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NIGERIA: SELECTED ISSUES

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NIGERIA

SELECTED ISSUES

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NIGERIA

SELECTED ISSUES

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Approved By
African Department

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OPTIONS AND STRATEGIES FOR A FISCAL RULE FOR NIGERIA'S OIL WEALTH MANAGEMENT[1]

1. **Despite a diversified economy, Nigeria's fiscal policy is heavily dependent on the oil sector.** With oil price falling, Nigeria's fiscal authorities are faced with significant challenges**.** Oil revenues have declined, limiting fiscal spending and fiscal buffers have been almost depleted. Setting Nigeria's fiscal policy on a more sustainable course is needed going forward. In the presence of sizeable revenue derived from oil, the near-term priority should focus on better and effective management of oil wealth. To that effect, a sound fiscal framework is needed.

2. **In this chapter, options for a formalized rule-based approach to setting a "depoliticized" budget oil price are being explored.** This formula is designed to be consistent with long-term fiscal sustainability, while ensuring needed accumulation of fiscal buffers. Options for the appropriate accompanying institutions are also examined. The paper finds that a budget rule using a combination of past 5-year average oil price, the current year oil price, and forward looking 5-year oil-price, together with a structural primary surplus target of 2½ percent of non-oil GDP, is one option (subject to pre-announced exceptions) that could provide a basis for long-term sustainability and the preservation of oil wealth, while limiting the effect of oil price volatility.

A. Background

3. **A revised fiscal framework is essential to put Nigeria's fiscal policy on a more sustainable footing.** Indeed, the actual framework presents several shortcomings. Nigeria's current fiscal framework is anchored in a 3-year medium-term strategy. It follows a constitutional resource revenue-sharing formula, and includes a stabilization fund that can be used flexibly to fund augmentation, ad hoc allocations, subsidies, and SURE-P projects. The budget oil price, a key parameter of the framework, is determined through negotiations between the Executive and Legislative branches. Agreed revenues at the reference price are transferred to the federation account (FAAC) for distribution among the three tier governments (federal, states, and local governments). Revenue allocated to the FAAC are accrued to the various tiers of government according to the constitutionally determined sharing formula. The Excess Crude Account (ECA), a stabilization fund, receives the bulk "windfall" revenues with the key objective to help mitigate the impact of volatile oil revenues and assist with macroeconomic stability.

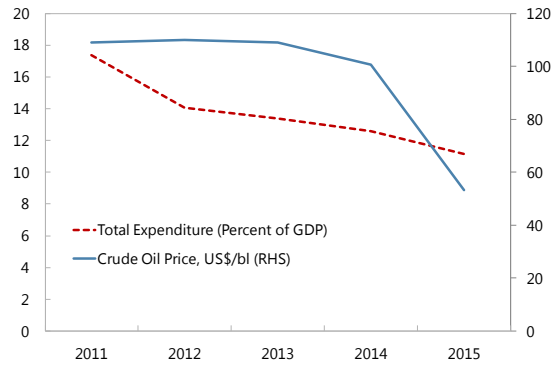
4. **A fiscal responsibility law (FRL) has been adopted in 2007**. The FRL helps prudent fiscal management by ensuring long-term macro-economic stability and by securing greater accountability and transparency in fiscal operations. The law includes numerical targets for the deficit and debt: consolidated deficit and consolidated debt for each financial year shall not exceed

[1] Prepared by S. Tapsoba.

3 percent and 25 percent of GDP respectively. An independent fiscal responsibility commission conducts the peer-monitoring of fiscal policy.

5. **The current framework presents several shortcomings and fails to set Nigeria's fiscal accounts on a sustainable long-term trajectory.** The medium-term non-oil primary deficits (NOPDs), though narrowing, cannot maintain real wealth in the long run (see past Article IV reports). Expenditure also closely tracks the development of oil price. For instance, the NOPD and spending tends to be correlated with oil price (Figure 1). Moreover, the main anchor of the budget is highly politicized and subject to political economy factors. Fiscal buffers are not always used to smooth shocks. The ECA can be used flexibly to fund augmentations, ad hoc allocations, subsidies, and SURE-P projects. As a result, expenditure is disconnected from the saving rule. At end-may the ECA balance stood at only $2 billion, well below the required precautionary level. Furthermore, the Sovereign Wealth Fund (SWF) is not large (only funded for $1 billion) and is excluded from the fiscal framework. Excess oil revenue accumulations are still directed toward the ECA. Finally, the fiscal responsibility law applies mostly to the federal government while the fiscal sustainability refers to the three tier governments (federal, states, and local governments). Because of these shortcomings, revamping Nigeria's fiscal framework is essential to ensure that fiscal policymaking maintains real wealth in the long run and delink expenditure from oil price fluctuations in the near term.

Figure 1. Nigeria: Fiscal Profligacy, 2011-15



Source: IMF staff estimates.

B. Considerations for a Revamped Fiscal Framework

6. **We first review theoretical considerations and assumptions for designing a fiscal framework for Nigeria**. A fiscal framework for resource-rich countries should provide a set of tools to achieve two interrelated objectives: (i) ensure long-term sustainability and intergenerational equity, and (ii) manage revenue volatility and uncertainty. The IMF has recently developed a new toolkit for designing fiscal rules that aim to smooth revenue volatility and ensure long-term fiscal sustainability in resource-rich countries. The toolkit includes intergenerational equity and price-based rule models.[2]

[2] IMF (2012) "Macroeconomic Policy Frameworks for Resource-Rich Developing Countries," IMF Policy Paper.

Key Assumptions

7. **To examine options for revisiting Nigeria's fiscal framework, some key assumptions need to be discussed.** The analysis is carried through 2050. The resource horizon for crude oil and gas follows the projections in British Petroleum.[3] In the long run, we assume crude oil and gas productions are estimated at about 2.5 and 2.1 billion of barrels per day respectively. The oil price path is projected with a similar level of volatility to that experienced over the past 10 years. For the non-oil sector, Nigeria is set to growth in the long run by an average of 4.1 percent. This reflects staff's projections from 2016 to 2033. The real rate of return on financial assets in dollar terms is assumed to be around 5.1 percent which is based on the typical breakdown of a savings fund, as follows: 91 percent is invested in fixed-income assets, 5 percent in cash holdings, and 4 percent in global equities.[4] The rate of return of each class of assets is as follows: 5.2 percent for fixed-income assets, 1.8 percent for cash-based assets, 7½ percent for global equity, and 7 percent for other assets (see J.P. Morgan 2013).[5]

8. **On the fiscal sector, the following specific assumptions are postulated**. Based on staff projections and historical data, Government shares of oil and gas revenues are assumed constant, at about 48 percent. This assumption is based on country team's projection from 2016 to 2033. This estimate is conservative and requires a constant cost-to-profit ratio in the oil industry. Based on staff's estimates using the latest input-output table, the steady-state multiplier of public investment in Nigeria is estimated to be around 0.7 and the tax revenue multiplier is set to 0.6. Because of the lack of longer time series for Nigeria, the elasticity of investment with respect to the real non-oil output for Nigeria is calibrated to around 0.19, in line with the work done on Central African oil wealthy states.[6]

9. **Finally, the medium term (2016-21) baseline macroeconomic framework assumes no policy change.** Overall GDP is set to growth by 3.5 percent on average. CPI inflation is forecasted to be at around 10.6 percent by 2020. Similarly, general government revenue is set to be at around 8.5 percent by 2021 while expenditure envelop is expected to be at 12.4 percent. By 2021, the overall deficit is expected to be around 4 percent while non-oil primary deficit will exceed 5 percent of non-oil GDP.

[3] See the 2013 British Petroleum Statistical Review of World Energy.

[4] IMF (2012), "Macroeconomic Policy Frameworks for Resource-Rich Developing Countries—Background Paper 1—Supplement 1," IMF Policy Paper, p. 61, Washington, DC: IMF.

[5] See the 2013 edition of J.P. Morgan Asset Management's long-term Capital Market Return Assumptions.

[6] Based on Tabova and Baker (2012). "Non-oil Growth in the CFA Oil-Producing Countries: How Is It different?" In Akitoby and Coorey (Eds.), Oil Wealth in Central Africa: Policy for Inclusive Growth.

Ensuring Intergenerational Equity

10. **The IMF has developed a toolkit for designing fiscal rules that aim to smooth revenue volatility and ensure long-term fiscal sustainability in resource-rich countries.** The toolkit includes intergenerational equity and price-based rule models.[7]

11. **Permanent Income Hypothesis (PIH).** The starting point of the long-term sustainability analysis is the permanent income hypothesis (PIH).[8] The PIH assumes that a country maintains a constant ratio of the non-oil primary deficit (NOPD) to non-oil GDP (NOGDP), equal to the implicit return on the present value of future natural resource revenue plus accumulated net financial savings. The computation basically transforms resource wealth on the ground into "virtual" financial wealth and uses an implicit rate of return. Total resource wealth is then computed as the sum of existing financial wealth and future resource revenues, measured in net present value. A shortcoming of the PIH, however, is that it is strictly a spending smoothing theory that does not address the need for investment. Alternative approaches have been proposed in the literature to account for temporary investment needs—and thus lower accumulation of fiscal savings than the PIH, in at least some periods. In such cases, the PIH is combined with temporary escape clauses to accommodate temporary modifications of public spending. These are the Modified PIH and the Fiscal Sustainability Framework.[9]

12. **Modified PIH (MPIH).** First, the MPIH accommodates front-loaded investment by allowing financial assets to be drawn down during the scaling-up period; the drawdown would then be offset by fiscal adjustment in the future to rebuild financial assets to the same level as under the traditional PIH. This approach does not explicitly account for the potential impact of the scaling up on growth and non-oil revenues. Over time, if the scaling up of investment is yielding "fiscal returns" (i.e., increasing non-oil revenues), the need for fiscal adjustment to compensate for the initial scaling up would be lower, and could be eliminated. There is a need to augment Nigeria's capital stock to help remove infrastructure bottlenecks and support further diversification of the economy. We explore the effect of stepping up investment on Nigeria's sustainability benchmarks. We follow the National Infrastructure Investment Plan (NIIP) which has identified new investment needs of about $30-50 billion (see 2015 Article IV). We consider the lower bound which corresponds to an average of $10 billion (about 2 percent of GDP) per year over three years (2016-18).

13. **Fiscal Sustainability Framework (FSF).** Unlike the MPIH, the FSF explicitly accounts for the impact of investment on growth and non-oil revenues. The FSF is consistent with an NOPD that allows a drawdown of resource wealth to build human and physical capital). In this context, it

[7] IMF (2012). "Macroeconomic Policy Frameworks for Resource-Rich Developing Countries," IMF Policy Paper.

[8] This approach has several variants (e.g., infinite or finite horizon; spending constant in real, per capita, or as share of non-resource GDP; and using the perpetuity or annuity value of the financial wealth of the resource revenue windfall) which can determine the sustainable path for the non-oil primary deficit.

[9] These tools can be used either for investment scaling-up or scaling-down scenarios.

stabilizes resource wealth at a lower level than the PIH models. Lower financial wealth will generate a lower stream of income to the budget than in the PIH-based frameworks, which will result in a lower NOPD consistent with fiscal sustainability; however, fiscal spending can still be stabilized at a higher level because higher growth will have "fiscal returns" in the form of larger non-oil revenues.

14. **Simulations indicate that the fiscal stance consistent with the PIH rule should be balanced, that is an NOPD-to-NOGDP of 0 percent under the perpetuity allocation principle** (Figure 2).[10] Gross cumulative savings will stand at around 135 percent of NOGDP by 2050. Under the scaling up scenario, the non-oil primary benchmark is negative of around 2.6 percent in terms of non-oil GDP, to accommodate the investment scaling up until 2018. This will be compensated by a tighter fiscal stance with a non-oil fiscal surplus of about deficit of about 4.5 percent of NOGDP through 2025. Thereafter the sustainable fiscal stance will stabilize at the PIH benchmark. In this case, gross cumulative savings will be larger than the metric under the PIH at 162 percent by 2050. With the FSF, the NOPD-to-NOGDP ratio closely tracks the benchmark under the MPIH outcome and stabilizes, though it would stabilize at around 0.6 percent thereafter, reflecting the lower return on of additional investments postulated above. Gross financial savings will be markedly lower at 127 percent of NOGDP.[11]

Addressing Commodity Price Volatility

15. **Price-based rules.** Addressing the volatility of oil price requires delinking expenditure from price fluctuations. To that effect, price-based rules are the privileged options. Price-based rules do not offer a direct link to sustainability benchmarks, but they help support fiscal sustainability by deliberately choosing a conservative and depoliticized budget oil price. Under price based-rules, Windfall revenues are saved in good times and drawn upon in bad times. The smoothing formula may use backward-looking and/or forward-looking prices. In Table 1, Ghana and Chile follow backward-looking price

Table 1. Nigeria: Price Rules in Selected Countries

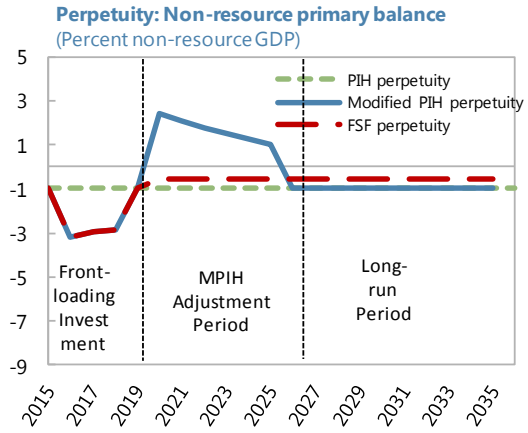
Rule	Description	Country
5/0/0	5-year rolling average of historical oil prices	Ghana
10/0/0	10-year rolling average of historical copper prices	Chile
5/1/5	Average of past 5 years, current year, and future 5 years	Trinidad & Tobago
10/1/3	Average of past 10 years, current year, and future 3 years (weighted 25/50/75)	Mexico
12/1/3	Average of past 12 years, current year, and future 3 years	Mongolia

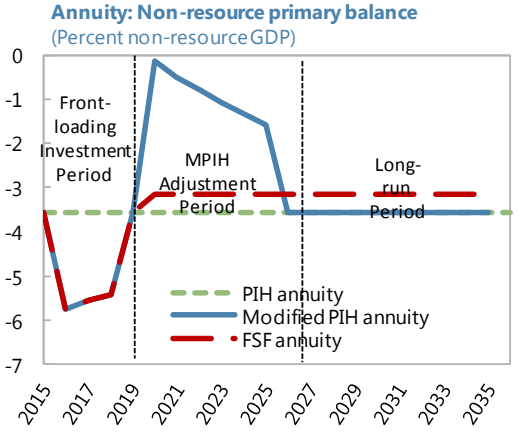
Source: IMF (2012). "Macroeconomic Policy Frameworks for Resource Rich Developing Countries—Analytic Frameworks and Applications," IMF Policy Paper. Washington, DC: IMF.

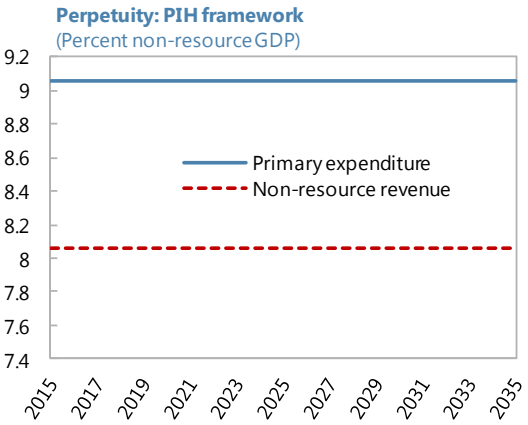
[10] The benchmark is significant loosened to an NOPD of 4.3 when the annuity allocation principle is considered but gross financial savings becomes negative.

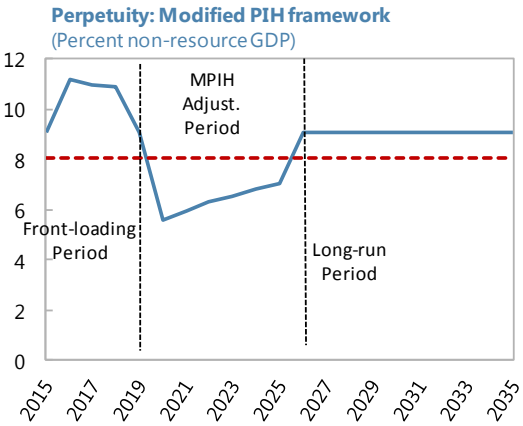
[11] We also explored the effect of doubling the efficiency of public investment (i.e., the elasticity of investment with respect to the real non-oil output) and find no significant changes in the sustainable benchmarks.

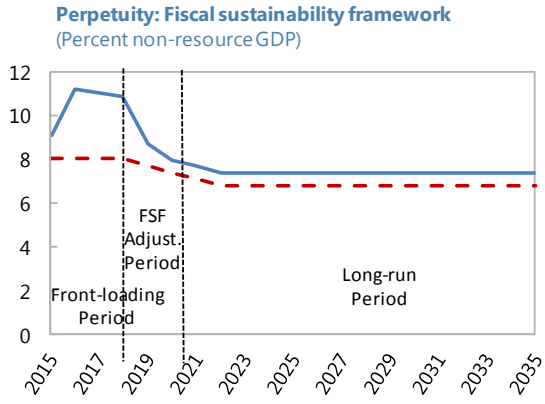
Figure 2. Nigeria: Sustainability Assessment Indicators, 2015-50

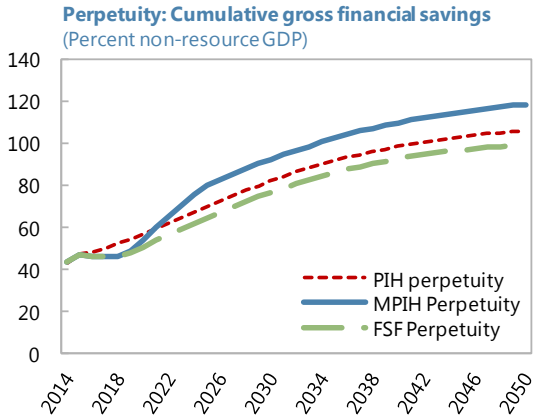










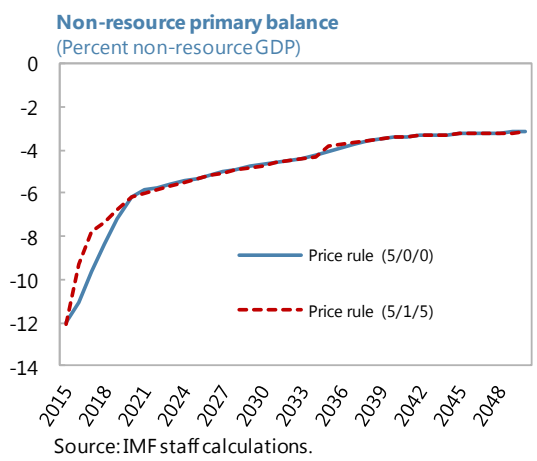


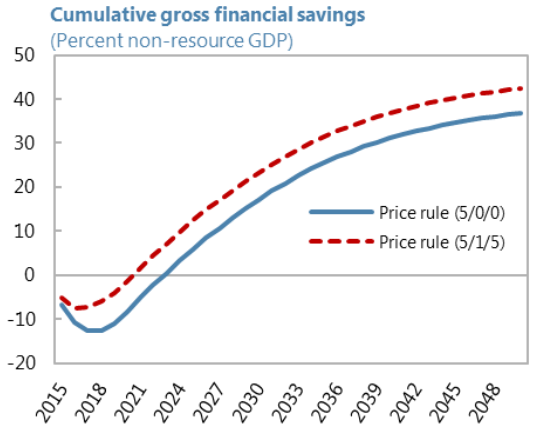
Source: IMF staff calculations.

rules (5/0/0 and 10/0/0 respectively) while Trinidad and Tobago, Mexico, and Mongolia apply combinations of backward and forward looking price rules (5/1/5, 10/1/3, and 12/1/3 respectively).[12]

16. **For Nigeria, we simulate two smoothing rules. The Ghana rule (5/0/0) and the Trinidad and Tobago rule** (5/1/5). In Figure 3, trends are very similar under the two rules. Realized primary balances remain negative. Gross cumulative financial savings with price smoothing formula are well below the levels predicted by the sustainability analysis. By 2050, cumulated gross financial savings in percent of NOGDP will stand at 42 percent under the 5/1/5 rule and lower under the 5/0/0 rule at 37 percent. Price rules alone are not satisfactory as they lead to financial savings lower than the sustainable levels. Below we explore alternative rules that could help mitigate volatility while ensuring sustainable financial savings. The price-based rule could be supplemented with a structural primary deficit or an expenditure rule.

