

IMF Publication

Macroeconomic Developments and
Prospects in Low-Income Developing
Countries - 2015

INTERNATIONAL MONETARY FUND



MACROECONOMIC DEVELOPMENTS AND PROSPECTS IN LOW-INCOME DEVELOPING COUNTRIES: 2015

November 19, 2015

EXECUTIVE SUMMARY

This paper examines macroeconomic developments and prospects in low-income developing countries (LIDCs) against the back-drop of a sharp fall in international commodity prices. The focus here—by contrast with IMF (2014a)—is on recent developments and the near-term outlook, recognizing that the new price environment is likely to remain in place for several years to come. The paper also includes a section examining the experience of LIDCs with capital inflows over the past decade.

Key messages in the report include: 1) many commodity-dependent exporters have been hit hard by export price declines, experiencing a significant growth slow-down in 2015 that will largely carry on into 2016; 2) countries less dependent on commodity exports benefited from the price movements (e.g., through reduced oil import bills), with growth continuing at the robust pace of recent years; 3) short-term economic vulnerabilities among LIDCs have increased steadily over the past two years, due mainly, but not exclusively, to weaker conditions in commodity exporters—underscoring the need for policy adjustments to strengthen fiscal and external positions; 4) most LIDCs are especially vulnerable to the projected effects of climate change, and will need significant support in the form of concessional climate finance to support adaptation efforts; and 5) capital inflows to LIDCs, including portfolio inflows, have grown sharply in recent years, augmenting domestic resources—but the usage of these resources, for consumption or investment, depends on national policy choices.

Recent Macroeconomic Developments: The Varied Impact of Falling Commodity Prices

The external economic environment facing LIDCs has weakened over the past eighteen months, with slowing global growth, sharp declines in commodity prices, and tighter external funding conditions. For most LIDCs, the key development has been the drop in commodity prices, which has adversely affected commodity-dependent exporters (especially oil exporters) but benefited many LIDCs less dependent on commodity exports (“diversified exporters”).

Most commodity exporters have experienced slowing growth, widening fiscal and external deficits, and some combination of exchange rate depreciation and declines in reserves (in terms of months of import cover). Most diversified exporters have

continued to record robust economic growth, averaging in excess of 6 percent per annum, albeit with some widening of fiscal deficits (often, but not always, linked to rising public investment levels); current account positions have deteriorated in some larger economies, while deficit levels remaining elevated in many countries, financed in some cases through significant increases in public external debt. Several countries have suffered setbacks from natural disasters (including Ebola) or from internal conflicts, a few others from adverse spillovers from Russia's recession.

Looking ahead, with commodity prices expected to show little recovery for the foreseeable future, commodity exporters are projected to experience a small pick-up in growth in 2016, alongside some policy-driven improvements in fiscal positions. The strong growth performance among diversified exporters looks set to continue, unless global performance disappoints, with some countries planning further debt-financed increases in public investment.

Key policy messages include: a) the need for commodity exporters to adjust fiscal positions and domestic competitiveness to align with sustained lower export prices; and b) the importance of building fiscal and external buffers, where eroded, to handle adverse future shocks. International financial institutions, including the IMF, can provide support for these efforts.

Growing Vulnerabilities

Analysis of the vulnerability of LIDCs to macroeconomic shocks, using established methodologies, points to a significant increase in estimated vulnerability levels across regions and country subgroups, most marked in the case of oil exporters. Some 40 percent of LIDCs are now classified as being highly vulnerable to shocks—the highest level since the global financial crisis. Vulnerable commodity exporters have little option but to move ahead with macroeconomic adjustment programs—or place macroeconomic stability in jeopardy. Fast-growing diversified exporters have the opportunity to strengthen fiscal and external positions while maintaining strong growth—and, where vulnerabilities are a concern, should take it.

The ongoing process of climate change is expected, over time, to have significant adverse effects on LIDCs, with more frequent natural disasters and adverse pressures on productivity in agriculture—the largest employer in LIDCs. LIDCs are already more prone to natural disasters than better-off countries—a feature expected to intensify with global warming. LIDCs contribute only marginally to global greenhouse gas emissions, but will need significant financial support in the form of climate finance if they are to handle adaptation challenges without compromising on development goals.

Capital Inflows and Macroeconomic Implications

Capital inflows to LIDCs rose sharply in the years prior to the global crisis, largely taking the form of foreign direct investment. Inflows have picked up again since the crisis period, and now include a significant amount of portfolio inflows to frontier market economies. The surge in portfolio flows (from a low base) has been facilitated by exceptionally low interest rates in the advanced economies, but has also been attracted by strong economic performance and improved macroeconomic fundamentals in many LIDCs. Several frontier LIDCs also took important steps to liberalize capital accounts in the mid-2000s and are now typically as open as emerging markets in *de jure* terms.

Statistical analysis indicates that capital inflows, by making more resources available, have boosted domestic spending levels—albeit with portfolio inflows being more strongly correlated with consumption levels than with domestic investment. The selected case studies include examples where sovereign bond issues have been more strongly associated with rising public consumption outlays than higher public investment.

Empirical analysis also shows that the ability of LIDCs to access external capital markets, and the terms at which they obtain funding, depend on both external and domestic factors—with the latter including solid external and fiscal positions, sustainable debt levels, and higher foreign reserve positions. Countries that are increasing their reliance on access to external funding thus face an additional risk factor—shifts in the external environment—and need to place a high premium on maintaining solid economic fundamentals, including strong public debt management capacity.

