive effect on original sin, banking sector have negative effect on original sin, money market and insurance sector development have positive effect on original sin.

From the findings, the study conclude that capital market development have negative and significant effect on original sin, foreign exchange market have positive and significant effect on original sin, banking sector development have negative and significant effect on original sin, money market development have positive and significant effect on original sin while insurance sector development have positive and significant effect on original sin .

RECOMMENDATIONS

i. From the findings, the study recommends the need for policies to deepen the capital market as this can cushion the effect of the negative effect of external borrowing and domiciled in Nigeria currency rather than international currency.

ii. There should be institutionalized policies to enhance the value of the naira against other international currencies as this can reduce the pressure of exchange rate variation in international debt and international monetary environment

iii. Public expenditure should be directed to the productive sector of the economy as this can enhance the productive capacity of the economy and reduce the negative effect on balance of payment and other macroeconomic variables.

iv. Policies should be advanced to reduce external borrowings; this can reduce the debt burden and reduce the incidence of original sin in the financial market.

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