Figure 3. Nigeria: Managing Volatility Indicators, 2015-50





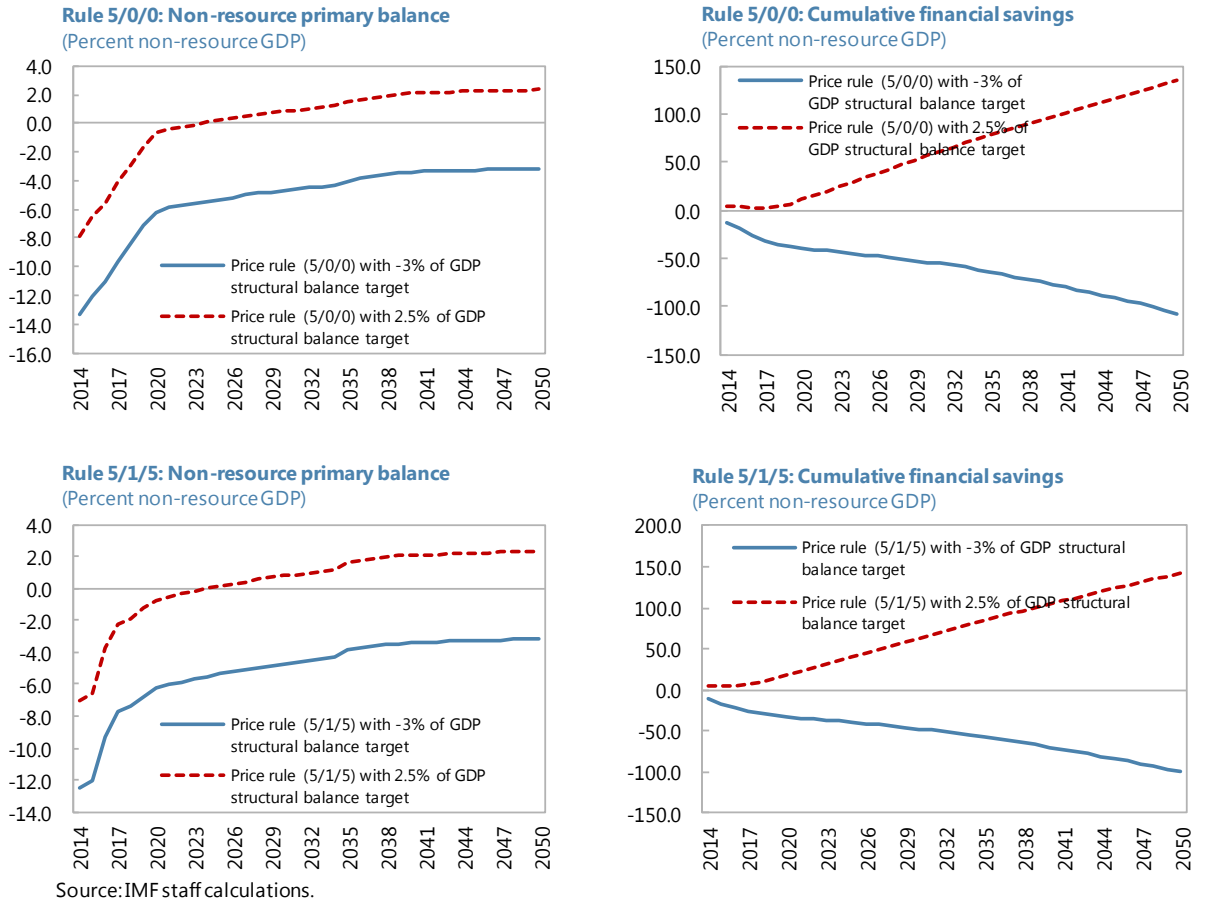
Source: IMF staff calculations.

17. **Structural primary balance benchmarks and price-based rules.** The structural primary balance rule allows assessing the sustainability of fiscal policy resource-rich countries in a similar manner as in non-oil rich countries. It imposes a ceiling on the overall deficit from the price-rule approach as percent of NOGDP. For Nigeria, we simulate a primary deficit rule of 3 percent of NOGDP. Such rule will be close to the numerical benchmark in the Fiscal Responsibility Law (FRL) which however covers the overall deficit. In Figure 4, it turns out under this rule; Nigeria will not accumulate financial savings. Instead, by 2050, gross worth will be negative at about -75 of NOGDP with the rule 5/0/0 and -69 percent of NOGDP with the rule 5/1/5. We further investigate for the required numerical target that will ensure positive gross financial savings close to the PIH levels. We

[12] The numbers in the price rule refer, in order, to the number of years in the past, present, and future used to calculate the expenditure path. Thus, the 5/0/0 price rule uses oil prices for the past five years only to calculate the smoothed resource revenue. A 5/1/5 price rule uses prices for the past 5 years, the current price, and prices forecast for the following five years.

find that, by 2050, such rule is a structural primary surplus of 2½ percent and will lead to gross financial savings between 130 percent of NOGDP with the rule 5/0/0 and 135 percent of NOGDP with the rule 5/1/5 close to the PIH benchmarks.

Figure 4. Nigeria: Price Rules Combined with Structural Primary Balance Rule, 2015-50

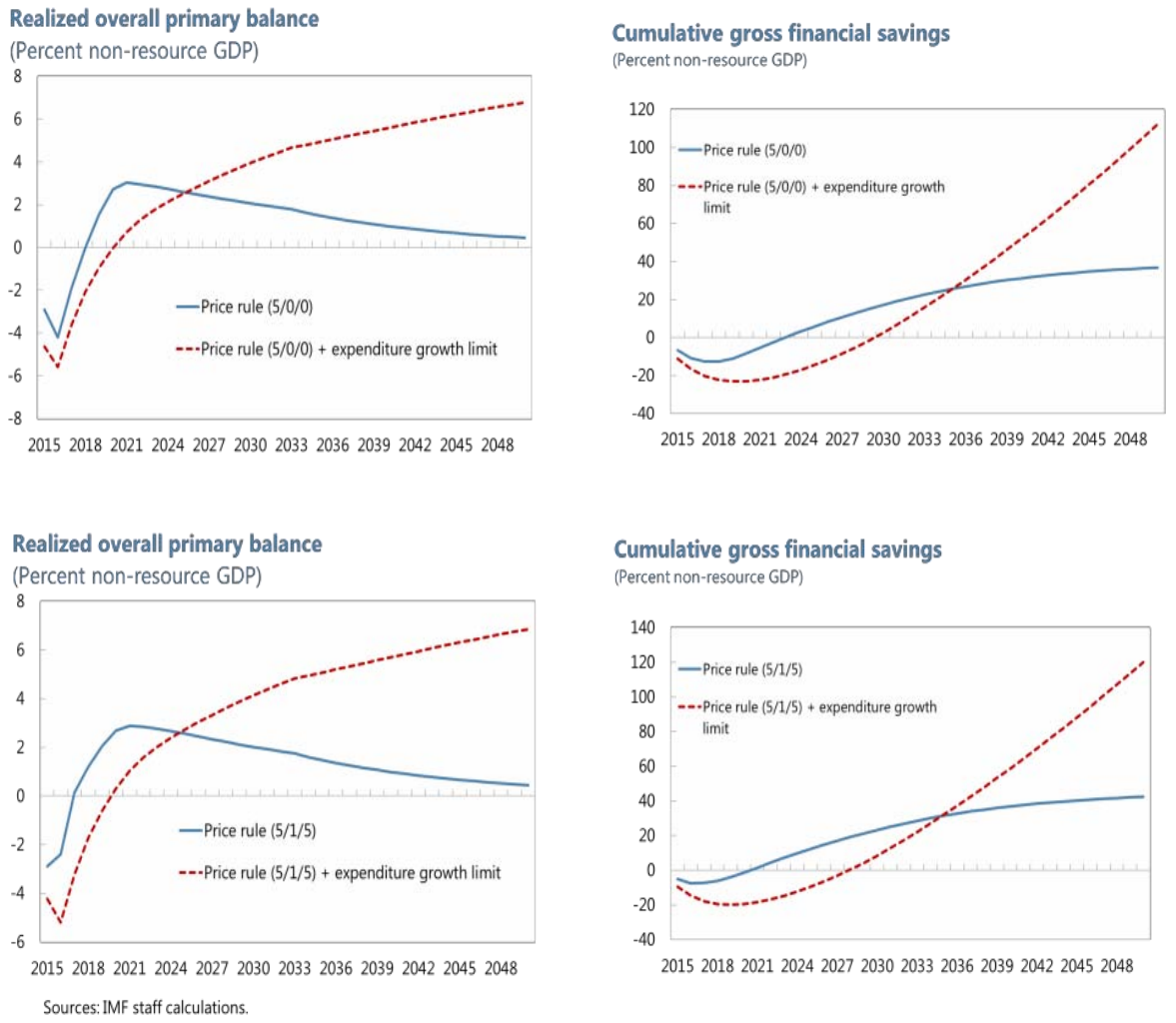


Source: IMF staff calculations.

18. **Expenditure growth benchmarks and price-based rules.** An expenditure rule (ER) can help mitigate volatility because it sets floors and ceilings for expenditure growth that can limit fiscal pro cyclicality. The rule can be formulated to limit the growth of government spending from the price-rule approach in nominal or real terms, or as a percent of NOGDP.[13] For Nigeria, even a zero real growth delivers financial savings between 112 and 120 percent of NOGDP, well below that obtained under the PIH exercise.

[13] Such a rule is desirable to guide the scaling up of public investment where there are absorptive capacity constraints (Berg and others, 2012) and where the volatility of resource windfalls requires precautionary savings (van der Ploeg, 2011).

Figure 5. Nigeria: Price Rules Combined with Expenditure Growth Limit, 2015—50



Sources: IMF staff calculations.

Fiscal Rule for Nigeria

19. **We discuss options for an optimal fiscal rule for Nigeria that aims at both preserving oil wealth for future generations and coping with commodity price fluctuations.** The analysis is based on gross financial savings position by 2050 (see Table 2). The long-term sustainability analysis indicates that the long-term NOPD-to-NOGDP ratio for Nigeria is a structural balance. To accommodate the removal of infrastructures bottlenecks, the benchmark can be loosen temporarily to a deficit of 2.6 percent but should be followed by a tighter fiscal stance that is a temporary surplus of 4.5 percent after the scaling period. Under the PIH analysis, the gross financial wealth of

the country will be between 127 and 162 percent of NOGDP depending on the inefficiency of new investments.[14]

20. **While the PIH-based approaches are the first-best rule, a more practical and operational approach is needed to address the near-term volatility while preserving intergenerational equity**. Price-based rule could help reconcile the two objectives. Given the current low levels of oil price, the combination of past 5-year average oil price, the current year oil price, and forward looking 5-year oil-price (5/1/5) tends the most adequate. It scores well by reining in volatility and by leading to a strong financial position. From a practical standpoint, it presents the advantage of not relying on the past outturn of oil prices while allowing for some flexibility on the prospect of oil price. For future prices, the best practice has been to rely on independent agency or committee. We also find that price-based or expenditure containment rules alone are not satisfactory in terms of financial savings compared to long term sustainability levels. In contrast, we find that the price rule 5/1/5 supplemented with a structural primary surplus benchmark of 2½ percent of NOGDP could generate long-term fiscal sustainability that is cumulative gross financial savings close to the levels obtained with the intergenerational equity analysis. Such rule can be loosened to a structural primary deficit of 1 percent of non-oil GDP to accommodate investment scaling up as discussed above (following the NIIP's proposal of new investment needs of at least $30 billion for the next three years). Thereafter, the structural benchmark is slightly higher to a primary surplus of 3 percent (Figure 6). In addition, the implementation of the proposed price rule is more credible as it would require less consolidation in the medium term (2016-20). The annual fiscal consolidation at the general government level in terms of NOPD-to-NOGDP ratio is estimated at about 2.4 percent under the proposed price rule against 4.8 percent under the PIH rule (Figure 7). In sum, the sustainable fiscal stance is characterized by a balanced NOPD-to-NOGDP ratio. A more practical solution is the combination of past 5-year average oil price, the current year oil price, and forward looking 5-year oil-price together with a structural primary surplus of 2½ percent of NOGDP.

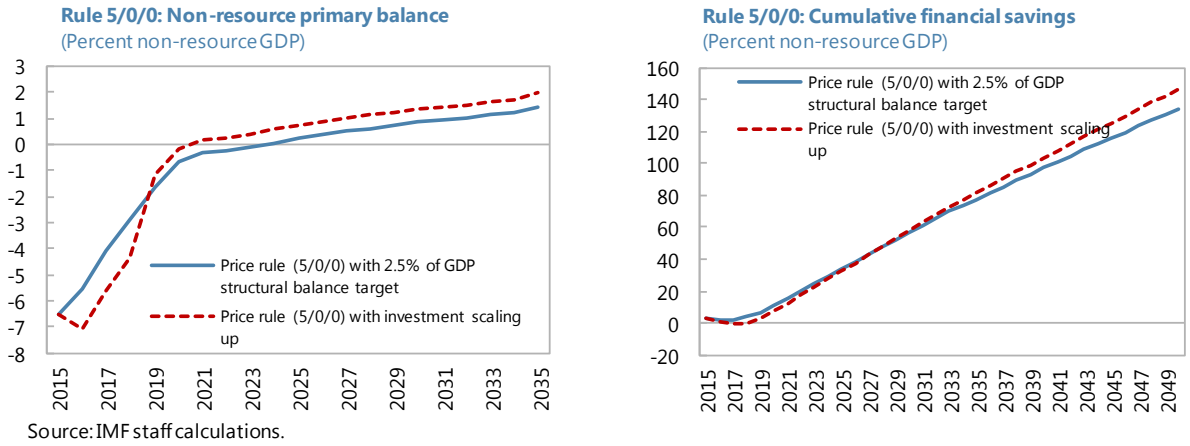
Table 2. Nigeria: Comparison of Cumulative Gross Financial Saving Under Different Fiscal Rules

Rules	Gross financial savings by 2050
Sustainability	
PIH (NOPB of 0 %)	149
MPIH (-2.7% during 2016-18, 5.7% through 2025 and 0% thereafter)	176
FSF (-2.7% during 2016-18 and 0.6% thereafter)	140
Volatility	
Price rule (5/0/0)	46
Price rule (5/0/0) with expenditure growth limit (0,0)	112
Price rule (5/0/0) with 2.5% of GDP SPB target	140
Price rule (5/0/0) with -3% of GDP SPB target	-67
Price rule (5/1/5)	52
Price rule (5/1/5) with expenditure growth limit (0,0)	121
Price rule (5/1/5) with 2.5% of GDP SPB target	146
Price rule (5/1/5) with -3% of GDP SPB target	-61

Source: IMF staff calculations.

[14] Net cumulative financial savings will be lower as financial liabilities are accounted for.

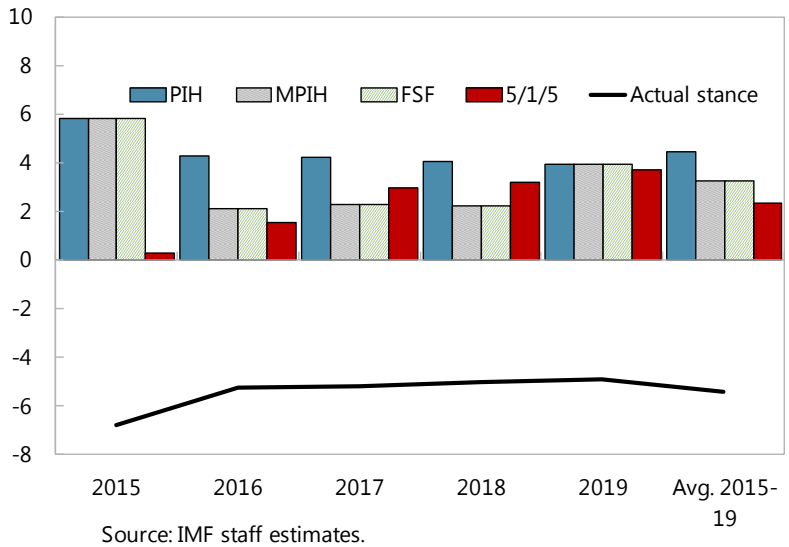
Figure 6. Nigeria: Price Rules Combined with Structural Primary Balance Rule and Investment Scaling Up Scenario, 2015-50



Source: IMF staff calculations.

Figure 7. Nigeria: Required Fiscal Consolidation Under Different Fiscal Rules

(Percent non-resource GDP)



Source: IMF staff estimates.

C. Supporting Institutions

21. **The fiscal framework needs to be supported by institutions that help establish stronger credibility of fiscal policy making, enforcement and flexibility of the fiscal rule.** For Nigeria, few ideas can be discussed.

22. **Escape clause.** Well-defined escape clauses are essential to ensure the flexibility of fiscal rules and reduce pressures to change or abandon them in face of large shocks. To be well-defined, escape clauses should only include: (i) a very limited range of factors that allow such escape clauses to be triggered; (ii) clear guidelines on the interpretation and determination of events; and (iii) specification on the path back to the rule and treatment of accumulated deviations.[15] For Nigeria, special treatments may need to address social and infrastructure needs in order to raise growth potential.

23. **Fiscal coverage.** A comprehensive coverage for the fiscal rule is necessary to ensure a better enforcement of the fiscal rule and would better support fiscal sustainability in Nigeria. With SLGs accounting for a large share of the general government budget, a better control over sub-national operations is required to ensure a better compliancy. Currently, the FRL applies only to the FGN and lacks an explicit coverage of SLGs. The lack of comprehensive fiscal coverage of SLGs is problematic for the enforcement of the fiscal rule. While it could create incentive for the central government to find ways to ensure better compliance by SLGs, the "weak control" over SLGs could also force the FGN to compensate for sub-national slippages. To enhance fiscal control, the FRL could be extended to SLGs.