Approved By
Siddharth Tiwari

Prepared by an SPR staff team led by Chris Papageorgiou and Hans Weisfeld, under the overall guidance of Seán Nolan, Rupa Duttgupta, and Chris Lane. Production assistance was provided by Dilcia Noren, Nazma Nunhuck, and Merceditas San Pedro-Pribram. The paper includes inputs from staff in the African Department, Asia and Pacific Department, Fiscal Affairs Department, and the Finance Department.

CONTENTS

ACRONYMS AND ABBREVIATIONS	6
RECENT MACROECONOMIC DEVELOPMENTS: THE VARIED IMPACT OF FALLING COMMODITY PRICES	7
A. Introduction	7
B. Evolving External Environment	7
C. Developments in LIDCs	10
D. The Near-Term Outlook	19
E. Policy Challenges	21
GROWING VULNERABILITIES	22
A. Current Vulnerabilities	22
B. Scenario Analysis: Vulnerability of LIDCs to Global Shocks	27
C. Climate Change: A Growing and Lasting Source of Vulnerability	30
CAPITAL INFLOWS AND MACROECONOMIC IMPLICATIONS	34
A. The Facts: Trends in Capital Inflows and Capital Account Openness	35
B. Capital Flows, Domestic Demand, and Policy Challenges	41
REFERENCES	53
BOXES	
1. LIDC Subgroups	8
2. 2015 PRGT Loan Demand: Recent Trends and Near-Term Outlook*	18
3. Methodology for Scenario Analysis	29
4. Measuring Capital Flows	36
5. Determinants of LIDC Sovereign Spreads—Push versus Pull Factors	45

FIGURES

1. Evolving Global Environment	9
2. Country-Specific Net Commodity Price Index by LIDC Subgroup: June 2004–June 2015	11
3. Country-Specific Net Commodity Price Index for LIDCs by Country: June 2004–June 2015	11
4. Real GDP Growth	12
5. Fiscal Sector Developments	14
6. External Sector Developments	16
7. Inflation Developments	19
8. Growth Decline Vulnerability Index, 2011–16	23
9. Growth Decline Vulnerability Index by Country Groups, 2011–16	23
10. Growth Decline Vulnerability Index by Country Groups, 2016	24
11. Evolution of Risk of Debt Distress	24
12. Frontier Markets' z-Scores ^{1/}	26
13. Eurobonds Maturity Amount	27
14. Shock Scenarios: Global Growth and Inflation	28
15. Impact of Financial Volatility Shock	29
16. Impact of Geopolitical Shock	29
17. Impacts in Sub-Saharan African	31
18. Frequency of Natural Disasters in LIDCs and the Rest of the Rest of the World, 1985–2015	32
19. Climate Change Exposure Index, 2015	33
20. Climate Change Exposure Index, 2015	33
21. Capital Flows to LIDCs, 2000–2014	35
22. Capital Inflows to LIDCs Versus EMs	37
23. Capital Inflows to Frontier Versus Other Non-Frontier LIDCs	38
24. Syndicated Loans to LIDCs	39
25. Capital Account Liberalization in LIDCs	40
26. Capital Flows and Domestic Demand	41
27. Evolution of Macroeconomic Aggregates in Frontier LIDCs, 2000–14	44

TABLES

1. Comparison of Projection Vintages	7
2. Selected Macroeconomic Indicators	20
3. Financial Vulnerability Index	26

APPENDIX

I. The Role of Macroeconomic and Structural Factors in Vulnerability	52
--	----

ANNEXES

I. LIDCs and Subgroups	46
II. Capital Account Liberalization: <i>De Jure Index</i>	47
III. Experience with Capital Flows in Selected Countries	48

Acronyms and Abbreviations

AMs	Advanced Markets
CPIA	Country Policy and Institutional Assessment
CRED	Centre for Research on the Epidemiology of Disasters
DSA	Debt Sustainability Analysis
DSF	Debt Sustainability Framework
EMs	Emerging Markets
EMBI	Emerging Market Bond Index
EM-DAT	Emergency Events Data Base
EMDCs	Emerging Market and Developing Countries
EMDE	Emerging Market and Developing Economies
FDI	Foreign Direct Investment
GDVI	Growth Decline Vulnerability Index
IFS	International Financial Statistics
IPCC	Intergovernmental Panel on Climate Change
LIC	Low Income Countries
LIDCs	Low-Income Developing Countries
NCPI	Net Commodity Price Index
PPP	Purchasing Power Parity
PPPs	Public-Private Partnerships
PRGT	Poverty Reduction Growth and Trust
SSA	Sub-Saharan Africa
VIX	CBOE Volatility Index
WEO	World Economic Outlook

RECENT MACROECONOMIC DEVELOPMENTS: THE VARIED IMPACT OF FALLING COMMODITY PRICES

A. Introduction

1. **The global economic environment facing low income developing countries (LIDCs) has weakened over the past year, with the most noteworthy development being the sharp declines in commodity prices.** While many LIDCs rely heavily on commodity exports, most are also significant importers of commodities (notably oil and foodstuffs), implying that the net impact of these price developments has varied quite markedly across countries. While growth in LIDCs as an aggregate has slowed significantly—from 6 percent in 2014 to 4.8 percent in 2015—the story at the country level involves both winners and losers, a story we seek to explore further below.

2. **For analysis purposes, we use two distinct classification systems in decomposing the universe of LIDCs:** a decomposition into a) *frontier markets*, b) *fragile states*, and c) *developing markets* (the last a residual category) that draws on the classification in IMF (2014a);¹ and a second breakdown into (i) *commodity exporters*—countries where at least half of export earnings come from commodities—and (ii) *diversified exporters* (Box 1).