24. **Fiscal watchdog.** Independent fiscal agencies (or so-called "fiscal councils") can enhance the credibility of fiscal rules. Through their external monitoring of the rules and independent assessment or preparation of macroeconomic and budgetary forecasts, well-functioning fiscal councils can support the implementation of fiscal rules. For Nigeria, this can build on the Fiscal Responsibility Committee (FRC). Such fiscal council should focus on the determination of the budget oil price and monitor progress towards targets. In its current version, the FRL lacks a clear rule for the determination of the budget oil price which is critical for the conduct of fiscal policy.

25. **Public investment management (PIM) institutions.** Complementary to the need for special treatment of the infrastructure need, PIM institutions would be essential to ensure a better return on public investments.[16] IMF staff have identified 15 key institutions that could help improve countries' PIM performance with more predictable, credible, efficient, and productive investments. In particular, critical areas to focus on for Nigeria are (i) strengthening the institutions related to the

[15] Schaechter, A., T. Kinda, N. Budina, and A. Weber, 2012, "Fiscal Rules in Response to the Crisis—Toward the 'Next Generation' Rules. A New Dataset," IMF Working Paper 12/187 (Washington: International Monetary Fund).

[16] See October 2014 WEO (Chapter 3: Is It Time for an Infrastructure Push? The Macroeconomic Effects of Public Investment) and the June 2015 FAD board paper ("Making Public Investment More Efficient").

funding, management, and monitoring of project implementation; (ii) adopting more rigorous and transparent arrangements for the appraisal, selection, and approval of investment projects; (iii) following a stricter oversight of public-private partnerships (PPPs); and (iv) and integrating national strategic planning with capital budgeting.

26. **Oil funds**. Management of oil revenues should be strengthened. International experiences suggest that oil funds should be integrated with the budget to enhance fiscal policy coordination and public spending efficiency. In Nigeria, there are concerns, however, with the transparency of the framework and the potential for undermining the budget as a tool to set priorities. The recent rapid drawdown of the ECA suggests that the country has not been able to contain the mounting spending pressures. In order to improve oil revenue management, the ECA should be merged to the SWF. Because of its stronger legal basis in terms on drawdown principle and transparency in the management of the fuel subsidy, a full transition to the SWF would provide a framework to appropriately ring fence oil revenue savings. Furthermore, adhering to international best practices may help the governance structure of SWFs. recently, the Santiago Principles were established: these are a voluntary code of conduct governing investment policies, disclosure rules, and other parameters of SWF activity.

27. **Capacity building.** Building capacity will be key to support the adequate implementation of the fiscal framework. This includes capacity in undertaking long-term revenue forecasts, establishing a medium-term orientation of the budget, implementing quality public investment projects, and managing stabilization funds. More specifically, in the near term, Nigeria needs to strengthen budget preparation process to transition from the incremental line item approach towards a programmatic approach. This will help facilitate policy costing and more effective setting of expenditure ceilings. Moreover, there is a need to capture all committed (multi-year) liabilities in the fiscal framework. It will help identify forward spending pressures (particularly from the existing capital projects contracts) and available fiscal space for new spending initiatives. Improving the quality, coverage and timeliness of fiscal reports is also important. To help provide the full picture of public spending and facilitate fiscal coordination between federal and sub-national levels, the fiscal reports should capture all off-budget revenues and spending and consolidate the general government revenues, expenditure and financing. The authorities have already made plans to implement international accounting standards to produce consolidated fiscal reports covering all the three tiers of government.

ENHANCING THE EFFECTIVENESS OF MONETARY POLICY IN NIGERIA[1]

1. **Two episodes of a boom and a bust since early 2000 have highlighted the challenges in the current monetary policy framework.** In particular, the sharp decline in oil production in 2013, followed by a sharp decline in oil prices in 2014, have severely tested the current framework. This paper reviews the effectiveness of the current framework and makes a number of policy recommendations to enhance the resilience of Nigeria to future shocks of a similar nature.

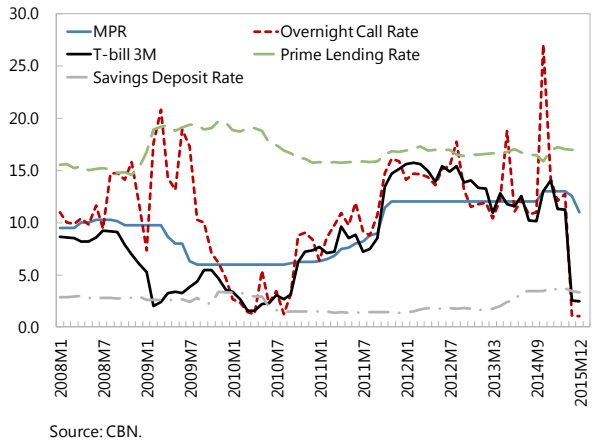
A. Recent Episodes and Key Policy Responses

Monetary policy framework

2. **The Central Bank of Nigeria (CBN) has been operating a de jure monetary targeting regime since 1974.** Price stability is the primary objective (CBN Act 2007) and communiqués of the Monetary Policy Committee (MPC) frequently refer to target range for inflation, most recently set at 6-9 percent. Financial system stability and promoting growth are also considered important.[2] Since 2006, price stability is achieved through stability in short-term interest rates around an "operating target" interest rate, Monetary Policy Rate (MPR) (p. 19; Modeling the Monetary Sector of the Nigerian Economy). The MPR is the nominal anchor for monetary policy in Nigeria and influences the level and direction of other interest rates in the domestic market. The MPR signals the monetary policy stance of the CBN to market operators hence guiding the way the CBN policy rate influences credit availability.

Figure 1. Nigeria: MPR and Other Interest Rates, 2008-16

(Percent)



Source: CBN.

[1] Prepared by Allison Holland, Mika Saito and Miriam Tamene.

[2] The 2014 Monetary Policy Review (March 2015) describes the CBN's vision as "By 2015, be the model central bank delivering price and financial system stability and promoting sustainable economic development" and the document on monetary policy framework (CBN, 2011) states that the major objectives of monetary policy include the attainment of price stability and sustainable economic growth.

3. **The CBN also has the scope to use other intervention instruments.** The CBN uses Open Market Operations (OMO), Discount Window Operations, Cash Reserve Ratio (CRR) and foreign exchange Net Open Position (NOP) (CBN, 2014) to effect changes in monetary conditions. Market interest rates generally follow movements in the MPR, but "structural" liquidity cycles can lead to occasional points of diversion (Figure 1). Spikes occur, for example, when a large amount of the oil receipts of the Nigerian National Petroleum Corporation (NNPC) held at deposit money banks (DMBs) are transferred to the CBN.[3] Since the beginning of 2015, however, maintaining the stability of money market rates around the corridor has become a challenge.

4. **The CBN has not always adjusted the MPR when broad money has deviated from the benchmark.** This has been the case even where the deviations are significant. For instance, since March 2015, broad money has been growing much slower than the 2015 benchmark of 15.24 percent, and yet the monetary policy committee has not changed the MPR.

5. **The CRR has been used to manage liquidity since mid-2013.** For instance, in the absence of a functioning Treasury Single Account (TSA), the CBN introduced a separate CRR on public sector deposits in mid-2013, increasing the rate from the general 12 to 50 percent, to help manage this source of monetary expansion and tighten liquidity conditions in the face of downward pressure on the exchange rate. This was further tightened to 75 percent in January 2014. In parallel, the CRR on private sector deposits was tightened from 12 to 15 percent in March 2014 and further to 20 percent in November 2014. These changes seem to have changed the relationship between the operating target (MPR) and intermediate target (Broad money) (Figure 2). The steady and predictable relationship between broad money and inflation (ultimate objective) also seems to have broken down in this more recent period (Figure 3).

6. **Other competing objectives deter the CBN from focusing on its price stability objective.** There are a number of competing objectives, for example, promoting growth and maintaining external reserves to safeguard the value of the naira. Many of the schemes were introduced during 2006-12 and are aimed at intervening in various sectors on a short- to medium term basis; some are designed as credit guarantee schemes while others involve providing subsidized funding for on-lending.[4] Those schemes involving funding for on-lending have a monetary impact through their impact on net domestic asset (NDA) of the CBN.

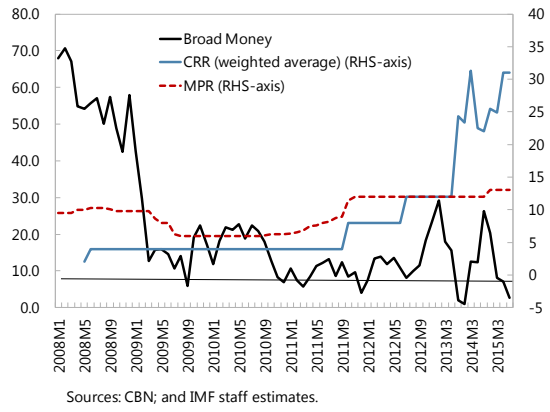
[3] The sources of these structural liquidity cycles (which are generally uncertain) include but are not limited to the monthly disbursements by the Federation Account Allocation Committee (FAAC).

[4] Several major credit schemes are active: Agricultural Credit Guarantee Scheme Fund (ACGS, NGN3 billion, 1977, CBN), Agricultural Credit Support Scheme (ACSS, 2006, NGN50 billion, implemented by commercial banks, state governments, and others), Commercial Agriculture Credit Scheme (CACS, NGN200 billion, 2009, CBN), Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL, N75 billion guarantee fund 2012); Power and Aviation Intervention Fund (PAIF, NGN300 billion, 2010, implemented by BoI), Restructuring and Refinancing Facilities for the manufacturing sector (RRF, NGN300 billion, 2010, implemented by BOI), and SME Credit Guarantee Scheme (SME CGS, NGN200 billion, 2010, administered by CBN).

7. **These interventions weaken the signaling effect of changes in the MPR.** The CBN's desire to make credit for the real economy available at relatively low interest rates—both in statement and fact through these intervention schemes—confuse a clear assessment of the monetary policy stance. In particular, the effectiveness of actions to tighten liquidity conditions only serves to increase the scale of subsidy available through these schemes and make the overall impact of monetary policy operations on the real economy more difficult to assess.

Figure 2. Nigeria: MPR and Broad Money, 2008-15

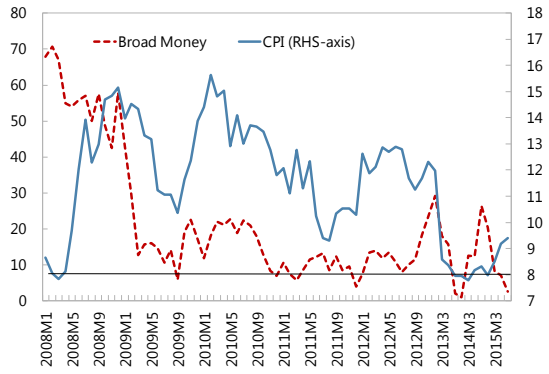
(Percent, y.o.y growth)



Sources: CBN; and IMF staff estimates.

Figure 3. Nigeria: Broad Money and CPI, 2008-15

(Percent, y.o.y growth)



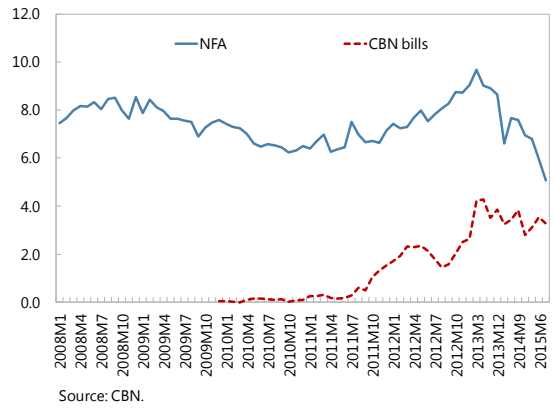
Source: CBN.

Recent episodes

8. **The current monetary policy framework has managed upside shocks.** Nigeria faced a sharp increase in export receipts during 2004-08 and a sharp increase in capital inflows in 2012. The increase in external receipts helped boost the stabilization fund (established in 2004) and reserves. This rapid increase in net foreign assets (NFA) of the banking sector could have led to a monetary expansion and pressure on inflation, but was managed successfully through sterilization (Figure 4). Reserve accumulation and prevention of "Dutch Disease" and exchange rate overshooting were consistent with macroeconomic policy recommendations for the resource-rich economies (IMF 2012).

Figure 4. Nigeria: NFA and CBN Bills Outstanding, 2008-15

(Trillion naira)

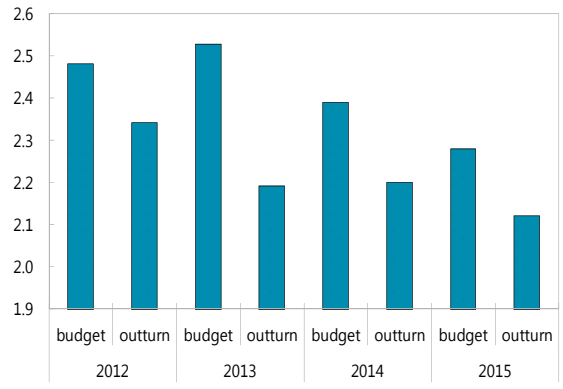


Source: CBN.

9. **In contrast, back-to-back shocks in oil production (2013), then in oil prices (2014), depleted the buffers and challenged the current framework.** Nigeria sailed through the 2008-09 crisis with ample buffers: the balance on the ECA was at $22 billion (8 percent of GDP), while gross international reserves (GIR) stood at $62 billion (equivalent to 16 months of imports). In contrast, given the sharp fall in oil production relative to the budget and a reversal of capital flows in 2013 (Figure 5), both fiscal and external buffers were much lower going into the 2014 crisis: the ECA had been depleted to $4 billion (½ percent of GDP) and GIR has fallen to $40 billion (about 8½ months of imports) (Figure 6). With reserves approaching historical lows, the CBN devalued the Naira in November 2014 and February 2015, and raised the MPR by 100 basis points (see Box 1 for the key policy actions taken since mid-2013). In February 2015, it closed the Dutch Auction System window, the mechanism through which it had previously channeled the government's foreign exchange (FX) proceeds into the market, and started intervening (almost daily) in the interbank FX market, meeting legitimate demand at a pre-announced rate. The frequency and the volume of intervention declined overtime as GIR fell below $30 billion.

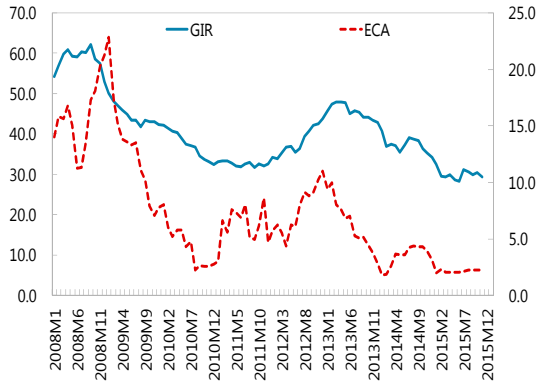
10. **The CBN's monetary stance has eased since September 2015.** In May 2015, it harmonized the CRR for both public and private sector deposits at 31 percent, representing a slight tightening of liquidity. The recent implementation of the TSA also tightened liquidity conditions temporarily; however, the CBN subsequently cut the CRR to 25 percent in September neutralizing the impact. However, once the use of OMOs is taken into account, the actual monetary policy stance has been less clear. For instance, the CBN provided liquidity to the system in the first quarter of the year; this is not surprising given the uncertainty surrounding the election. It then sought to tighten conditions again through the summer, but has recently reversed this trend.

Figure 5. Nigeria: Oil Production, 2012-15
(Million barrels per day)



Source: FGN.

Figure 6. Nigeria: ECA and GIR, 2008-15
(Billion U.S. dollars)



Source: CBN.

11. **With pressures still elevated, the CBN introduced various exchange restrictions to prevent a further decline in GIR.** These efforts are aimed at influencing the demand for FX through administrative measures.

12. **Against this background, this paper reviews the effectiveness of monetary policy transmission channels and options for strengthening monetary policy effectiveness going forward.**

Box 1. Nigeria: Chronology of Key Monetary Policy Actions, 2013-15

- July 23, 2013. The Monetary Policy Committee (MPC) raises the Cash Reserve Requirement (CRR) on public sector deposits from 12 percent to 50 percent.
- January 21, 2014. The MPC raises the CRR on public sector deposits from 50 percent to 75 percent.
- March 25, 2014. The MPC raises the CRR on private sector deposits from 12 percent to 15 percent. No changes to the CRR on public sector deposits.
- November 25, 2014. The MPC raises Monetary Policy Rate by 100 bps (to 13 percent); increases CRR on private sector deposits by 500 bps (to 20 percent); widen band around official exchange rate to +/- 8 percent (from +/- 5 percent); depreciate official FX rate by 8 percent from N155/$ to N168/$.
- February 18, 2015. The official foreign exchange window was closed and all foreign exchange demand is now being met via the interbank market, with the move implying an additional 18 percent downward adjustment in the official exchange rate from N168/$ to N199/$.
- May 19, 2015. The MPC harmonized the CRR on public and private sector deposits at 31 percent (down from 75 percent for the public sector deposits and up from 20 percent for the private sector deposits.
- September 22, 2015. The MPC reduces the harmonized rate of CRR from 31 percent to 25 percent.
- November 24, 2015. The MPC reduced the CRR from 25 percent to 20 percent; the MPR from 13 percent to 11 percent; and changed the symmetric corridor of +/- 200 basis points (bps) to +200 bps and -700 bps.

B. Effectiveness of Monetary Policy Transmission Channels

13. **This section analyzes the effectiveness of monetary policy instruments in transmitting policy objectives.** This section first reviews a number of structural impediments to the transmission of policy rate impulses. It then examines the effectiveness of monetary policy instruments, namely the MPR and the CRR. This section also looks at the nature of the exchange rate pass-through on inflation. The exchange rate is not a nominal anchor of monetary policy in Nigeria but the monetary policy communiqué of the monetary policy committee meetings have started including explicit exchange rate target with a band since the end of 2011 (CBN, Monetary Policy Communiqué No. 80, November 21, 2011).

Structural impediments

14. **Both direct and indirect interest rate channels, as well as the credit channel of the monetary transmission mechanism are limited by the overall financial depth of Nigeria.** Assets of the banking sector are only about 30 percent of GDP in Nigeria, compared to 80 – 200+ in the BRICS (Figure 7). The exposure of the banking sector to the sovereign is high, at about 20 percent in Nigeria, while credit to the private sector is low (13 percent of GDP). The Nigerian Stock Exchange has about 200 listed companies, with a total market capitalization of about NGN11.5 trillion (about 12 percent of GDP). Other constraining factors include low banking penetration and the fact that many foreign owned corporations manage their financial activities at the group level.