B. Evolving External Environment

3. **Global economic performance weakened significantly** with output growth declining from 3.4 percent in 2014 to 3.1 percent in 2015—in contrast with expectations of a pick-up in growth to 3.8 percent in IMF (2014b) (see Table 1).² Slowing growth in emerging market economies was an important contributory factor, with a number of large economies (including *Brazil* and *Russia*) moving into recession and the rebalancing of demand contributing to growth deceleration in *China* (Figure 1, Panel A).

Table 1. Comparison of Projection Vintages

	2014	2015	2016
Global Growth (Percent)			
October 2014	3.3	3.8	4.0
October 2015	3.4	3.1	3.6
Petroleum Price (APSP; US\$)			
October 2014	106.1	102.8	98.5
October 2015	96.2	58.9	64.2
Nonfuel Price (Index, 2005=100)			
October 2014	163.7	157.2	155.8
October 2015	162.3	136.9	134.6

Sources: World Economic Outlook (October 2014, October 2015).

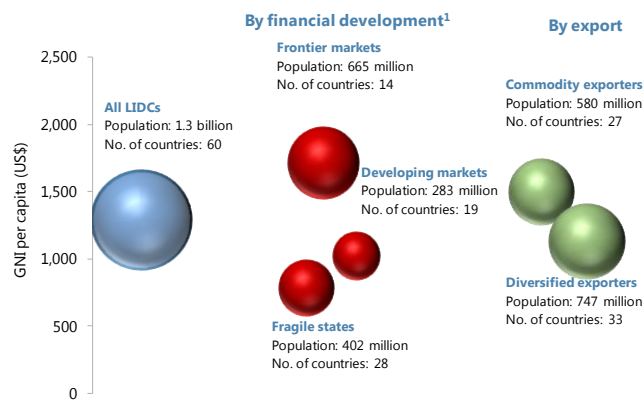
¹ This decomposition is a simplification of the approach employed in IMF (2014a); one country, *Cote d'Ivoire*, is included in both the "frontier market" and "fragile state" groupings.

² For analysis of the factors explaining the shifting global outlook, see IMF (2015a).

Box 1. LIDC Subgroups*

- **Frontier markets** are those countries closest to resembling emerging markets in terms of depth and openness of financial markets and access to international sovereign bond markets.
- **Fragile states** are countries where a) institutional capacity is weak, measured by a three-year average Country Policy and Institutional Assessment (CPIA) score below 3.2 or b) there has been/is significant internal conflict.
- **Developing markets** are all LIDCs that are neither fragile nor frontier economies.
- **Commodity exporters** are those countries where at least 50 percent of export earnings come from fuels and primary commodities—27 countries in all.
- **Oil exporters** are countries that are net exporters of oil; those include *Cameroon, Chad, Ghana, Republic of Congo, Niger, Nigeria, Papua New Guinea, South Sudan, and Yemen*.
- **Diversified exporters** are LIDCs that do not belong to the commodity exporter group—33 countries in all. While several of the countries in this group do export commodities, these account for less than 50 percent of total exports.

LIDC Sub-Groups by GNI per Capita and Population, 2014



¹ Cote d'Ivoire is included in both the "Frontier" and the "Fragile" groups.

* See Annex I for a full list of countries under the classification systems.

4. A combination of slowing global growth, falling demand for minerals in China, and supply side developments have resulted in a sharp drop in commodity prices to levels that are expected to persist for the foreseeable future. From a peak in June 2014, energy prices declined by 55 percent through September 2015, while non-energy prices declined by some 23 percent over the same period (Figure 1, Panel B).³ IMF commodity price projections point to little, if any, rebound from current levels in the near term—a very different trajectory from the strong rebound recorded in the wake of the Great Recession of 2008–09.

5. Global inflation has remained low due to weak demand and falling commodity prices. Global inflation declined in 2014 and is set to fall further in 2015, helped by the drop in commodity prices and weak demand in major advanced economies (Figure 1, Panel C). Prices for exports of manufactures have been on a declining trend since 2012, contributing to wider deflationary pressures in importing countries.

6. External financing conditions facing emerging market and frontier economies have started to tighten. While monetary policies in the advanced economies have remained accommodative, sovereign spreads for emerging market economies have been increasing over the past year (Figure 1, Panel D), albeit with significant discrimination across regions (with commodity

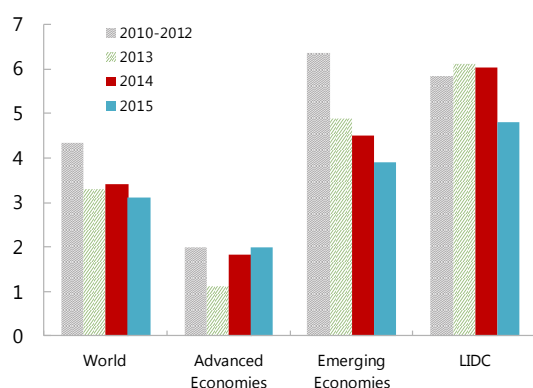
³ See IMF (2015b), for a detailed analysis of the factors behind the decline in oil prices.

exporters hit hardest). Sovereign spreads have also increased for many frontier market LIDCs,⁴ with increases again most marked among commodity exporters. Widening spreads have also reflected weak domestic economic policies in many cases.⁵

Figure 1. Evolving Global Environment

Panel A. Real GDP Growth

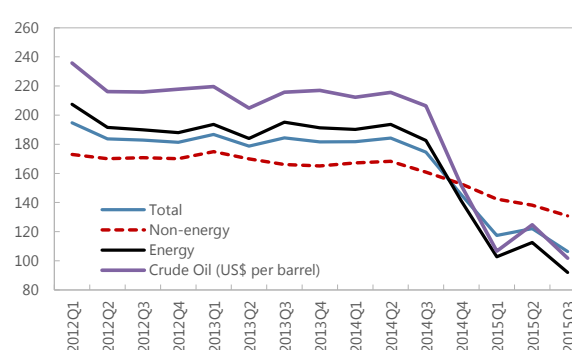
(Percent, PPP-GDP weighted averages)



Sources: World Economic Outlook and IMF staff estimates.

Panel B. Commodity Price Indices¹

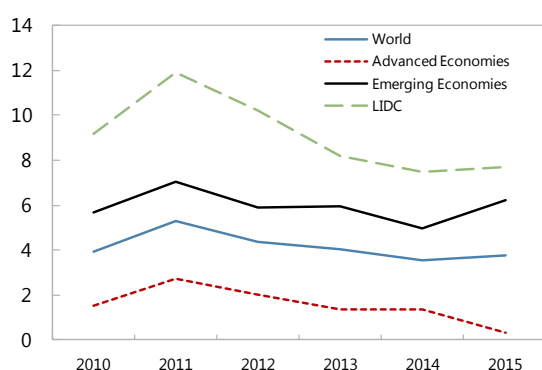
(Index, 2005=100)



Source: IMF Primary Commodity Price System.

Panel C. Inflation²

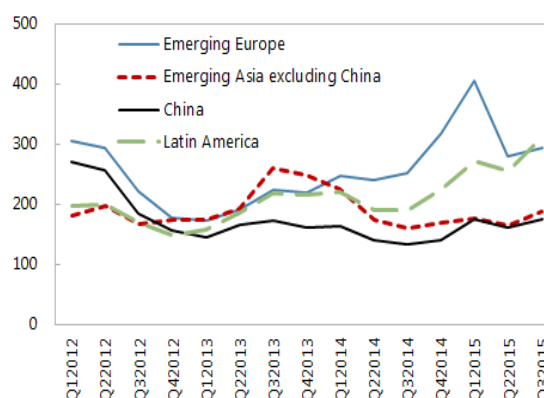
(Percent, PPP-GDP weighted averages)



Sources: World Economic Outlook and IMF staff estimates.

Panel D. EMBI Sovereign Spreads

(Basis points, quarterly averages)



Source: Bloomberg.

¹ Energy price index includes crude oil, natural gas, and coal prices; Non-energy price index includes food, beverage, and industrial input prices.

² The median for LIDCs is estimated at 5.7 percent in 2015.

⁴ See Figure 6, Panel D.

⁵ See IMF (2015a) and IMF (2015c), for a comprehensive discussion on financing conditions in emerging and developing countries.

C. Developments in LIDCs

7. Changes in the external environment affect LIDCs through several channels: the *trade channel* includes the impact of commodity price changes on both exports and imports, along with the impact of softening external demand on diversified exports;⁶ the key *financing channel* is the impact of higher external financing costs on those countries (primarily frontier economies) seeking new funding from international capital markets; the main *investment channel* is the impact of changing global conditions on foreign direct investment, particularly in resource sectors. The importance of these channels varies markedly across LIDCs, albeit with the commodity price channel being important in almost all cases.

Commodity terms of trade: some lose, some gain.

8. Analysis of the first-round effects of the drop in commodity prices indicates that, on balance, there have been more winners than losers among the 60 LIDCs—although the scale of the losses experienced by some of the losers, particularly oil exporters, is very large. The first-round impact on national income of the shift in commodity prices can be assessed using the country-specific net commodity price index (NCPI) developed by Gruss (2014);⁷ we focus on the movements in commodity prices from June 2014 to June 2015, given data availability. Results of this analysis are shown in Figures 2 and 3. Key conclusions are that:

- Countries heavily dependent on energy exports, such as *Nigeria*, and *Bolivia*, suffered large losses, ranging from 6 to 12 percent of GDP—with the *Republic of Congo* and *South Sudan* suffering even larger income declines.
- Most non-energy commodity exporters experienced a net gain from the commodity price shocks, with savings on imports of commodities such as oil more than offsetting revenue losses on the export side.
- Diversified exporters saw a sizable net gain of almost 2 percent of GDP from the commodity price decline, with only a handful experiencing a negative impact (e.g., *Myanmar*).

⁶ This second trade channel is of significance for countries that have succeeded in establishing themselves as exporters of manufactures (either stand-alone or as part of global value chains) or services (such as tourism).

⁷ This index weights each commodity price change by the country's net exports of the corresponding commodity, expressed as a share of GDP: it measures the impact of the shift in prices on the net income earned from/paid for commodities, expressed as a share of GDP. The index includes a large number (33) of commodities, with weights derived from the latest three years of trade data. See Gruss (2014) for details and data sources.