15. **The exchange rate channel of monetary policy transmission is circumscribed, given the preference for a relatively stable exchange rate.** While Nigeria has an open capital account, as is common with other oil exporters, the exchange rate is tightly managed. This limits the effectiveness of the exchange rate channel as the exchange rate is not allowed to respond to changes in monetary policy stance. For instance, all 29 WEO fuel exporters, except Colombia, are currently classified as other managed, stabilized or more fixed (e.g., "conventional peg" or "no separate legal tender"). However, experience has clearly demonstrated that the volatility of oil (commodity) prices can transmit shocks to both fiscal and monetary policy, and influence the stability of the relationships between monetary instruments, targets, and ultimate objectives, often leading to failure in meeting targets.

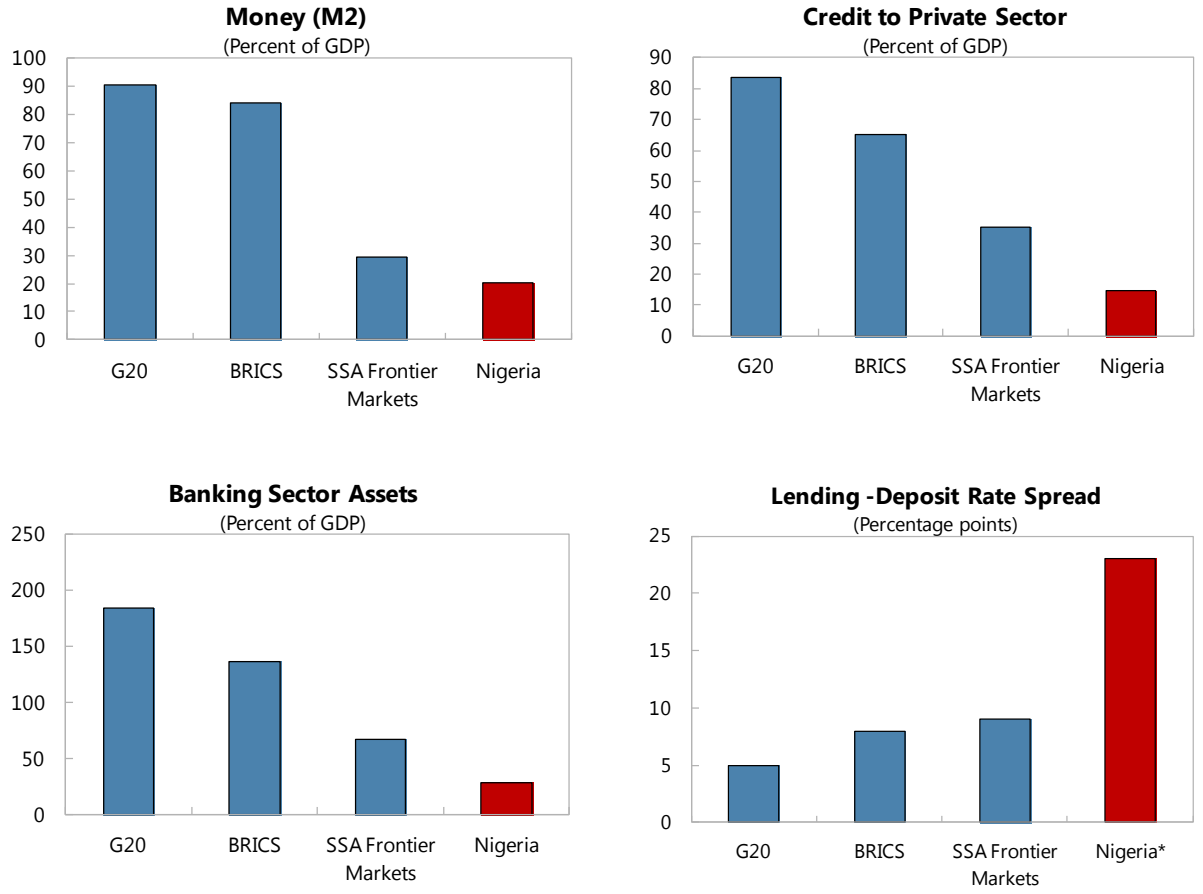
16. **The composition of the consumer basket makes inflation dynamics largely beyond the direct control or influence of monetary policy actions.** A high share of the consumer basket is in items (e.g., food) that tend to be volatile, either from domestic (e.g., weather) or external factors (foreign price of imports). For example, the share of food items in the CPI basket exceeds 50 percent in Nigeria.

17. **Potential fiscal dominance could also constrain the conduct of monetary policy.** High rising public domestic debt could reduce the central bank's ability to raise the interest rate in the face of rising inflationary pressures to prevent further worsening in the public debt and debt service. In the case of Nigeria, while the debt-to-GDP ratio is only about 14 percent, interest payments-to-revenue ratio is above 30 percent and is projected to increase in the medium term. The use of the

central bank overdraft facility has been growing in recent months, but the Federal Government of Nigeria (FGN) does not generally rely on overdrafts from the central bank, and in net terms, the FGN is still a net creditor to the banking sector.

18. **Lumpy oil-related and fiscal flows make liquidity management a challenge.** Monthly transfers of oil funds from the Nigerian National Petroleum Corporation held at Deposit Money Banks (DMBs) to the Federation Account of the CBN and subsequent transfers to states and local government (SLGs) generate significant intra-month volatility in reserves balances and consequently interest rates. As export receipts are sizeable relative to banking sector assets, the timing of their tax or wage payments (and their cash management more generally) can cause liquidity fluctuations in the foreign exchange and interbank markets and occasional spikes in short-term interest rates.

Figure 7. Nigeria: Structural Impediments, 2014



Source: International Financial Statistics.

19. **Moreover, the absence (until now) of fully functioning and comprehensive coverage of Treasury Single Account (TSA) has also been a source of liquidity fluctuations.** The absence of the full coverage and functioning of the treasury single account (TSA) for all ministries, departments and agencies (MDAs) of the FGN, has made managing liquidity a challenge at times. For example, between 2013M6 and 2013M8, federal government of Nigeria (FGN) deposits held in DMBs

increased by N1.2 trillion. The Monetary Policy Committee "expressed concern over the rising cost of liquidity management as well as the sluggish growth in private sector credit, which was traced to DMB's appetite for government securities. This situation is made more serious by the perverse incentive structure under which banks source huge amounts of public sector deposits and lend same to the Government (through securities) and the CBN (via OMO bills) at high rates of interest."

20. **The lending-deposit rate spread is stubbornly high in Nigeria, making real cost of borrowing high.** A key factor underpinning this spread is likely to be banks' operating costs; in addition to the general challenges in the business environment that face all companies, banks are also likely to face higher security costs. Funding costs as reflected in the return on equity also seem relatively high, while there is some clear differentiation across banks in terms of deposit funding, with some banks having to offer relatively high time deposit rates. Alongside efforts to strengthen the overall macroeconomic policy framework and reduce the risk premium, and continued efforts to ensure all banks are resilient, the authorities' plans to address key security and governance concerns in the economy should help this spread to narrow over time.

Monetary policy transmission on inflation

21. **Staff examined the relationship between monetary policy instruments and its intermediate and ultimate targets.**[5] The CBN Working Paper "Monetary Growth and Inflation Dynamics in Nigeria" looks at the relationship between money, inflation, and output. It suggests: (i) a long-run cointegrating relationship between money and inflation exists but not between money with output; and (ii) the long-run relationship is found in the full sample (1982-13), but not in the more recent sub-sample period (1996-13). This study looks at multiple monetary policy instruments simultaneously using more recent time period (2008-15). More specifically, a 5-variable Vector Auto Regression (VAR) analysis was conducted to investigate whether there exists a long-run stable relationship between the three key monetary policy instruments, its intermediate target (broad money), and the inflation rate (ultimate target). Policy instruments included are the MPR and CRR. The net domestic asset (NDA) of the CBN is also included to capture the role of the CBN interventions through CBN schemes as well overdrafts to the federal government. The role of tightly managed exchange rate in managing the inflationary pressure is examined in the next subsection.

22. **The Johansen test of cointegration suggests that there exist long-run cointegrating relationships between not all five variables but following three variables**.[6] For example, one of the cointegrating relationships is expressed as follows:

$$cpi_{t-1} - 0.648m_{t-1} - 0.021nda_{t-1} \sim I(0)$$

[5] The transmission of changes in monetary policy instruments on deposit and lending rates were conducted. There is no evidence of transmission.

[6] Empirical results of this section are available upon request.

where cpi is the natural logarithm of consumer price index, nda is the natural logarithm of the net domestic asset of the central bank, and m is the natural logarithm of broad money. The VEC ECM estimated includes the following equation for cpi:

$$Dcpi_t = -0.070\left(cpi_{t-1} - 0.648m_{t-1} - 0.021nda_{t-1}\right) + \text{difference in lags} + \varepsilon_t.$$

23. **Note that neither MPR nor CRR enter these long-run relationships, implying empirical irrelevance of these variables in explaining movements in the price level or the inflation rate.** Instead, this relationship suggests that there is a long-run cointegrating relationship between cpi, m, and the net domestic asset of the central bank and the signs of the cointegrating vector are as expected: the cointegrating vector suggests that an increase in the price level is associated with an increase in broad money and the net domestic asset of the central bank. More specifically, in the long run, a 1 percent increase in the growth of broad money is associated with an increase in the inflation rate by 0.65 percent. Similarly, a 1 percent increase in the growth of NDA is associated an increase in the inflation rate 0.02 percent.

24. **The impulse response analysis, which takes the short-run feedback effects of the VEC ECM estimated, suggests that the impact of recent changes in nda is limited.** The NDA of the CBN increased significantly in the past year, by about N1.8 trillion between 2014M8 and 2015M8. Part of this increase by due to the federal government's drawdown on deposits and not necessarily a result of active monetary policy. That said, if the NDA were to increase by N 1.8 trillion from the current level (about 25 percent increase in NDA), the likely increase in the inflation rate is only about 0.05 percent within a 12-month period.

25. **On the other hand, the transmission of an expansion in broad money and inflation is non-trivial, highlighting the importance of managing the broad money growth.** Broad money growth was limited in the past year, about y-o-y 3 percent, partly due to a rapid drawdown gross international reserves and net foreign asset of the central bank and the banking sector. The impulse response analysis suggests that this increase would have increased the headline inflation by 0.5 percent within a year.

Exchange rate pass-through on inflation

26. **In parallel to the conduct of monetary policy through monetary policy instruments, exchange rate targets with a band have been used to anchor inflation expectations.** One of the most important reasons provided for keeping the exchange rate stable, in particular in resisting downward movements, is its potential impact on inflation rate. When the economy has little social safety net, and a large fraction of population is living below the poverty line or is vulnerable to poverty (i.e., a small shock can put them back in poverty), avoiding a sudden increase in the inflation rate is an important consideration.

27. **Empirical analysis suggests that the exchange rate pass-through on headline inflation has been statistically insignificant.** Lariau, El Said and Takebe (2015) investigate the magnitude of the exchange rate pass-through on inflation. They find that there is no stable long run relationship

between CPI, the nominal effective exchange rate (NEER) and the price of imports (Pm) for the period from January 2000 to April 2015.

28. **Changes in the NEER, however, seem to have a significant (but short-lived) pass-through effect on core inflation.** In the short-run, headline inflation is not responsive to changes in NEER. Impulse response functions obtained from the estimation of a Vector Autoregressive model are not statistically significantly different from zero within a year following the shock. The point estimates for the pass-through are small, of less than 10 percent even 6 months after the shock occurs.

29. **Evidence also indicates that this relationship has not changed over time.** Core inflation displays a lagged and short-lived response to changes in NEER. Changes in NEER do not have a contemporaneous effect on core inflation. The impact becomes statistically significant 4 months after the shock occurs, but only lasts for 2 months, becoming statistically insignificant afterwards. The pass-through elasticity to core inflation half a year after the shock occurs is around 32 percent.

30. **A key factor behind the low pass-through from exchange rate to headline inflation is that food prices are not affected by changes in NEER.** The results indicate that devaluations of the naira only have a short-lived effect on non-food inflation. Food prices do not react to changes in the exchange rate because most of the food is locally produced. That is food prices are to respond more strongly to local market supply and demand developments to foreign exchange market developments. More than 90 percent of product lines (at SITC 5-digit classifications) and more than 96 of food imports are subject to tariff rates ranging between 5 percent and 35 percent. This factor limits the potential negative impact of an exchange-rate devaluation on the poor.

C. Options for Strengthening Monetary Policy Effectiveness

Adopting the monetary policy framework to changes environment

31. **Absent other policies to address structural FX demand-supply mismatches, maintaining the current monetary policy framework with a tightly managed exchange rate will be difficult.** With low fiscal buffers, the public sector is relying on financing from the banking sector, potentially crowding out the private sector. Without fiscal adjustment to reflect the decline in oil revenue, monetary expansion may be inevitable, leading to further pressures on the naira, inflation, and GIR (at $31.5 billion, GIR is 12 percent below the adequacy level). Staff's medium-term macroeconomic framework indicates that the level of GIR will recover but not sufficient enough to reach what is considered adequate for countries with a fixed exchange rate regime. More generally, the combination of the current monetary policy regime (monetary targeting) with a tightly managed exchange rate with an open capital account will face more challenges ahead.

32. **Nigeria envisions itself to become a less oil dependent economy, and the monetary policy framework needs to be able to accommodate this objective.** The economy is already diversified (the oil sector is already less than 10 percent of GDP) but the external and fiscal sectors are still highly dependent on oil. While fiscal revenue remains highly dependent on oil revenue,

accumulating oil savings during a boom time and using it in a downturn may remain an appropriate policy choice given the volatility in oil prices. However, the impotence of monetary policy (by preventing exchange rate movements in an open capital account environment) becomes more costly as fiscal revenue becomes more diversified since (i) tapping into the stabilization fund becomes less important; and (ii) being able to stimulate non-oil GDP growth in a downturn becomes more important.

The role of financial sector policies

33. **Financial deepening efforts need to be sustained to strengthen key channels of monetary policy transmission.** The authorities have made major strides in increasing banking penetration and facilitating other channels for savings to move from the informal to informal sectors (e.g., innovative insurance products distributed through mobile distribution channels) (see IMF Article IV 2014).

34. **However, to ensure clarity of monetary policy signaling, CBN interventions in the real sector should be minimized.** Overall, these schemes should be reviewed to determine whether they have proved cost effective and to determine whether there is a continued need for them (see IMF Article IV 2014). If the authorities deem it necessary to continue with some targeted schemes, these should be transferred to other agencies.

35. **When setting the MPR and CRR, the CBN should clearly take account of the impact of these schemes on NDA.** And to ensure there is a comprehensive picture of effective liquidity conditions, the impact of OMOs should be more clearly incorporated. These factors should be more clearly discussed in the communiqué, including setting out the links with broad money growth and inflation.

36. **The authorities also need to work with the banking sector on ways to reduce the deposit-lending spread**. This could involve broader efforts in the economy to improve the business environment.

Role of the exchange rate

37. **The authorities should take steps towards greater exchange rate flexibility.** As economic diversification efforts deepen, the export sector is likely to also become more diversified. That would support greater exchange rate flexibility as potential gains and losses from exchange rate movements are more broadly distributed.

38. **Overall, allowing the exchange rate to absorb more of future shocks would reduce the burden on other policies.** In a more fixed regime, fiscal policy typically has to carry the burden of adjustment to shocks. However, fiscal policy can have limited scope to be "nimble" when a tightening is required. Capital expenditures are often the buffer, but this could have significant effects on long-run growth prospects and is limited if it is small in the first place (e.g., in Nigeria capital expenditure was less than planned in the 2015; though there is a plan to rectify this going

forward, implementation may still pose a challenge) Experience shows that, when shocks are largely external in nature, i.e., a shock to oil prices, a more flexible regime proves more resilient. For instance, that would facilitate the use of counter-cyclical fiscal policy (assuming there are sufficient buffers in place—ref to fiscal SIP) without risking the goal of price stability. It would also provide scope for a relatively looser monetary policy.

39. **Other countries' experiences of transitioning to greater flexibility can provide important insights.**[7] In particular, they point to the benefits of a "planned" transition (e.g., Chile, Russia) relative to a "forced" transition (e.g., Mexico, Thailand, Russia), which can entail some large short-run costs. In many cases, transition to greater flexibility came as a result of a general recognition of the challenge of addressing large and volatile capital flows; these often revealed weaknesses in monetary / fiscal policy mix (Chile, Mexico, and Thailand). The need to address large external imbalances was also a contributing factor in some cases so as to preserve reserves (Mexico, Thailand). Finally, in some instances, a move to greater flexibility was driven by a desire to protect economic growth by avoiding large increases in interest rates (Mexico, Thailand). All these drivers are relevant for Nigeria at the current conjuncture.

40. **Reverting to the previous framework of a central parity rate within a band would be a first step.** However, further consideration could be given to the width of the band to increase the shock absorption capacity. A wider band could also increase the imperative for the private sector to seek out hedging instruments, potentially stimulating further market development. In addition, taking a more rules based approach to determining the central parity could minimize the future risk that the central parity rate becomes "too sticky". Having a clear objective framework that links the central parity rate to key economic variables (e.g., Chile) would also reduce the political challenges associated with changes and would provide a clear platform to communicate updates to the rate.

41. **A strong communications policy would also be required to minimize the negative connotation of greater flexibility.** Nigerians set great store in a stable exchange rate so the benefits of greater flexibility would need to be carefully communicated. For instance, the limited pass through to food prices, which limits the negative impact on the poor, should be emphasized. Similarly, the general empirical findings that there is a strong negative link between the flexibility of the exchange rate and the volatility of output and employment (Ghosh, et al, 1997) could be leveraged. Finally, given the increased financial access of the corporate sector, a more credible exchange rate framework should be reflected in lower risk premiums, thereby creating a more supportive financing environment. The consequent reduction in pressure on GIR would also contribute to a more positive investment environment.

[7] From Fixed to Float: Operational Aspects of Moving Toward Exchange Rate Flexibility Rupa Duttagupta, Gilda Fernandez, and Cem Karacadag (IMF Working Paper 2004, WP/04/126).

42. **Broader efforts to improve communications could also pay dividends.** In particular, there could be more discussion of forward looking factors and the implications for future inflation in the communiqué. The communiqué is a key channel through which expectations are managed and which can influence the effectiveness of the transmission mechanism.

43. **That said, the recent experiences of oil exporters such as Russia and Azerbaijan, highlight the fact that sustaining a managed floating arrangements may not be feasible in the long-run.** For instance, the recent experience of Russia highlighted the vulnerabilities associated with excessive reliance on the oil and gas sector in both the fiscal and export sectors, coupled with structural bottlenecks and limited labor mobility. This illustrates that resilience will require a multi-pronged approach to not only establish an overall monetary and fiscal framework is both robust and credible, but also to progress the economic diversification agenda and address key infrastructure gaps.

CAPITAL FLOWS TO NIGERIA: RECENT DEVELOPMENTS AND PROSPECTS[1]

This paper examines recent developments in capital flows to Nigeria, and prospects for flows in the near term. *While data on capital flows is subject to limitations, especially on capturing outflows, Nigeria has enjoyed increased international capital flows from a broad array of sources in recent years, though these have declined since 2014. Key drivers of capital inflows have been Nigerian and external interest rates, oil prices, and risk aversion among international investors. Some of these factors, including recent monetary easing, low oil prices expected for a long period, administrative measures inhibiting activity in the interbank foreign exchange market, and market participants expecting the naira to weaken, are likely to weigh on the outlook for capital flows in the near term.*

Recent Developments

1. **Nigeria has enjoyed increased international capital inflows in the last decade.[2]** This has been facilitated by a strengthened macroeconomic policy framework, rapid economic growth, high commodity prices, and the conclusion of external debt relief in 2005 and 2006.[3] Capital flows have accelerated since 2011, and Nigeria is considered to have joined the ranks of frontier markets—that is, economies with access to international capital markets and domestic financial markets that are deep and open relative to other Low-Income Developing Countries (LIDCs).[4]

2. **Capital has flowed to both the public and private sector, and has been sourced from both international and domestic issuance.** Nigeria issued its first sovereign Eurobond in 2011, and two more in 2013. Private sector external debt issuance also ramped up over that period (Figure 1). While data on non-resident investment in domestic markets is subject to uncertainty, available indicators point to inflows to the equity market and both short-term and long-term federal government domestic debt, especially over 2011–13 (Figure 2). Nigeria has also received steady net foreign direct investment (FDI) inflows averaging nearly two percent of GDP over the last decade and been a leading recipient among LIDCs of cross-border syndicated bank loans.[5]

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[1] Prepared by Andrew Swiston, with research assistance from Marwa Ibrahim.

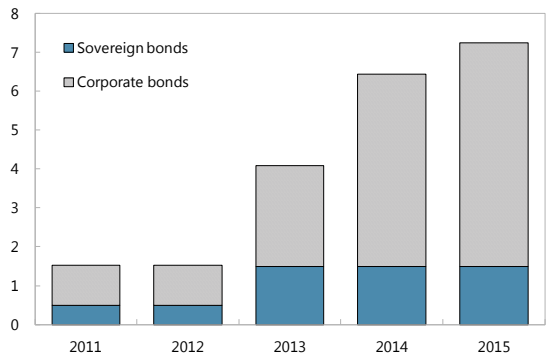
[2] Total capital inflows are defined here as net non-resident investment in Nigeria (see International Monetary Fund, 2015, "Macroeconomic Developments and Prospects in Low-Income Developing Countries: 2015 Report," IMF Policy Paper. Similarly, total capital outflows are defined as the net investment of Nigerian residents abroad. As such, the values taken on by both concepts can be either positive (increase in liabilities or assets) or negative (decrease in liabilities or assets).

[3] In addition, a rule that required foreign investors to maintain their government bond holdings for at least a year was removed in 2012.

[4] The set of LIDCs and frontier markets are as defined in International Monetary Fund, 2014, "Macroeconomic Developments in Low-Income Developing Countries: 2014 Report," IMF Policy Paper.

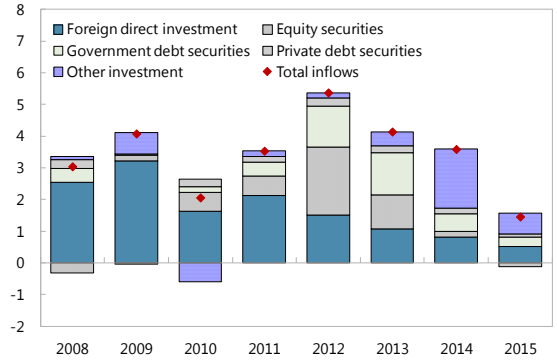
[5] See International Monetary Fund, 2015.

Figure 1. Nigeria: International Bonds Outstanding, 2011-15
(Billion U.S. dollars)



Source: Dealogic.

Figure 2. Nigeria: Total Capital Inflows, 2008-15
(Percent of GDP; 2015 includes through Q3 only)

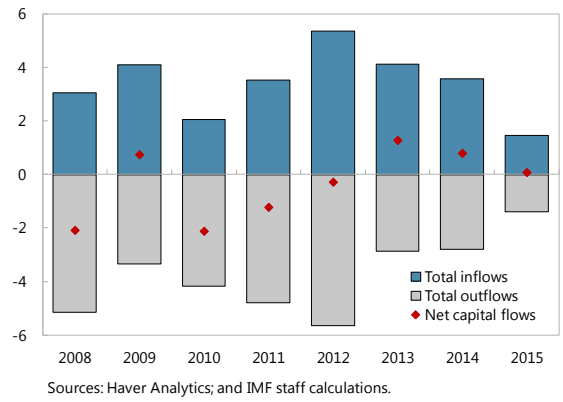


Sources: Haver Analytics; and IMF staff calculations.

3. **Capital inflows have slackened since 2014.** Total capital inflows averaged over 4 percent of GDP over 2011–14 but fell to 1.5 percent of GDP through the first three quarters of 2015 (Figure 2). Both FDI and portfolio inflows declined in 2014 and remained low in 2015, with some offset, especially in 2014, from other investment inflows to the banking and oil and gas sectors.

4. **Nigeria has also been characterized by sizable capital outflows, which have also diminished recently.** Total capital outflows, which averaged 4 percent of GDP over 2011–14, have mostly consisted of other investment outflows such as trade credits and private sector holdings of currency and deposits. These outflows slowed sharply in 2015, buffering the impact on the balance of payments of the reduction in capital inflows (Figure 3).

Figure 3. Nigeria: Net Capital Flows, 2008-15
(Percent of GDP; 2015 includes through Q3 only)



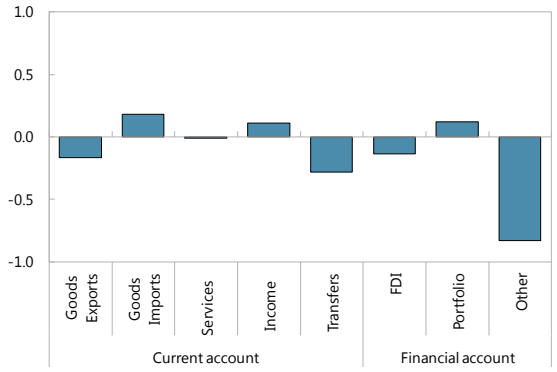
Sources: Haver Analytics; and IMF staff calculations.

5. **The large magnitude of outflows of other investment assets, and of errors and omissions, highlights the uncertainties faced in analyzing developments and prospects in Nigeria's capital flows and overall balance of payments.** Analysis of Nigeria's capital flows is subject to limitations in the data, as inflows are generally captured more comprehensively than are outflows. This has in the past been a contributing factor in the large, negative errors and omissions reported in balance of payments data. Net other investment, including both inflows and outflows, averaged about minus 3 percent of GDP over 2010-14. Errors and omissions outflows were of similar

size, and highly negatively correlated with other investment flows, suggesting the errors and omissions could reflect unrecorded other investment outflows (Figure 4).[6] Supporting this potential relationship is the similarity of Nigeria's net other investment and errors and omissions outflows, when taken together, with those of other oil exporters, at a level well above most major economies (Figure 5).

Figure 4. Nigeria: Errors and Omissions Correlations, 2008Q1-2015Q3

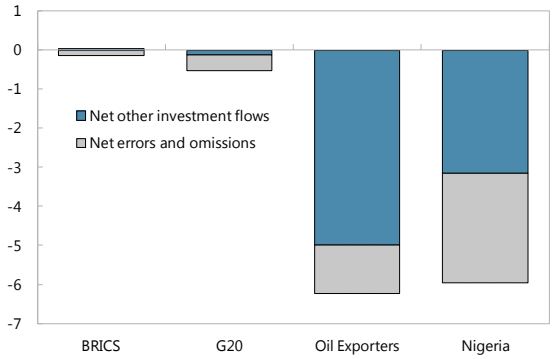
(Correlation of quarterly data)



Sources: Haver Analytics; and IMF staff calculations.

Figure 5. Nigeria: Net Other Investment and Errors and Omissions Flows, 2010-14

(Percent of GDP; average 2010-14)



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

Drivers of capital flows

6. **This section examines the recent behavior of typical drivers of capital flows.** The volatility of capital flows during the global financial crisis of 2008-09 and its aftermath spurred a renewed interest in the drivers of capital flows to emerging markets.[7] Many studies have distinguished between external "push" factors and country-specific "pull" factors. Push factors would include determinants of the rate of return on advanced economy assets, such as interest rates and economic growth, and the degree of risk aversion by non-resident investors. Pull factors would include determinants of the rate of return on assets in the emerging market, such as domestic interest rates, expectations of the exchange rate, and economic growth, as well as country-specific macroeconomic fundamentals and other risk factors. For Nigeria, given its dependence on oil for foreign exchange earnings and fiscal revenue, the oil price is potentially a key driver of both the rate of return on domestic assets and of country-specific credit and foreign exchange risks.

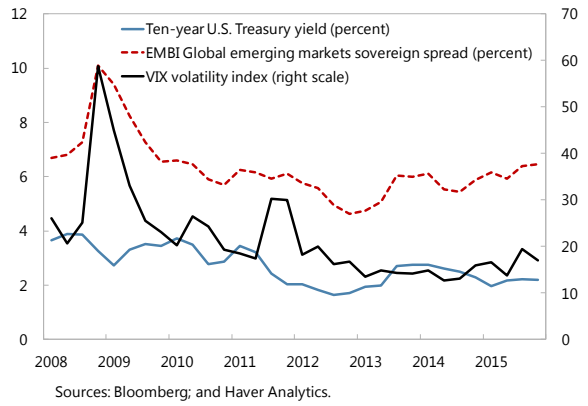
[6] Some of these outflows could be illicit flows, as discussed in Annex II of *Nigeria: Staff Report for the Article IV Consultation*.

[7] For a recent review, see Koepke, R., 2015, "What Drives Capital Flows to Emerging Markets? A Survey of the Empirical Literature," Institute of International Finance Working Paper.

7. **Figures 6 through 9 display some of these factors for Nigeria.**

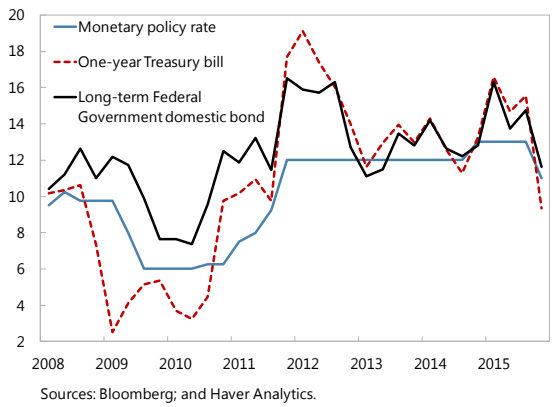
- Figure 6 shows some pull factors—the ten-year U.S. Treasury yield, the VIX volatility index, and the EMBI Global spread on emerging market sovereign debt, as a measure of investor sentiment toward emerging markets in general.
- Figure 7 shows the Nigerian monetary policy rate, and yields on one-year and long-term (ten years or more) Federal Government of Nigeria securities, and shows that domestic interest rates have typically exceeded ten percent.
- Figure 8 shows the spread on Nigerian Eurobonds versus U.S. Treasury yields, and the oil price. The negative relationship reflects Nigeria's dependence on oil for fiscal revenue, and thus market perceptions of its creditworthiness.
- Expectations of future exchange rates are shown in Figure 9. Both the Consensus Forecast and the non-deliverable forward (NDF) market have tended to expect the naira to depreciate, with the latter embodying expectations of a larger depreciation.

Figure 6. Nigeria: Global Financial Conditions, 2008-15
(Quarterly averages)



Sources: Bloomberg; and Haver Analytics.

Figure 7. Nigeria: Interest Rates, 2008-15
(Percent; quarterly averages)

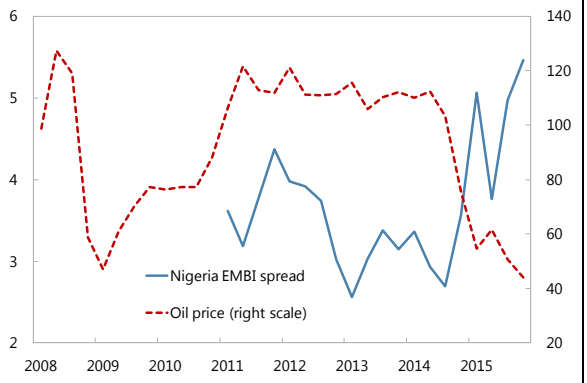


Sources: Bloomberg; and Haver Analytics.

8. **Developments in these underlying determinants appear to have some bearing on movements in Nigeria's capital inflows and outflows.** Overall, the broad stylized facts shown above suggest that total capital inflows, in particular portfolio inflows, lined up with the period of high oil prices and low interest rates in advanced economies, and the associated search for yield by investors. The subsequent downturn in these flows in late 2014 coincided with the decline in oil prices, which also generated higher yields on domestic securities and Eurobonds, and expectations of exchange rate depreciation. Administrative restrictions on foreign exchange market activity imposed around that time, as described in the next section, also likely had a dampening effect on capital inflows.

Figure 8. Nigeria: EMBI Spread and Oil Price, 2008-15

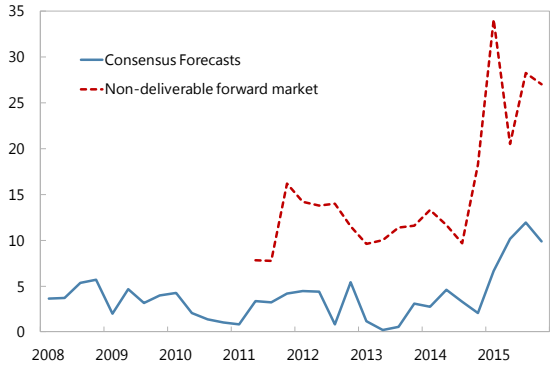
(Spread in percentage points; price in U.S. dollars per barrel; quarterly averages)



Sources: Bloomberg; and Haver Analytics.

Figure 9. Nigeria: Expected Exchange Rate Depreciation, 2008-15

(Expected 12-month percent change in naira per U.S. dollar)



Sources: Bloomberg; and Consensus Forecasts.

9. **Regressions also point to the importance of these factors for portfolio inflows.** Given the short time span of the data, its volatility, and the measurement issues noted above, empirical analysis of Nigeria's capital flows should be treated with caution. Furthermore, the short time span prevents consideration of some more slow-moving macroeconomic fundamentals such as public debt. Nevertheless some insights emerge from the regressions shown in Table 1, where each category of capital flows was regressed on each of these potential determinants.[8] Shaded cells signify statistically significant relationships of the correct sign at the 10 percent level. There were few such relationships for capital outflows, but for inflows, in particular for portfolio flows, relationships were stronger and in line with expectations. Table 2 lists the qualitative findings:

- **Factors increasing capital inflows:** Tighter domestic monetary policy, and broader financial conditions, as well as stronger expected growth and higher oil prices, all tended to increase capital inflows, especially of portfolio debt securities.

- **Factors reducing capital inflows:** Higher U.S. yields and increased risk aversion either in general or toward emerging markets in particular reduced capital inflows, with the relationship again tighter for portfolio flows. Higher expected depreciation of the naira also tended to reduce capital inflows, but the results were not statistically significant.

[8] Tests found that the explanatory variables did not display a unit root over this sample period. For external factors, the contemporaneous value and first lag were used. To avoid potential endogeneity, the regressions used the first and second lags of Nigerian interest rates. For the two variables from the Consensus Forecasts survey, expected Nigerian growth and exchange rate depreciation, the contemporaneous value and first lag were used, using the survey taken early in the first month of each quarter.

Table 1. Nigeria: Coefficients from Univariate Regressions, 2008Q1-2015Q3

	Domestic factors					External factors			
	Monetary policy rate	1-year Treasury yield	Long-term bond yield	Expected depreciation	Expected growth	10-year U.S. Treasury yield	Oil price	VIX index	EMBI spread
Capital outflows (change in assets abroad)									
Direct investment	19	6	19	-22	49	-62	1	1	1
Portfolio investment	69	36	28	5	223	35	7	-5	-19
Equity securities	51	29	23	6	194	36	6	-3	-9
Debt securities	18	7	5	-1	30	-1	1	-3	-10
Other investment	-30	251	533	140	-580	584	49	-127	-656
Capital inflows (change in liabilities to non-residents)									
Direct investment	-109	-43	-36	-28	33	278	2	28	122
Portfolio investment	233	223	411	-64	653	-1,639	42	-83	-1,039
Equity securities	63	101	222	-26	266	-894	21	-36	-554
Debt securities	170	122	189	-38	387	-745	21	-47	-485
Government	160	110	179	-37	317	-698	18	-40	-419
Private	10	12	11	-1	70	-47	3	-7	-66
Other investment	243	97	174	-9	-142	-195	12	-100	-490

Source: IMF staff calculations.

Note: The sample period is 2008Q1 to 2015Q3. The independent variables are the first two lags for domestic interest rates, and the contemporaneous term and first lag for the external factors and survey variables. The coefficients shown are the sum of these two terms. Shaded cells are statistically significant at the 10 percent level, as measured by p-values of Wald F-statistics, which are robust to autocorrelation and heteroscedasticity and test the joint significance of the independent variables.

Table 2. Nigeria: Broad Impact of Push and Pull Factors on Capital Inflows

Increased net capital flows	Reduced net capital flows
Monetary policy tightening	Expectations for currency depreciation
Tighter domestic financial conditions	Tighter U.S. financial conditions
Expectations for stronger economic growth	Higher risk aversion by international investors
Higher oil prices	Worsening sentiment toward emerging markets

Source: Regressions in Table 1.

Prospects for Capital Flows

10. **This section examines some factors that could affect the outlook for Nigeria's capital flows.** Nigeria's increasing reliance on market sources of financing warrants a closer examination of portfolio investment inflows. Building on the results in the previous section, each category of portfolio flows was regressed on a subset of variables of particular importance for forecasting and policy analysis. These variables are the Nigerian monetary policy rate, the expected depreciation of the naira, the U.S. Treasury yield, and the oil price. This model was chosen to maximize the applicability to the outlook for portfolio inflows, controlling to the extent possible for key factors

identified in the univariate regressions, while mindful of the limited degrees of freedom due to the short time span of the data. The contemporaneous value of each variable is included except for the Nigerian monetary policy rate, where the first lag was used.

11. **Table 3 shows the results of these regressions, which are of the expected sign.** The regressions explain between 20 percent and 70 percent of the variation in portfolio inflows, with the best fit for government debt securities. The effects of the various explanatory factors on capital inflows are in line with those of the univariate regressions above. In particular, higher oil prices and tighter monetary policy tend to raise inflows, while higher U.S. yields and higher expected depreciation tend to lower them.[9]

Table 3. Nigeria: Portfolio Inflows Regressions, 2008Q1-2015Q3

	Independent variables				Adjusted R-squared
	Nigeria monetary policy rate	Expected depreciation	U.S. Treasury yield	Oil price	
Equity securities	-128	-20	-1,086 **	20 ***	0.39
	(0.27)	(0.54)	(0.02)	(0.01)	
Debt securities	100 **	-44 **	-459 **	14 ***	0.71
	(0.04)	(0.04)	(0.02)	(0.00)	
Government	95 **	-41 **	-425 **	12 ***	0.70
	(0.03)	(0.05)	(0.01)	(0.00)	
Private	4	-4	-34	2 ***	0.23
	(0.69)	(0.41)	(0.42)	(0.00)	

Source: IMF staff calculations.
Note: The sample period is 2008Q1 to 2015Q3. The dependent variables, capital flows, are expressed in million U.S. dollars. The independent variables are the first lag for the monetary policy rate and the contemporaneous term for the other variables. Asterisks denote statistical significance at the 5 percent (**) and 1 (***) percent levels, respectively, using test statistics robust to autocorrelation and heteroscedasticity.