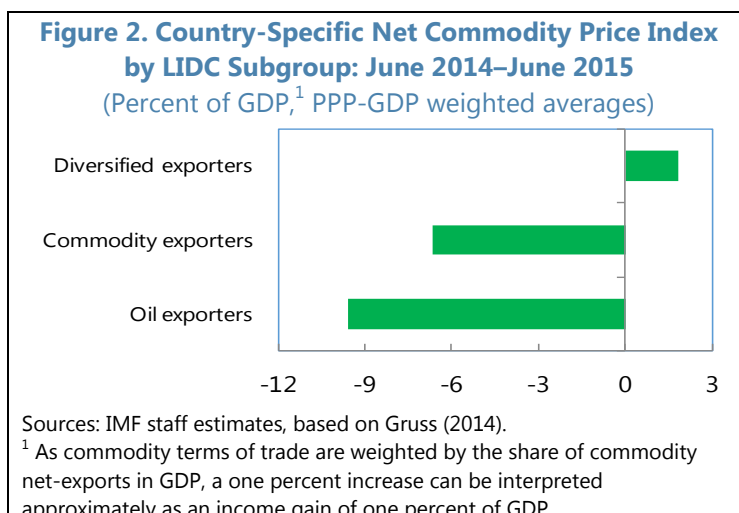
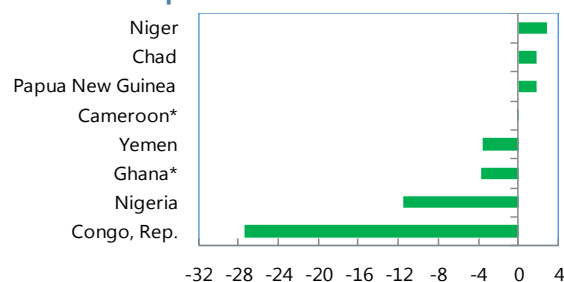
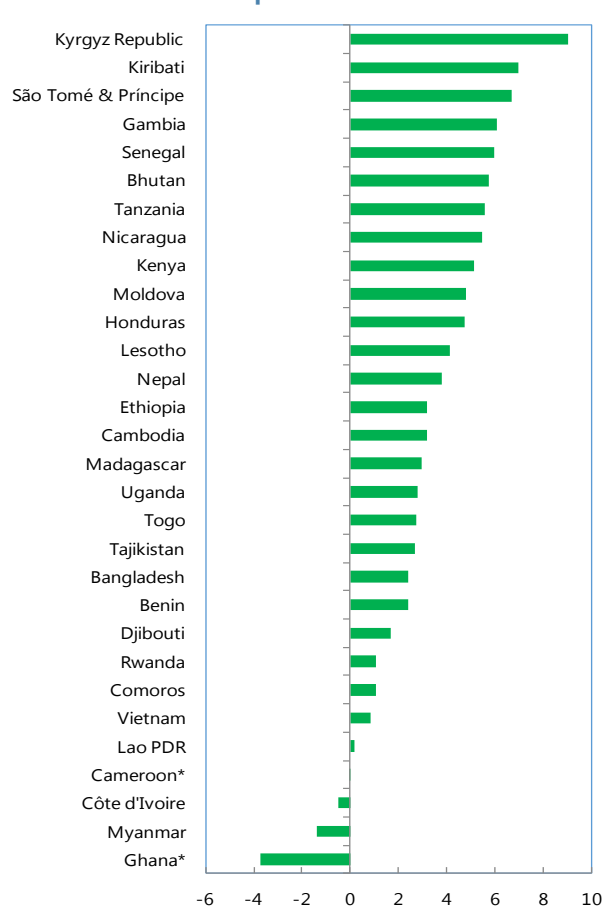


Figure 3. Country-Specific Net Commodity Price Index for LIDCs by Country: June 2014–June 2015¹
(Percent of GDP)²

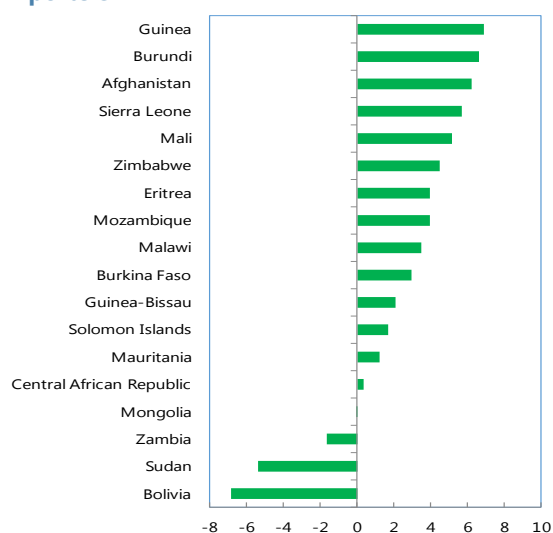
Panel A. Oil Exporters



Panel C. Diversified Exporters



Panel B. Commodity Exporters Excluding Oil Exporters



Source: IMF staff estimates, based on Gruss (2014).

¹ Due to data availability, *Democratic Republic of Congo*, *Haiti*, *Liberia*, *Somalia*, *South Sudan*, and *Uzbekistan* are excluded.

² As commodity terms of trade are weighted by the share of commodity net-exports in GDP, a one percent increase can be interpreted approximately as an income gain of one percent of GDP.

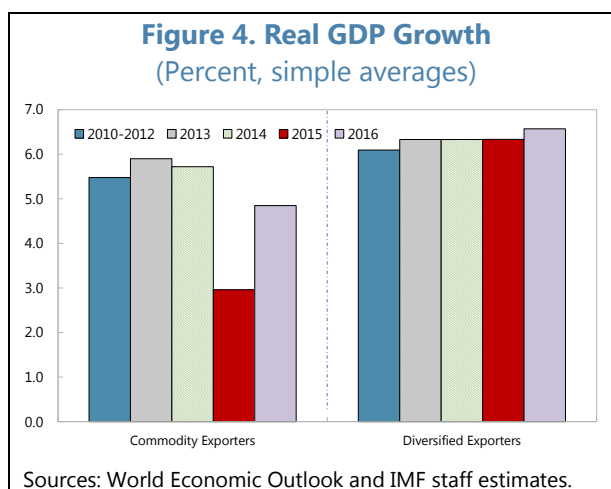
* *Cameroon* and *Ghana* are net-oil exporters while being classified as diversified exporters.

9. Analysis of the full impact of price changes on commodity exporters would generate a richer and less sanguine assessment in many cases. The NCPI analysis looks only at the net income effect of price changes, ignoring second-round effects. These second-round effects on income, as producers cut back export volumes (and employment) and suspend or terminate new investments, can be large, affecting both current output and medium-term growth prospects (as in *Liberia* and *Sierra Leone*). That said, the NCPI analysis can also overstate the losses to *national* income in cases where resource exports are produced by multinational enterprises: here, much of the loss in export revenues affects the incomes of foreign shareholders, with the impact on domestic incomes dependent on the effectiveness of the domestic tax system in capturing economic rents (typically high in the oil sector, often much lower in other mineral sectors).