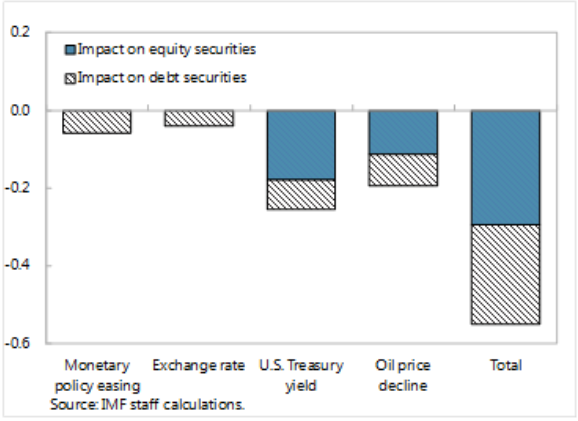
12. **These findings point to risks that capital inflows to Nigeria will be lower in the near term than in the recent past.** As an illustrative calculation, the coefficients estimated in Table 3 were used to calculate the potential impact of a one standard deviation shock to each of these drivers of portfolio inflows. The magnitude of these shocks would be a tightening of Nigeria's

[9] Tighter monetary policy was found to lower portfolio equity inflows, but the estimated effect was not significant.

monetary policy rate by 250 basis points, an increase in expected depreciation of the naira by 4 percent, a rise in U.S. Treasury yields by 70 basis points, and a fall in oil prices by $23.[10] Figure 10 shows the potential impact on portfolio inflows of such shocks as well as the combined impact if all shocks were experienced simultaneously.[11] The total impact would amount to over half a percent of GDP, with the largest contributions from the U.S. Treasury yield and the oil price. The magnitude is not large relative to GDP, but the results highlight the drag that external conditions could exert on capital inflows and reserves, particularly in the current environment characterized by recent monetary easing, market expectations of a devaluation, and low oil prices for a long period. Given the role of oil in Nigeria's external accounts, the impact on the balance of payments could be offset to some extent by lower outflows of other investment assets and of errors and omissions, as seen in the first three quarters of 2015.

Figure 10. Nigeria: Portfolio Inflows Sensitivity to Shocks

(Percent of GDP)



Source: IMF staff calculations.

13. **The recent implementation of administrative measures adds uncertainty to the outlook for capital flows.** Measures have been taken recently that could lower both inflows and outflows. In December 2014, the Central Bank of Nigeria (CBN) reduced the daily foreign exchange trading exposure limit for commercial banks and required customers to utilize funds purchased on the foreign exchange market within 48 hours, or return them to the CBN for re-purchase. These measures significantly reduced liquidity on the interbank foreign exchange market, an impact that persisted despite the subsequent partial relaxation of these limits. Citing this reduction in liquidity of the foreign exchange market, J.P. Morgan and Barclay's decided to remove Nigeria from their global indexes of domestic currency bond markets, which are widely tracked by non-resident investors. In June 2015, the CBN enacted a restriction on obtaining foreign exchange for outward portfolio investment by Nigerian residents.

14. **Non-deliverable forward (NDF) prices are another indicator that can be used to assess the impact of administrative measures on capital flows.** NDFs are foreign exchange derivatives in which a net payment in a convertible currency is exchanged based on the difference between the contracted forward exchange rate and the realized spot exchange rate at the end of the contract.

[10] The fall in the oil price is close to the expected price decline from 2015 to 2016 based on average prices in futures markets.

[11] The impacts of monetary policy and expected depreciation on equity flows were excluded since the coefficients were not statistically significant.

Covered interest parity would imply that the forward rate should be equal to the spot exchange rate adjusted for the interest differential:[12]

$$F = S * (1 + i)/(1 + r_t^{\$})$$

Where F is the forward exchange rate, S is the spot exchange rate, i is the onshore interest rate on a naira-denominated instrument, and r$ is the U.S. dollar interest rate. For an NDF, this condition would be:

$$NDF = S * (1 + i^*) \,/\, (1 + r_t^{\$})$$

The only difference is that i*, the implied offshore interest rate in naira, is unobserved. Rearranging terms, the implied offshore interest rate can be expressed in terms of observable indicators:

$$i^* = NDF * \left(1 + r_t^{\$}\right)/ S \; - 1$$

A key concept for analysis is the gap between the implied offshore interest rate and the onshore rate, i* – i, which is a measure of the degree of effective segmentation between the onshore and offshore markets. A positive gap is an indication of higher returns offshore, suggesting that potential capital outflows are being inhibited in some way.

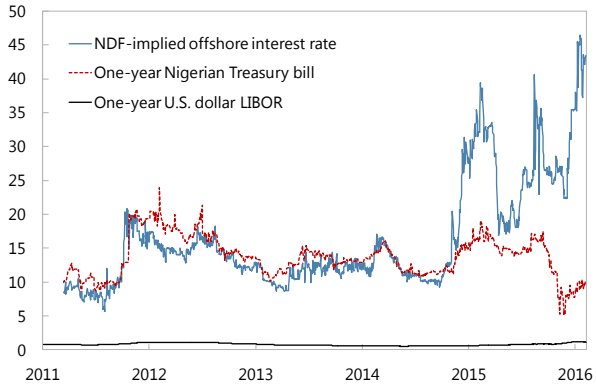
15. **A sizable gap has opened between implied offshore and onshore rates.** Figure 11 shows one-year interest rates in naira and in U.S. dollars, plus the NDF-implied offshore rate as calculated above. Onshore and offshore-implied rates were generally close from 2011–14, with some tendency for the onshore rate to be higher, signifying the potential for more inflows. This situation reversed in late 2014, when NDF contracts began pricing in substantial amounts of naira depreciation not reflected in the prices of financial instruments onshore, suggesting the administrative measures on foreign exchange market activity implemented around that time were binding for capital outflows. The NDF-implied offshore interest rate averaged 27 percent in 2015, compared to an onshore rate of 14 percent. This 13 percent offshore premium—which increased to an average of about 30 percent in the first two months of 2016—is substantially higher than for any of the countries analyzed in a similar recent study covering a number of emerging Asian economies, plus Korea and Brazil.[13] While covered interest parity may fail to hold completely due to market illiquidity or

[12] See, for example, G. Ma, C. Ho, and R. McCauley, 2004, "The Markets for Non-Deliverable Forwards in Asian Currencies," BIS Quarterly Review, June 2004, pp. 81-94.

[13] See R. Bi, 2016, "How Open is India's Capital Account? An Arbitrage-Based Approach," in India—Selected Issues, SM/16/27 (1/29/2016).

time-varying country or credit risk premia, the large offshore-onshore interest rate gap for Nigeria suggests that capital flows are unlikely to pick up in the near term due to investor expectations of naira depreciation and the higher expected returns of investing offshore.

Figure 11. Nigeria: NDF-Implied Interest Rate, 2011-15
(Percent)



Sources: Bloomberg; and Haver Analytics.

16. **Overall, the analysis points to both exogenous and policy-related factors as drivers of capital flows.** In the long run, removing structural impediments to growth and enhancing the business environment and governance would be the ideal way to increase capital flows. In the short run, Nigeria's room to maneuver in an environment of low oil prices and rising external interest rates may be limited, especially with NDF-implied interest rates suggesting that in an unrestricted setting, Nigeria could experience capital outflows. Nevertheless, the authorities may be able to counterbalance these factors to some extent through tighter monetary policy and avoiding exchange rate misalignment. These findings are in line with other recent work on capital flows to LIDCs, which find a substantial role for the macroeconomic fundamentals of this group of countries in the access to and pricing of external funding.[14]

[14] See International Monetary Fund, 2015, "Macroeconomic Developments and Prospects in Low-Income Developing Countries: 2015 Report," and Presbitero, A., and others, 2015, "International Sovereign Bonds by Emerging Markets and Developing Economies: Drivers of Issuance and Spreads," IMF Working Paper WP/15/275.

FINANCIAL DEEPENING AND THE NON-OIL SECTOR GROWTH IN NIGERIA[1]

1. **Nigeria's recent growth has been supported by the strong growth in the non-oil sector.** It is important to investigate how much of the non-oil growth was associated with the oil price boom. In particular, it is important to understand how the growth in the oil sector was transmitted to the non-oil sector growth, both by raising aggregate demand in the economy but also by raising aggregate supply and potential output of the non-oil sector. The channel of transmission through the aggregate demand channel was analyzed in the 2014 Article IV using the input-output table. The transmission through the aggregate supply channel, in particular by financing investment (both fixed capital formation and working capital) in the non-oil sector is less understood. Better understanding of the magnitudes of spillovers through the aggregate supply side of the economy is important at this juncture as the reversal of oil price boom observed since summer 2014 could result in not only a decline in the aggregate demand but also in the aggregate supply and potential output which could have a lasting effect on the long-run growth.

A. Impact of the Oil Price Shock on the Corporate Sector

2. **The collapse in oil prices reduces the aggregate demand.** A decline in oil prices and a decline in terms of trade more generally can reduce consumption demand by reducing real income and wealth. The 2014 Article IV estimated, using the input-output table, the effect of a unit decline in oil price on consumption demand. Given that the majority of consumption goods and services are produced in the non-oil sector, the impact of a decline of oil prices on the non-oil sector growth was nontrivial: non-oil growth was projected at 5.5 percent in 2015, down from 7.2 percent for 2014.

3. **How much could the collapse in oil prices reduce aggregate supply by reducing financing available for working capital and fixed capital formation for the non-oil sector?** The more important channel of spillover from the oil sector for the country's long-term sustainable growth is the channel through investment. How much has the oil price boom been fueling investment and in turn raising potential output or long-run aggregate supply? To answer this question a number of questions need to be investigated. How much of the growth in investment (both fixed capital formation and working capital) in the corporate sector in recent years financed by retained earnings as opposed to other sources of financing such as credit from suppliers, bank credit, equity and bond financing?

4. **Sources of financing have a critical importance in assessing inter-linkages across sectors from the supply-side of the economy**. If fixed capital formation and working capital

[1] Prepared by Allison Holland, Mika Saito, and Miriam Tamene, with research assistance from Sebastian Corrales and Marwa Ibrahim.

investment rely solely on retained earnings, then a decline in demand for goods and services in one sector and thus a decline in retained earnings in that sector will impact availability of funding for fixed capital formation and working capital for that sector. On the other hand, if other sources of financing become available through financial deepening, then firms in one sector can mitigate some of adverse demand shocks in that sector by borrowing from resources available from other sectors. This change makes the economy more robust to shocks. But this change also implies that an adverse shock in one sector (e.g., the oil sector) can be transmitted more easily to other sectors of the economy (e.g., non-oil sector) through reducing investment and growth in other sectors.

5. **Enterprise surveys conducted in the eve of the 2008-09 financial crisis and in the midst of 2014 oil price shock suggest that means of financing investment changed in Nigeria**. Enterprise surveys show that growth real sales in the corporate sector was on average 13.6 percent before the 2008-09 crisis but was down to 3.5 percent in 2014. Empirical investigation suggests that the transmission of the slowdown in the oil sector (which began in 2012) was more prominently observed in firms in non-oil sector that have benefited from financial deepening partly due to changes in means of financing their fixed capital formation and working capital.

Survey coverage

6. **This section uses the World Bank's Enterprise Survey** to get a snap shot of the corporate sector activities in two periods, (i) the eve of the 2008-09 global financial crisis and (ii) the midst of the 2014 oil price shock. Enterprise surveys were conducted in 2007, 2009 and 2014. In 2007, 2,387 firms in 25 states were surveyed. Subsequently, in 2009, 3,157 firms in remaining 11 states were surveyed. As these two sampling periods, 2007 and 2009, covered the entire country, in this section of the paper, the first survey period is referred to as the 2008 survey or the survey conducted at the eve of the 2008-09 global financial crisis. In 2014, 2,676 firms in 19 states were surveyed. This survey is also referred to as the survey conducted the midst of the 2014 oil price shock as it was conducted during April 2014 and February 2015. The panel dataset for this study was constructed to include only firms that had an observation in 2008 (either 2007 or 2009) and 2014, which comprised 1,354 firms in 18 states.

7. **The panel data constructed for this study cover a wide range of enterprises across states, sectors, and size**. The total number of firms observed both in 2008 and 2014 are 1,354 firms (Table 1). It is important to note that 1,354 firms is a small set of firms as the enterprise population for the entire country is estimated in the range of 73,000 firms.[2]

[2] The World Bank survey was conducted in collaboration with Nigeria's National Bureau of Statistics (NBS). Based on the information available on NBS's website, there were 68,168 small size enterprises and 4,670 medium size in 2013.

Table 1. Nigeria: Enterprise Survey Coverage, 2007/09 and 2014

By Size:	2008	2014	Total
Small(5-19)	380	420	800
Medium(20-99)	250	214	464
Large(100+)	47	43	90
Total	677	677	1,354

By State:	2008	2014	Total
Abia	42	41	83
Abuja	24	25	49
Cross river	52	52	104
Enugu	42	43	85
Gombe	33	33	66
Jigawa	29	29	58
Kaduna	61	61	122
Kano	60	61	121
Katsina	30	30	60
Kebbi	38	38	76
Kwara	28	28	56
Lagos	30	30	60
Nasarawa	28	28	56
Niger	34	34	68
Ogun	36	35	71
Oyo	57	57	114
Sokoto	20	19	39
Zamfara	33	33	66
Total	677	677	1,354

By Sector:	2008	2014	Total
Textiles	10	10	20
Garments	33	37	70
Food	83	75	158
Metals and machinery	34	40	74
Chemicals and pharmac	10	7	17
Construction	35	10	45
Wood and furniture	51	52	103
Non-metallic and plastic	22	36	58
IT services	11	10	21
Other manufacturing	38	30	68
Retail and wholesale	210	225	435
Hotels and restaurant	104	106	210
Other unclassified	36	39	75
Total	677	677	1,354

Sources: Enterprise Survey; and IMF staff calculations.

Growth

8. **Real annual sales growth at the eve of the 2008-09 global financial crisis was much higher than in the midst of oil price shock in 2014**.

- Annual sales growth reported in the current fiscal year from a previous period was on average 13.6 percent in the 2008 survey while only 3.5 percent in the 2014 survey (Table 2 and Figure 1).
- Firms in a number of states in the north west region (e.g., Zamfara, Sokoto, Kebbi, and Katsina) experienced a sharp decline in annual sales growth, though there were some exceptions (Kaduna).
- Real annual sales growth declined the sharpest in the chemical and pharmaceuticals industry, while the construction industry showed a robust growth in the 2014 survey.
- The real annual sales growth observed in the 2014 survey portrays similar patters observed in the national income accounts data (e.g., strong growth in IT services and construction) but not all for all sectors (e.g., textile, chemical and pharmaceutical products, basic metals, machinery

and equipment, and accommodation and food services all showed strong growth in the national income accounts data).

- It is important to note that the evidence of slowdown in the real annual sales growth was observed for firms with all sizes but a large variation was observed among large firm, some continue to do well with others (e.g., retail and whole sale trade and hotel and restaurant) facing a much sharper decline in real annual sales.[3]

Table 2. Nigeria Growth in Real Sales, 2007/09 and 2014

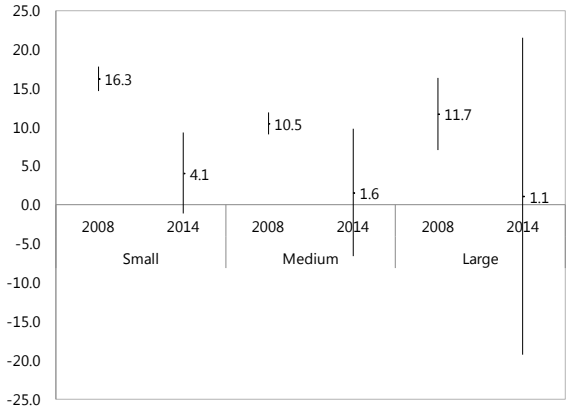
(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	15.9	17.1	32	36.0	47.1	29
SW	11.1	9.7	100	3.8	49.5	59
SE	20.1	11.7	53	6.6	49.1	60
NW	12.3	11.6	219	4.7	45.9	198
NE	8.9	6.4	28	-8.1	41.7	32
NC	15.6	15.2	83	-5.4	43.3	83
By Sector:						
Light	13.4	12.7	156	4.5	46.9	116
Heavy	13.9	13.3	63	-4.5	45.3	53
Other man	14.1	11.9	59	3.1	52.2	47
Services	13.6	12.5	237	5.8	46.4	245
By Size:						
Small	16.3	12.6	244	4.1	46.1	299
Medium	10.5	10.9	228	1.6	49.0	137
Large	11.7	15.6	43	1.1	52.1	25
Total	13.6	12.5	515	3.5	46.8	461

Sources: Enterprise Survey; and IMF staff calculations.

Figure 1. Nigeria Growth in Real Sales: By Firm Size, 2007/09 and 2014

(Percent)



Sources: Enterprise Survey; and IMF staff calculations. The point and the line indicate the mean and the confidence interval.

Labor input

9. **The sources of slower growth in the 2014 survey are examined in turn**. More specifically, the rest of this section explores differences in labor, capital, and productivity between the 2008 and 20014 surveys.

10. **Annual employment growth declined in the 2014 survey relative to 2008 survey**. It declined from the average growth of 8.3 percent in the 2008 survey to 5.3 percent in the 2014 survey (Table 3).

[3] Firm size is defined as follows: small for 5-19 workers; medium for 20-99 workers; and large for more than 100 workers.

- There were notable differences among firms with different sizes. While small- and medium-size firms were contracting the employment size, large-firms (with some variations) were expanding on average.
- Employment continued to grow in some states (e.g., Cross River, Enugu, Gombe, Niger, and Oyo states) in 2014, but a sharp decline in others (e.g., Katsina), but there is no regional pattern. Employment continued to grow in chemical and pharmaceuticals despite a decline in real sales growth. This in terms implies that there was a significant decline in labor productivity in this sector.
- Growth in the use of temporary workers did not change much between the two periods.
- The female ownership seems to have declined sharply between the two periods (Table 4). The question was as "among the owners of the firm, are there any females?" and the statistics in the table is the average of yes = 1 and no = 2. That is, the average of 1.16 for 2008 implies that there were 16 percent of the firms in the sample that answered no to this question in 2008. However, 74 percent of the firms indicated no females in the ownership.