Output developments

10. The overall pace of economic growth in LIDCs slowed noticeably in 2015, driven by export price shocks to commodity exporters and adverse domestic developments in several countries. Growth in LIDCs has been robust since the global crisis, remaining at 6 percent in 2014, but is projected to fall to 4.8 percent in 2015 (Figure 4).

- *The slowdown in 2015 has been concentrated among commodity exporters (such as Nigeria), with domestic shocks an important additional contributory factor in countries hit by the Ebola epidemic (Guinea, Sierra Leone) and by security disruptions (Burundi, Yemen, South Sudan). Some commodity exporters continued to record strong output growth as new mineral projects came on stream (Democratic Republic of Congo, Mozambique, Papua New Guinea).*
- *Growth has remained robust among diversified exporters in 2015, helped by strong performance in some large frontier market economies (Bangladesh, Vietnam, Kenya). But several countries suffered from adverse supply shocks in the form of natural disasters (Haiti, Liberia, Nepal, Nicaragua), while countries with close economic links to Russia (Kyrgyz Republic, Moldova, Tajikistan) suffered from adverse spillovers from Russia's recession.*⁸



⁸ See IMF (2015d, Chapter 7), and IMF (2015e) for further discussions on *Russia's* spillovers to neighboring countries.

Fiscal positions have weakened in many, but not all, cases...

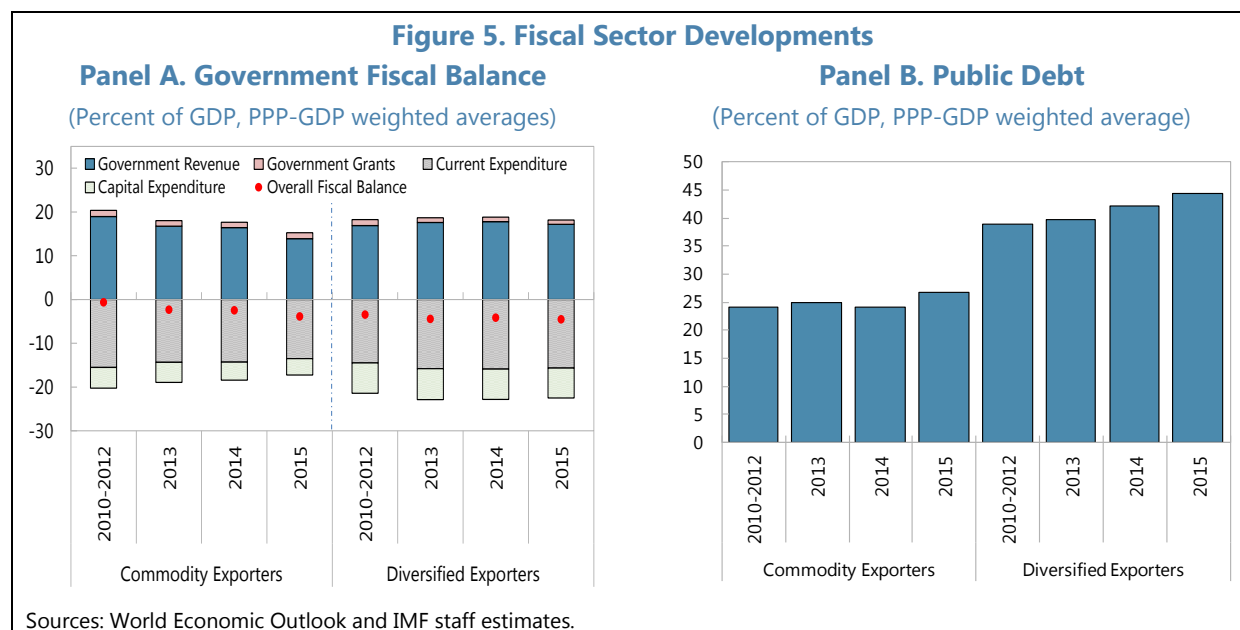
11. Fiscal deficits are estimated to have risen in 2015, driven in the main by revenue declines among commodity exporters.

- Among commodity exporters, fiscal deficits in 2015 are projected to have increased from 2014 levels by some 1½ percentage points of GDP, driven by a drop in budgetary revenues that averaged some 2½ points of GDP (Figure 5, Panel A). Many countries (including *Chad* and *Mozambique*) cut back on spending levels in the face of revenue erosion while some (*Nigeria*) took revenue measures, but these were typically not commensurate with the revenue losses.
- Fiscal deficits increased by an average of 0.4 points of GDP in 2015 among diversified exporters, notwithstanding the favorable headwinds of continued high growth and favorable (net) commodity price developments. Among the larger countries, *Myanmar* and *Kenya* feature as cases where fiscal deficits increased significantly in 2015—to 5 and 8 percent of GDP, respectively—linked to a fall off in receipts from state-owned energy companies and a public wage increase (*Myanmar*) and rising expenditure levels (*Kenya*). Among the smaller economies, some achieved a net improvement in fiscal positions, helped by lower fuel costs, elimination of fuel subsidies, and improved revenue mobilization (*Honduras*, *Rwanda*).

12. Public debt burdens have also risen across LIDCs, albeit with substantial cross-country variation—reflecting both price shocks and divergences in domestic budgetary policies.