Table 3. Nigeria: Growth in Employment, 2007/09 and 2014

(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	4.0	8.6	42	1.6	2.9	48
SW	3.5	8.8	107	4.6	13.3	113
SE	2.6	3.8	55	1.7	5.6	79
NW	3.4	10.2	237	3.8	9.8	267
NE	1.4	4.3	29	2.5	3.8	33
NC	3.9	12.8	104	2.6	4.9	114
By Sector:						
Light	4.2	12.1	167	3.1	6.0	170
Heavy	3.5	9.9	66	3.3	7.7	79
Other man	2.2	4.4	64	3.5	10.1	64
Services	3.1	8.6	277	3.3	10.5	341
By Size:						
Small	1.2	2.3	277	2.0	4.3	407
Medium	3.9	8.6	250	6.3	13.9	206
Large	15.4	24.5	47	12.4	24.8	41
Total	3.4	9.6	574	3.3	8.9	654

Sources: Enterprise Survey; and IMF staff calculations.

Table 4. Nigeria: Female Ownership, 2007/09 and 2014

(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	1.13	0.34	50	1.68	0.47	50
SW	1.19	0.40	117	1.67	0.47	115
SE	1.25	0.43	83	1.59	0.49	84
NW	1.12	0.33	258	1.83	0.38	267
NE	1.14	0.35	30	1.70	0.47	33
NC	1.19	0.40	105	1.74	0.44	114
By Sector:	1.16	0.37	643	1.74	0.44	663
Light	1.17	0.38	168	1.77	0.42	169
Heavy	1.04	0.20	64	1.94	0.25	80
Other man	1.12	0.33	65	1.73	0.45	66
Services	1.19	0.40	346	1.66	0.48	348
By Size:						
Small	1.22	0.40	374	1.73	0.40	418
Medium	1.08	0.30	229	1.78	0.42	208
Large	1.00	0.00	40	1.60	0.50	37
Total	1.16	0.37	643	1.74	0.44	663

Sources: Enterprise Survey; and IMF staff calculations.

Fixed capital

11. The fraction of firms that purchased fixed assets also declined in the 2014 survey (Table 5).

- The question asked was "Did This Establishment Purchase Any Fixed Assets In Last Fiscal Year?" The table is the average of yes = 1 and no = 2. That is, 53 percent of the firm did not invest between 2007-08, while 61 percent did not investment between 2013-14.

- There is a large difference between the two periods among large firms (Figure 2). In 2008, only 16 percent of large firms indicated "no investment in the past year," while in 2014, 49 percent of large firms as such. This evidence is consistent with what is presented in the later part of this paper that the larger firms were more expansionary in the earlier period.

Table 5. Nigeria: Fixed Capital Investment, 2007/09 and 2014

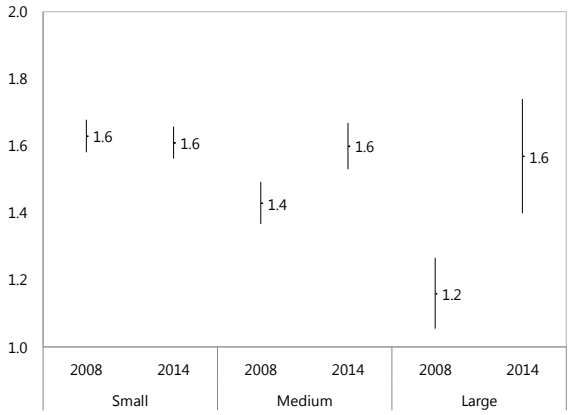
(Index: Yes = 1; No = 2)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	1.61	0.49	52	1.55	0.50	49
SW	1.45	0.50	123	1.62	0.49	105
SE	1.77	0.42	84	1.73	0.45	80
NW	1.49	0.50	271	1.58	0.49	266
NE	1.27	0.45	33	1.52	0.51	33
NC	1.53	0.50	114	1.62	0.49	113
By Sector:						
Light	1.51	0.50	177	1.53	0.50	165
Heavy	1.52	0.50	66	1.55	0.50	79
Other man	1.53	0.50	74	1.54	0.50	62
Services	1.54	0.50	360	1.71	0.46	340
By Size:						
Small	1.63	0.48	380	1.62	0.49	408
Medium	1.43	0.50	250	1.60	0.49	199
Large	1.16	0.37	47	1.49	0.51	39
Total	1.53	0.50	677	1.61	0.49	646

Sources: Enterprise Survey; and IMF staff calculations.

Figure 2. Nigeria: Fixed Capital Investment: By Firm Size, 2007/09 and 2014

(Index: Yes = 1; No = 2)



Sources: Enterprise Survey; and IMF staff calculations.

The point and the line indicate the mean and the confidence interval.

Factors affecting productivity

12. **Firms differed between the two periods in other aspects affecting productivity**. Total factor productivity cannot be measured using the enterprise survey, as capital stock data are not available. This section looks at both labor productivity (which can be measured) and other factors affecting productivity (e.g., power outage (duration), whether they own a generator or share a generator, whether transportation is a major obstacle or not (costs of delivery of goods and services), use of email or having website (efficiency and delivery of goods and services), whether tax admin, tax rate, or licensing as a major constraint, number of bribery incidence, and security costs).

13. **Labor productivity declined on average between the two periods** (Table 6).

- In particular, chemicals and pharmaceuticals decline and construction improved.

- Larger firms were worse hit than small- and medium-sized firms, as despite the decline in the growth of real sales, employment continued to grow in large firms (Figure 3). There were

however large variations among large firms, some improved productivity significantly while others had a major set-back.

- There were no particular regional patterns.

Table 6. Nigeria: Labor Productivity, 2007/09 and 2014

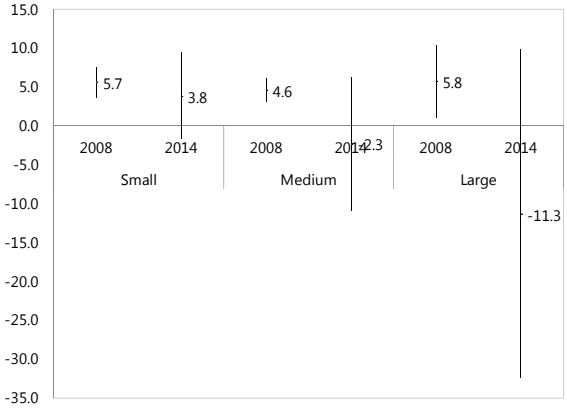
(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	5.6	18.4	32	32.3	48.5	28
SW	1.4	10.4	100	-2.1	53.3	53
SE	8.2	13.5	53	4.1	49.6	54
NW	5.2	14.6	219	4.7	47.7	188
NE	4.1	8.6	28	-11.4	45.2	30
NC	8.4	15.0	83	-4.9	43.3	80
By Sector:						
Light	4.5	14.1	156	0.9	47.6	111
Heavy	4.9	14.1	63	-5.1	47.2	50
Other man	5.4	12.8	59	3.9	55.3	43
Services	5.9	14.4	237	5.6	47.8	229
By Size:						
Small	5.7	15.4	244	3.8	47.4	276
Medium	4.6	11.7	228	-2.3	50.5	133
Large	5.8	15.5	43	-11.3	52.8	24
Total	5.3	14.1	515	2.2	48.2	433

Sources: Enterprise Survey; and IMF staff calculations

Figure 3. Nigeria: Labor Productivity: By Firm Size, 2007/09 and 2014

(Percent)



Sources: Enterprise Survey; and IMF staff calculations. The point and the line indicate the mean and the confidence interval.

14. **Other factors affecting productivities suggest some positive and negative pictures**.

- The annualized losses due to power outages as a percent of total annual sales have gone up on average 8.2 percent in 2008 to 20.3 percent in 2014. Here the distinction between small- and medium-sized firms and large firms are large. In fact large firms on average reduced the losses due to power outage. In contract, small- and medium-sized firms were largely hit by power outages.
- Large firms were hit by less by power outages (Figure 4). The percent of electricity from generator owned or shared, however, increased for large firms.
- On the other hand, the percent of contract value paid in informal gifts to secure contracts have gone down from on average 7.4 percent in 2008 to 3.8 percent in 2014. The decline is evident for both large- and small- and medium-sized firms.
- The perception that tax administration as an obstacle to firm operation seems to have eased somewhat. The multiple choice ranged from no obstacle = 0 to very severe obstacle = 4 and the average statistics decline from 1.7 in 2008 to 1.4 in 2014. However the decline was more evident among large firms (the average score went down from 2.5 to 1.0) but not for small firms (the score remained unchanged at around 1.5).

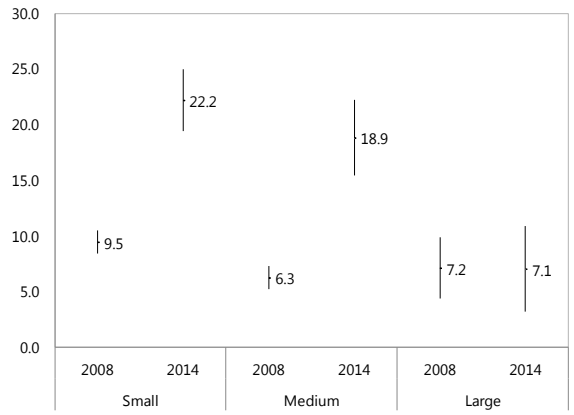
- The contrast between large firms and small- and medium-sized firms is noticeable in terms of the use of technology (Figure 5). In 2014, on average only 70 percent of large firms used email communications with clients and suppliers while 80 percent of firms on average across all sizes did not use email communications. The change over time was not however evident.

Table 7. Nigeria: Other Factors Affecting Productivity, 2007/09 and 2014
(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
Annualized losses due to power outages as % of total annual sales	8.2	9.0	570	21.3	23.7	459
Of which: Large firms	7.2	9.3	44	7.1	7.6	15
Transport as an obstacle to firm operations*	1.79	1.30	677	1.24	1.10	623
Of which: Large firms	2.4	1.3	47	1.2	0.8	33
Percent of contract value paid in informal gifts to secure contracts	7.3	9.5	670	4.1	11.4	361
Of which: Large firms	8.2	8.9	46	2.7	8.2	21
Tax administration as an obstacle to firm operations*	1.7	1.3	677	1.4	1.0	620
Of which: Large firms	2.5	1.5	47	1.0	1.1	33
Percent of electricity from generator owned/shared in the last fiscal year	61.4	24.6	294	56.4	28.6	501
Of which: Large firms	64.3	24.0	31	66.0	28.0	29
Communicate with clients and suppliers by E-Mail (yes = 1; no = 2)	1.71	0.5	677	1.75	0.4	622
Of which: Large firms	1.12	0.3	47	1.31	0.5	33

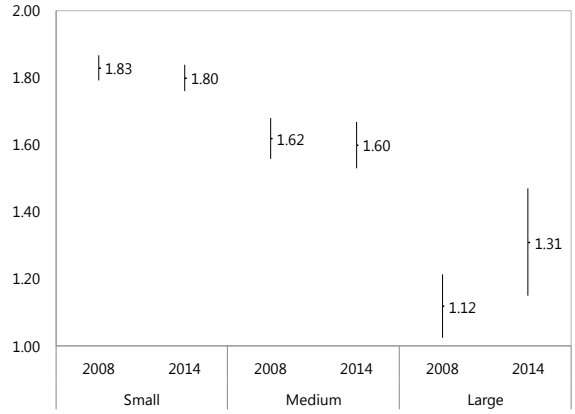
Sources: Enterprise Survey; and IMF staff calculations.

Figure 4. Nigeria: Loss Due to Power Outage: By Firm Size, 2007/09 and 2014
(Percent of Total Sales)



Sources: Enterprise Survey; and IMF staff calculations.
The point and the line indicate the mean and the confidence interval.

Figure 5. Nigeria: Use of Technology: By Firm Size, 2007/09 and 2014
(Index: Yes = 1; No = 2)



Sources: Enterprise Survey; and IMF staff calculations.
The point and the line indicate the mean and the confidence interval.

Financing investment

15. **There is a noticeable difference in the form of financing in Nigeria between the two periods** (Table 8). First, the financing of fixed capital formation has changed between the two periods.

- On average, 90 percent of fixed capital formation was funded by retained earnings or internal funds. This dependence on internal funds declined sharply in the 2014 survey, down to about 25 percent in 2014. This pattern is observed in all states, sectors, and size, except for textile industry.

- Credit from suppliers, advances from customers, equity issuances (most likely private equity), and borrowing from non-bank financial institutions and others (which includes debt issuance) have become alternative financing options in 2014.

16. **Financing of working capital has also changed** (Table 9).

- On average, two thirds of working capital were funded by retained earnings or internal funds. The share of retained earnings that are financing working capital goes down to 55 percent by 2014. This pattern is all across states, sectors, and size, except for textile industry.

- As in the case of fixed capital formation, alternative funding sources are credit from suppliers, advances from customers, equity issuances (most likely private equity), and borrowing from non-bank financial institutions, debt issuance, and others.

- The share of retained earnings declined (and the share of alternative funding increased) especially in the manufacturing sector.

17. This change in sources of financing, or larger use of external financing (e.g., loans, debt and equity finance) rather than internal financing (e.g., retained earnings) has important implications on the inter-linkages between sectors within a country. On the one hand, options to have internal financing can cushion the impact of a negative shock in its own sector as it will allow firms to obtain financing from other sectors that are not affected by a negative shock. On the other hand, this may put firms more exposed to and linked to fluctuations in other sectors.

Table 8. Nigeria: Financing of Fixed Capital, 2007/09 and 2014

(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	84.7	29.2	21	21.3	36.1	48
SW	91.0	20.2	68	22.0	37.5	90
SE	84.6	31.3	18	16.6	35.1	82
NW	92.7	18.2	137	27.2	36.8	164
NE	94.6	17.6	24	44.2	43.3	15
NC	84.6	24.8	55	32.5	36.1	61
By Sector:						
Light	89.0	20.9	88	32.0	39.4	118
Heavy	83.1	29.9	32	33.1	36.3	50
Other man	86.1	27.2	38	25.8	38.0	42
Services	93.1	18.6	165	18.7	34.5	250
By Size:						
Small	90.3	22.3	139	22.7	35.8	297
Medium	93.7	19.2	143	30.7	39.1	128
Large	76.3	23.7	41	29.1	40.1	35
Total	90.0	21.9	323	24.7	36.8	460

Sources: Enterprise Survey; and IMF staff calculations.

Table 9. Nigeria: Financing of Working Capital, 2007/09 and 2014

(Percent)

	2008			2014		
	mean	sd	N	mean	sd	N
By Zone:						
SS	64.6	29.8	52	53.6	37.4	50
SW	66.4	26.0	123	58.3	40.7	101
SE	66.1	29.9	84	67.0	38.7	83
NW	65.5	25.3	271	50.2	37.1	251
NE	68.1	18.7	33	55.6	30.3	31
NC	72.8	20.5	114	62.3	35.7	110
By Sector:						
Light	63.4	25.0	177	57.0	37.3	158
Heavy	70.9	19.7	66	47.8	34.7	75
Other man	62.1	26.9	74	47.3	39.7	59
Services	69.6	26.3	360	60.8	38.1	334
By Size:						
Small	67.8	26.3	380	57.1	37.5	389
Medium	69.4	22.5	250	55.2	38.9	196
Large	47.7	27.4	47	53.7	39.3	41
Total	66.9	25.7	677	56.6	37.8	626

Sources: Enterprise Survey; and IMF staff calculations

Panel data analysis

18. **From the descriptive statistics above, it is important to notice that larger firms' performance declined by more than small firms in the second survey period**. Further analysis is warranted given the importance of those large firms in terms of macroeconomic impact. In particular, the panel data analysis considers the following three types of factors that could explain why large firms were affected by more:

- Factors capturing factors of production: employment growth, whether they had invested on fixed capital, age of the firm, fraction of full-time workers, whether lack of education level considered major obstacle (skill constraint; skilled labor cannot absorb shocks),
- Factors that affect the shock absorption capacity: share of imported inputs (this would capture vulnerability to depreciation), whether access finance is a major constraint (facing credit constraint; borrowing can absorb shocks), share of retained earning used for working capital investment (this captures either credit constraint or more profitability), share of retained earning used for fixed investment (size of buffer).
- Other factors that affect productivity: efficiency and delivery of goods and services, whether tax admin, tax rate, or licensing as a major constraint, number of bribery incidence, and security costs; use of technology.

19. **The focus of the analysis is which firm characteristics can explain the slowdown in the decline in the performance of the oil sector (which began in 2012)**. The empirical model is therefore specified as follows: "change" in performance is the left-hand side (LHS) variable and the characteristics of firms at the pre-crisis level (in 2008) and the "change" in these firm-characteristics as the right-hand side (RHS) variables between the two survey periods.

20. **As heteroscedasticity was observed the weighted ordinary least square (OLS) estimator was preferred**. Moreover, to control for the endogeneity between share of retained earnings used to finance investment (one of the RHS variable) and performance (the LHS variable), the real growth of sales in 2008 was used as an instrument, as this will affect how much individual firms had access to external finance while it cannot explain what will happen to firms' performance following 2008. The null of weak instrument was not rejected at 5 percent level. The result of the instrumental variable (IV) estimator is presented in the last column.

21. **Main findings from the regression analysis are as follows** (Table 10):

- The level of or the change in employment do not seem to explain the difference in the change in real sales between the two periods, but the composition of labor (permanent vs. temporary) and the change in this composition both seem to matter.
- Expanding fixed capital in the late 2000s seems to have had a negative impact on the change in real sales, but not with a statistical significance, once controlled for the endogeneity.
- Improvements in financial access over the two periods did seem to have contributed to firms' performance (measured in terms of real sales).
- Starting to own a generator seems to have contributed to firms' performance.
- Other characteristics that matter in distinguishing firms' performance are the use of IT technology and the requests for informal gift for administrative process.