- Among commodity exporters, the average increase in general government debt has been relatively modest (Figure 5, Panel B)—helped in part by the large weight of *Nigeria* (where public debt rose only marginally, with fiscal financing facilitated by depleting government deposits). But several countries have experienced more severe stresses, with *Republic of Congo* (oil), *Mali* (fragility), *Yemen* (fragility/conflict), *Zambia* (loose fiscal policies), and *Zimbabwe* among the countries where the public debt/GDP ratio increased by at least 10 points of GDP from 2013 to 2015.⁹
- For diversified exporters, public debt burdens are also on an upward trend, notwithstanding modest fiscal deficits *in the aggregate*. Among the larger countries, public debt levels increased by more than 10 percentage points of GDP from 2013 to 2015 in *Ghana* (where fiscal deficits have been high since 2012), *Kenya* (with its strategy of scaling-up public investment through borrowing), and *Cameroon* (where deficits have increased and inflation, anchored on the euro, has been low). Smaller countries where public debt burdens have increased sharply from 2013 through 2015 include *Moldova* (up 21 points of GDP, linked to banking sector bailouts), *The Gambia* (up 24 points of GDP on Ebola-hit growth and large fiscal deficits), *Liberia* (up 14 points of GDP on Ebola-related shocks to growth and the budget), and *Kyrgyz Republic* (up 14 points of GDP on public sector investment).

⁹ Large exchange rate depreciations have contributed to rising public debt/GDP ratios in many cases, including *Kyrgyz Republic* and *Zambia*.



... while external positions show a mixed picture.

13. The divergent impact of commodity price changes on commodity and diversified exporters is reflected in the evolution of external positions in 2015. For commodity exporters:

- The (weighted) average of current account deficits for the group as a whole is projected to have increased from 2.6 to 4.0 percentage points of GDP during 2015 (Figure 6, Panel A)—but current account positions have been improving, for example, in the *Democratic Republic of Congo* as new projects shift from the investment stage to production. *Nigeria* and *Bolivia* provide cleaner examples of the impact of resource price shocks, with current account deficits widening by 5 and 8 points of GDP, respectively, during 2013–15.¹⁰
- *External debt levels* are assessed to have increased moderately (Figure 6, Panel C), with the aggregate increase partly contained by *Nigeria's* minimal level of public external debt.¹¹ But group averages—an unweighted increase of 3½ points of GDP in 2015—hide significant country-level variations. Countries where debt levels are projected to rise significantly in 2015 include *Republic of Congo* and *Niger* (both up 17 points of GDP), *Zimbabwe* (up 15 points of GDP), and *Zambia* and *Mozambique* (both up 9 points of GDP, assisted by large exchange rate depreciations (Figure 6, Panel E)).

¹⁰ Interpreting current account developments in countries where there are large investment projects underway, financed externally, is difficult without a detailed disaggregation of the balance of payments. In countries such as *Mozambique* (current account deficit of 40 percent of GDP in 2015), attention is often best focused on the evolution of government external borrowing and foreign reserve levels.

¹¹ Nigeria accounts for about one-half of the PPP-measured GDP of commodity exporters.

- *Reserve levels* (measured in months of import coverage) have declined in 2015—most markedly in the case of countries defending fixed exchange rates (Figure 6, Panel F). Declines are projected to be particularly sharp in the cases of *Republic of Congo* (five months) and, among the larger countries, *Yemen* (three months) and *Nigeria* (0.9 months).
- Countries with fixed exchange rate regimes are set to experience a median decline in reserves of 1½ months of import cover. By contrast, reserve coverage is set to move only marginally in *Zambia* and *Mozambique*, where large exchange rate depreciation facilitated adjustment (Figure 6, Panel E). Intermediary cases include *Malawi* and *Nigeria*, where the balance of payments shock was accommodated through a mix of reserve depletion and exchange rate depreciation.

14. Developments among diversified exporters also involved significant variation across countries:

- Current account positions are estimated to have deteriorated significantly for diversified exporters as a group in 2015, led by *Vietnam* (up a projected 4 points of GDP), *Myanmar* (up 3 points of GDP), and *Ethiopia* (up 4 points of GDP) among the larger economies.¹² But reserve coverage ratios are expected to show only marginal changes in each of these three cases (rising slightly in *Ethiopia*, falling slightly in *Myanmar* and *Vietnam*), pointing to the offsetting role of capital inflows in financing these imbalances.¹³ Increases in external debt burdens in the three countries are expected to be modest (1–2 points of GDP), helped by strong trend growth and non-debt creating inflows.
- Current account positions are expected to move only modestly among other large economies in this group, some recording improvements, others minor declines. But current account deficit levels remain elevated (a projected 8–10 points of GDP per annum) in several cases, including *Ghana* and the *East African Community*—with external debt levels increasing significantly in 2015 in *Uganda* (10 points of GDP) and *Tanzania* (7 points of GDP). Import coverage is expected to show generally modest changes in 2015, with significant declines (0.5 months or more) only in *Uganda*, *Cameroon*, and *Kenya* (in the latter two cases, reversing increases in 2014).
- Among the smaller diversified exporters, current account positions should show relatively modest movements in 2015 (an exception being Ebola-hit *Liberia*), but deficit levels remain high in many cases, reflecting large investment projects (public and private). External debt levels are set to rise sharply in *Djibouti* (infrastructure projects), and *Kyrgyz Republic* (banking system bailouts), with import cover declining significantly (at least one month of imports) in *Comoros*, *The Gambia*, and *Moldova*.