Table 10. Nigeria: Factors Affecting Firm Performance, 2007/09 and 2014

(Variables in difference are changes between 2008 and 2014, while levels are for 2008)

VARIABLES	Dependent Variable: Difference in Sales Growth Rate between 2008 and 2014					
	(1)	(2)	(3)	(4)	(5)	(IV)
Labor						
Age of the firm in years	0.04	0.05	-0.89***	-0.73**	-0.54	-0.87
	(0.19)	(0.19)	(0.29)	(0.32)	(0.33)	(0.55)
Annual Employment Growth (%)	-0.13	-0.11	-0.07	0.34	0.16	0.18
	(0.16)	(0.16)	(0.24)	(0.25)	(0.26)	(0.34)
Diff. in Employment Growth	0.34***	0.37***	0.33***	0.43***	0.36***	0.19
	(0.08)	(0.08)	(0.12)	(0.12)	(0.12)	(0.24)
Share of permanent workers to total	-0.30**	-0.32**	-0.09	0.25	0.61***	1.15*
	(0.14)	(0.14)	(0.20)	(0.22)	(0.23)	(0.64)
Diff. in Share of permanent workers to total	-0.03	-0.03	0.15	0.29**	0.25**	0.39*
	(0.08)	(0.08)	(0.12)	(0.12)	(0.13)	(0.22)
Capital						
Dummy: Did the firm invest in Fixed Capital?		-11.31***	-6.70	-8.99*	-9.49*	-28.13
Yes=1; No=0		(3.19)	(4.77)	(4.88)	(5.37)	(20.85)
Intermediate inputs						
Share of imported inputs			0.06	0.14	0.16	0.44
			(0.12)	(0.13)	(0.14)	(0.35)
Financial access						
Dummy: Access to Finance Major Obstacle?				-6.60	-5.94	2.31
Yes=1; No=0				(7.33)	(7.59)	(13.12)
Diff. in Dummy: Access to Finance Major Obstacle?				-19.22***	-12.87**	-20.62*
0=No change; 1=Less access; -1=More access				(4.77)	(5.19)	(10.58)
Working Capital Financed with Retained Earnings				-0.26**	-0.26**	-2.35
				(0.13)	(0.13)	(2.21)
Diff. in Working K financed with Retained Earnings				-0.22***	-0.27***	-0.92
				(0.07)	(0.07)	(0.69)
Other factors affecting productivity						
% of annual sales lost due to power outages					-0.81***	-0.42
					(0.29)	(0.56)
Diff. in Dummy: Own or share a generator?					-15.27***	-14.23**
0=No change; 1=No longer own one; -1=Started owning one					(5.32)	(6.98)
Dummy: e-mail communication with clients/supplier?					13.81**	19.39**
Yes=1; No=0					(5.97)	(9.72)
Dummy: is tax administration an obstacle?					1.47	-13.78
Yes=1; No=0					(5.66)	(17.67)
Dummy: informal gift requested for adm. process?					27.66***	38.84**
Yes=1; No=0					(7.80)	(15.53)
Diff. in Dummy: informal gift requested for adm. process?					1.89	10.66
0=No change; 1=More bribery; -1=Less bribery					(5.41)	(11.61)
Constant	18.79	25.84**	20.40	-3.95	-44.23*	48.96
	(12.93)	(13.00)	(19.12)	(22.42)	(23.62)	(102.90)
Observations	908	908	425	391	348	348
R-squared	0.038	0.051	0.061	0.136	0.259	

Source: IMF staff estimates.

Standard errors in parentheses. Astrisks indicate: *** p<0.01, ** p<0.05, * p<0.1.

B. Corporate and Banking Sector Vulnerabilities

22. **How much would the decline in oil prices affect the bank's balance sheet by raising the corporate sector vulnerabilities?** The April 2015 GFSR highlighted two features regarding Nigeria's banking sector relative to other emerging market economies: (i) Nigerian banks have relatively high exposure to the corporate sector; (ii) the corporate sector performance was more negatively affected by the oil price decline than those in the other countries. This section of this paper traces the same story at a more granular level using firm-level data with the breakdown of banks into large versus other banks and examine the differences in the exposure to the corporate sector and possible impact on their balance sheet.

Debt stock outstanding of the non-financial sector

23. **As noted above, firms' access to external sources of financing has increased**. This increases the integration of the corporate and financial sector increasing the scope for shocks in one element of the corporate sector to be transmitted to the financial sector and, through that channel, spillover to other elements in the corporate sector. One specific aspect of this development that is Nigerian firms' use of market based financing through either bond issuance or syndicated loan issuance.

24. **Data from Dealogic provides insight into the evolution of how Nigerian corporates have used market-based sources of financing.** We track issuances by Nigerian non-financial corporates on a subsidiary basis (i.e., all debt issued by Nigerian resident entities, even those with multinational parents). This is more relevant for balance of payments purposes and represents the full scale of the liabilities of Nigerian entities.

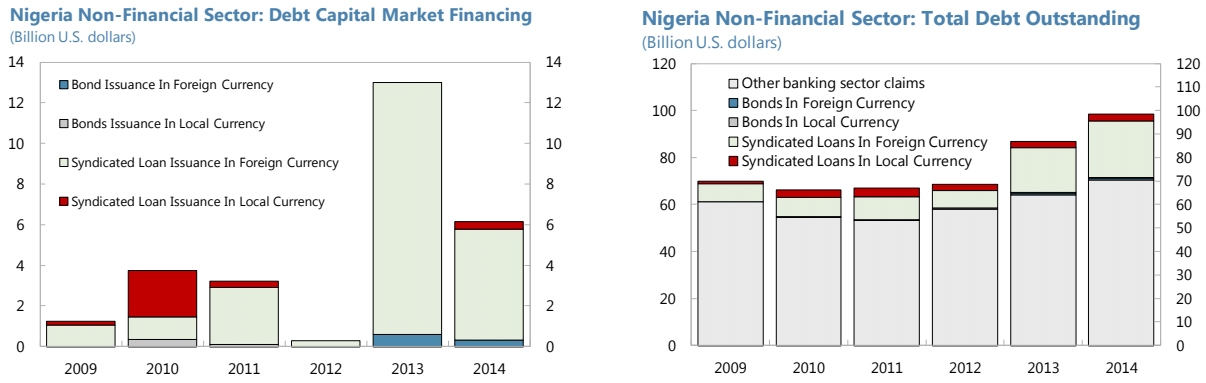
25. **There was a significant surge in the scale at which Nigerian corporates tapped market based sources of financing in 2013** (Figure 6). This has not only increased corporate sector vulnerabilities but also external vulnerabilities. It is noteworthy that syndicated loans account for the largest part of this issuance. Issuance dropped off significantly in 2014; this suggests credit conditions may have tightened and would also explain the increased reliance of large firms on internally generated resources to finance working capital in the 2014 Enterprise Survey.

26. **To estimate total debt outstanding of the non-financial corporate, we also incorporate the banking sector's claims on the private sector**. Given that local banks are likely to be involved in some part of syndications, we assume that all syndicated loans in local currency are held by domestic banks. Similarly, we assume that domestic banks hold all bonds issued in local currency; while this likely overstates the full extent of their holdings, this may offset the likelihood that domestic banks may take a small proportion of syndicated loans in foreign currency. In addition, we do not have any information on lending to the household sector so we allocate all lending to the private sector as lending to the non-financial corporate sector.

27. **Overall, we estimate that total debt outstanding of the non-financial corporate sector is of the order of $100 billion as of end-2014** (Figure 6). Of this, about 25 percent is market-based

financing, and the remainder financing from the domestic banking sector. In terms of specific risk exposures, about 40 percent of this debt is exposed to exchange rate risk, while almost all of the debt is in the form of loans and so exposed to significant re-fixing risk (i.e., the risk that interest rates rise significantly). Consequently, it is critical to assess the potential impact on the banking sector of rising vulnerabilities in the corporate sector.

Figure. 6 Nigeria: Non-Financial Corporate Sector, 2009-14



Sources: CBN; and Dealogic.

The corporate vulnerability stress test[4]

28. **The corporate vulnerability stress test is conducted using the same approach adopted in recent GFSRs**. The key points are as follows:

- We use detailed firm level data for about 100 firms for 2014 from Orbis; the total debt captured in this sample is about $8.8 billion (or a little under 10 percent of our estimate of total corporate debt outstanding).
- Of this, $2.5 billion (or 30 percent) is what we would call "debt-at-risk", i.e., the total debt of firms where their interest coverage ratio (ICR) is less than 1.5 times.
- This debt-at-risk is concentrated in large firms; they represent 72 percent of the "debt-at-risk" (although they account for 89 percent of total debt outstanding).
- Overall, there was a sharp increase in debt-at-risk from 2012 to 2013—from $1.1 billion to $2.1 billion (and from 16 percent of total debt outstanding to 27 percent of current total debt outstanding) (Figure 6).

[4] Please see the Appendix for a depiction of corporate sector vulnerability analysis.

- More notable is the fact that there is a significant deterioration in interest coverage between 2013 and 2014. Over this period, debt where ICR is less than one increased from $0.9 billion to $2.2 billion. This suggests a significant increase in vulnerabilities in 2014, which would explain the apparent tightening of credit conditions mentioned above.

29. **The potential evolution of this debt is assessed under a baseline, adverse and extreme scenario**:

- For the baseline scenario, we incorporate the actual exchange rate depreciation of 18 percent in 2015 plus assume a 100 basis point increase in borrowing costs (in line with the observed widening of the Nigerian EMBI spread). Under this scenario total debt increases to $9.4 billion and debt-at-risk increases by 11 percent in 2015 to $2.8 billion. Note that the increase in total debt captures the stock effect (or solvency effect) of the depreciation, while the change in debt-at-risk also captures the impact of increased interest rates (or liquidity effect).

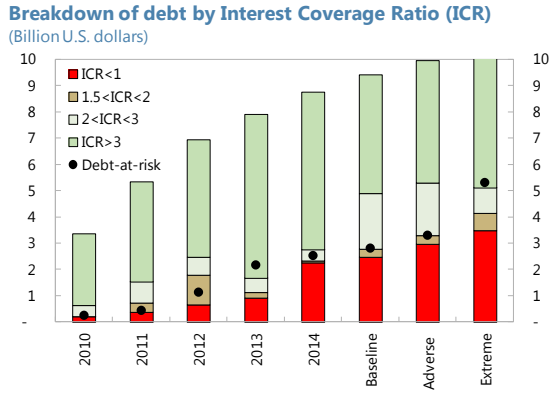
- For the adverse scenario, we assume there is a further depreciation of 15 percent (consistent with the estimated overvaluation in the exchange rate assessment), a further 100 basis point increase in borrowing costs, and a decrease of net operating income by 10 percent reflecting the unfavorable prospects for increase in profitability under the current economic climate.[5] Under this scenario, total debt would increase to $10 billion, while debt-at-risk would increase by 19 percent to $3 billion.

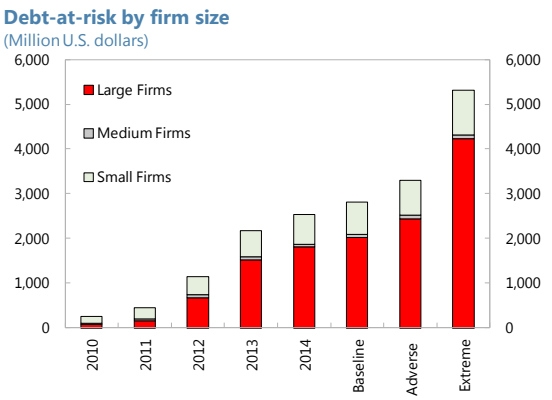
- Finally, under the extreme scenario, we assume the exchange rate depreciates by a further 30 percent, borrowing costs increase by 350 basis points relative to the baseline (in line with an extreme scenario explored as part of the Vulnerability Exercise), and a further decrease in net operating income by 20 percent. Under this scenario, total debt would increase to $10.5 billion and debt-at-risk increase by 110 percent to $5.3 billion.

- Importantly, the scale of debt at firms with less than 1 ICR increases from $2.3 billion to $3.5 billion; i.e. the proportion of highly vulnerable corporate debt increases markedly (Figure 7).

[5] Net operating income, here is defined as earnings before interest, depreciation and amortization.

Figure 7. Nigeria: Corporate Sector Vulnerabilities, 2010-14





Sources: Orbis; and IMF staff calculations.

Potential impact on the banking sector

30. **What is the potential impact of these scenarios on the banking sector?** We assume that the banking sector holds the same proportion of debt-at-risk as is reflected in our corporate sector sample. Taking Moody's estimated probability of default of 15 percent for companies with ICR<1.5, this generates non-performing loans of between N560 billion to N1,291 billion; this would take the NPL ratio from 2.4 percent as of end-2014 to between 4.5 to 10.4 percent (Table 11).[6]

31. **To assess the potential impact on capital, we use the Basel II guidance on loss given default of 45 percent.** This indicates that the system's CAR could decrease by between 1.3 to 2.5 percentage points.

32. **While the banking system would remain resilient to this shock, the impact on credit growth could be very significant.** To determine the potential impact on credit growth of such a loss of capital we draw on preliminary staff analysis which indicates that for each 1 percentage point change in the capital/asset ratio translates into a 4.4 percentage point reduction in annual credit growth.[7]

[6] Assuming a 45 percent loss given default could arguably be considered an optimistic assumption. Based on World Bank's Doing Business assessment, the number is higher, at 70 percent (see Appendix).

[7] This is based on preliminary empirical work by Julian Chow (MCM) estimating the Bernanke and Lown (1991) approach on a sample of 2,317 banks across emerging market countries for the period 2001 to 2014. Note as a reference, various empirical studies with U.S. data suggest the multiplier for the U.S. to lie within the range 0.7-2.8 depending on the specification; emerging markets are likely to have a higher multiple (given they are more dependent on the banking system for credit).

Table 11. Nigeria: Impact of Corporate Sector Stress Scenario on Banking Sector, 2014

	End 2014	Baseline	Adverse Scenario	Extreme Scenario
Current claims on private sector (N Billion)	12,446	12,446	12,446	12,446
Implied increase in aggregate NPLs (N Billions) 1/		281	393	936
Aggregate NPLs (N Billions)	279	560	673	1,291
Implied NPL Ratio (percent)	2.4	4.5	5.4	10.4
Implied increase in aggregate NPLs (percent)		58	90	264
Implied loss rate (percent) 2/		2.2	2.5	4.1
Implied loss (N billion)		270	317	510
Implied capital (N Billions)	3,045	2,775	2,728	2,535
Implied risk weighted assets (assume 100% risk weighting) (N Billion)	17,695	17,425	17,378	17,185
CAR (%)	17.2	15.9	15.7	14.8
Impact on CAR (ppts)		(1.3)	(1.5)	(2.5)
Impact on credit growth (ppts) 3/		(5.6)	(6.6)	(10.8)
Credit growth (implied)	18.00	12.35	11.35	7.19

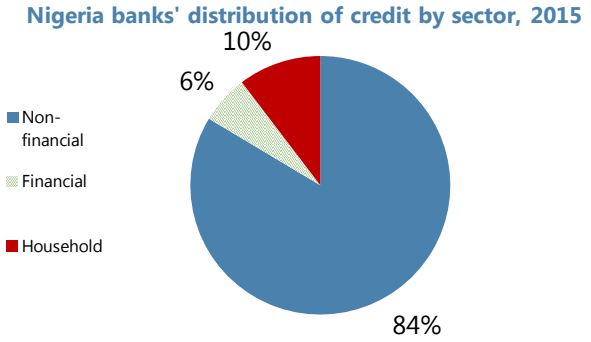
Sources: Financial Soundness Indicators; and IMF Staff estimates.

1/ Assuming banking sector holds same percentage of debt-at-risk as in corparate sector sample, with a 15 percent probability of default.
2/ Assuming a 45 percent loss given default (note, this is an optimistic assumption, based on WB Doing Business, Resolving Insolvency should be 70 percent).
3/ Using assumed multiplier of 4.4 on the change in CAR based on preliminary empirical work by Julian Chow estimating the Bernanke and Lown (1991) approach on a sample of 2,317 banks across emerging market countries for the period 2001 to 2014. Note as a reference, various empirical studies with U.S. data suggest the multiplier for the U.S. to lie within the range 0.7 - 2.8 depending on the specification; emerging markets are likely to have a higher multiple (given they are more dependent on the banking system for credit).

Appendix. Corporate Sector Vulnerability Analysis

1. **Nigerian banks' exposure to the corporate sector is exceptionally high**. The April 2015 Global Financial Stability Report highlighted more than half of bank loan books in 11 or 21 emerging markets consists of loans to firms, rendering them more exposed to corporate weakness. In Nigeria, banks' exposure to the non-financial corporate sector is particularly high, accounting for over 75 percent of loans (chart).

2. **Consequently a deterioration of corporate sector financial health would have significant risks to the banking sector**. The broader impact to the economy would depend on the banks' capacity to absorb losses and continue provide liquidity and credit, since banks continue to be the primary source of financing. While Nigerian banks are well capitalized, non-performing loans (NPLs) have been rising which could lead to reduction in credit growth. Indeed according to some market participants NPLs are close to 10 percent of total assets as of end-December 2015, that is, double of the amount reported in Central Bank of Nigeria's June 2015 Financial Stability Report.[1]



Sources: CBN; IMF staff estimates.

3. **The authorities have taken measures, but more can still be done.** The authorities have taken action by increasing the level of provisions required for performing loans, which is one of way of building buffer. However, a systemic approach that differentiates between businesses might be warranted, so as to avoid stifling credit to the entire corporate sector which may do more harm by further slowing down the economy. For example, requiring banks to increase their provisions or allocate higher capital for loans extended to creditors that are highly indebted (with high debt to equity, or interest cover ratio).

4. **The methodology used to analyze the corporate sector liability**

Database: As noted in the main text of this paper, the financial statements of 100 firms were analyzed.

[1]SBG Securities Nigerian Banks 2016 Looks Tough too (January 15, 2016).

Indicator: The indicator used to assess risk was interest cover ratio (ICR), more specifically interest payments as a percentage of operating surplus. Generally firms with debt service ratio of less than 2 are considered to be risky. The credit rating agency Moody's maps debt indicators to its credit rating where debt service ratio of 1.7 is mapped to have a credit rating of "B" , one notch above the lowest credit rating. On this basis, the threshold 1.5 was selected to indicate debt-at-risk.

Implied loss rate: by applying the definition of 1.5 interest cover ratio we determine the level of debt at risk (and its ratio as proportion of total debt). We then multiply this ratio with probability of default (PoD) and loss given default (LGD) to determine the loss rate. S&P and Moody's put the probability of default of corporate entities with credit rating of "B" at around 15 percent. For LGD, we apply Bank of International's standard rate of 45 percent for corporate sector. A more prudent approach would suggest applying LGD pertinent to Nigeria which is 70 percent, according to World Bank's Doing Business Assessment. If one assumes 70 percent instead of 45, the loss rate increases significantly.

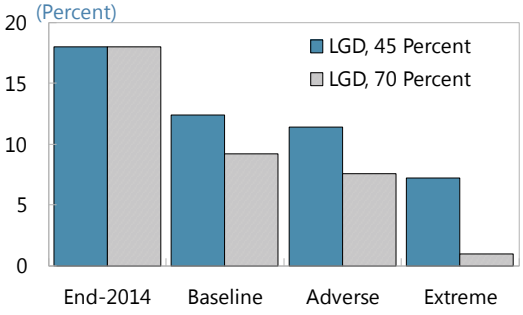
Nigeria: Implied Loss Rate

	Baseline	Adverse	Extreme
Debt-at-risk (percent)	32	38	61
Implied Loss Rate (LGD 45 percent)	2.2	2.5	4.1
Implied Loss Rate (LGD 70 percent)	3.4	4.0	6.4

Capital adequacy ratio: assuming the risk weighting of such loans was 100 percent (a reasonable assumption given their riskiness) if loss was to materialize it would lead to a corresponding fall in regulatory capital (and hence capital adequacy ratio).

5. **Impact on credit growth:** based on the approach of Bernanke and Lown (1991), that examined the link between banks' capital and credit growth, various empirical studies with U.S. data suggest the multiplier for the U.S. to lie within the range 0.7–2.8 depending on the specification. That is for 1 percentage point reduction in capital adequacy ratio, the corresponding reduction in credit growth could be 0.7 to 2.8 percent. For emerging markets, given their higher dependency on the banking sector, the multiplier is likely to be higher. Based on preliminary internal IMF work the multiplier is estimated to be around 4.4. The implication is, as can be seen from the chart, the credit growth would decline significantly should the extreme scenario materialize.

Nigeria: Implied Credit Growth, 2014



Sources: Financial Soundness Indicators; Staff estimates.