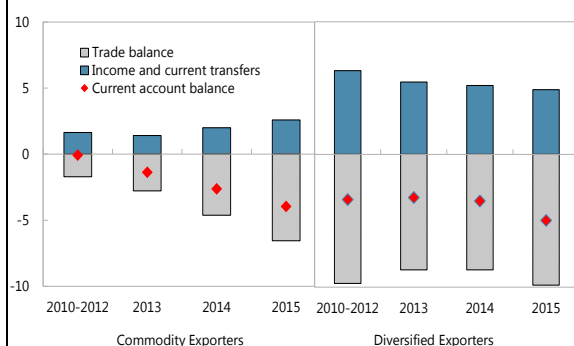
¹² The weighted-average change in the current account position for the 12 largest diversified exporters excluding *Ethiopia*, *Myanmar*, and *Vietnam* is a slight deterioration of 0.1 percent of GDP.

¹³ The (unweighted) average change in import cover across the ten largest diversified exports, excluding *Uganda*, is estimated to have been about -0.3 months in 2015, and about 0.1 months during 2014–15. By contrast, *Uganda* is estimated to have experienced a decline of almost one month of reserve import coverage in 2015.

Figure 6. External Sector Developments

Panel A. Current Account Balance

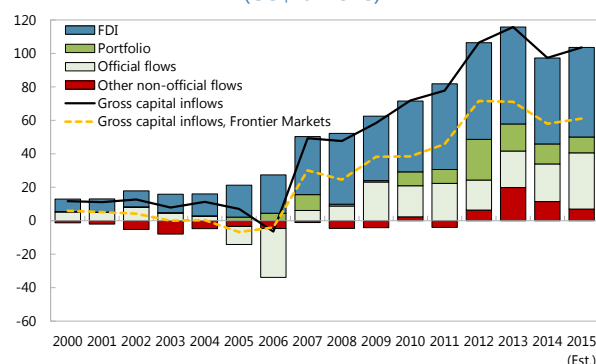
(Percent of GDP, PPP-GDP weighted averages)



Sources: World Economic Outlook and IMF staff estimates.

Panel B. Capital Flows to LIDCs

(US\$ billions)



Sources: World Economic Outlook and IMF staff estimates.

Panel C. External Debt

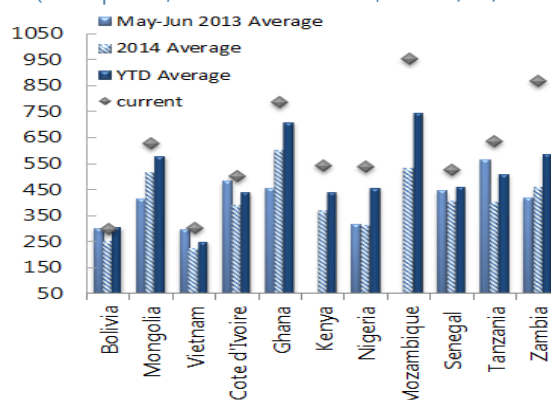
(Percent of GDP, PPP-GDP weighted averages)



Sources: World Economic Outlook and IMF staff estimates.

Panel D. EMBIG Sovereign Spread

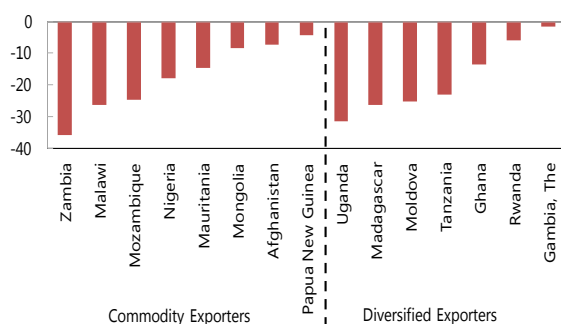
(Basis points, USD-denominated, as of 9/23/2015)



Source: Bloomberg.

Panel E. Depreciation of Currencies

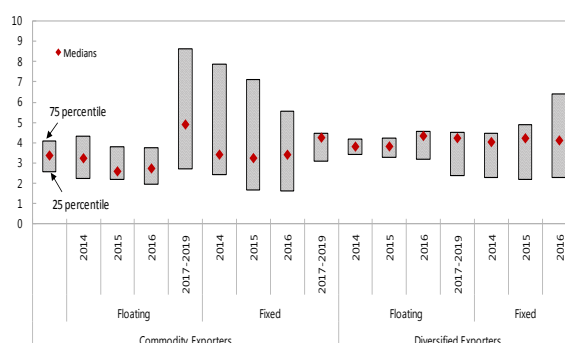
(Selected LIDCs, June 2014–September 2015, percentages)



Sources: World Economic Outlook and Bloomberg.

Panel F. Reserve Coverage

(Months of imports, percentiles)



Sources: World Economic Outlook and IMF staff estimates.

15. Aggregate capital inflows to LIDCs eased in 2014 but are projected to partially recover in 2015, helped by an increase in official flows (Figure 6, Panel B); private capital flows look to have fallen in both years, with FDI remaining somewhat more robust. Movements in the LIDC aggregates are closely linked to flows to frontier markets, suggesting that flows to non-frontier markets have been broadly stable in the aggregate, albeit with higher official flows partially offsetting weaker private flows (likely FDI). For countries with outstanding sovereign bond issues, yields have generally increased in 2014–15 (Figure 6, Panel D)—most notably for *Mozambique*, *Zambia*, and *Ghana*—but the cross-country variations are large (see Section 3 for further analysis).

16. Fund financial support for LIDCs has increased significantly in 2015, boosted by requests from frontier market economies and from Ebola-affected countries in West Africa (Box 2). New programs with *Ghana* and *Kenya*—the latter a precautionary arrangement aimed at providing contingent support in the face of uncertain external financing conditions—accounted for three-quarters of the new commitments of financial support. Indications are that there will be additional demand for new funding commitments in 2016.

Currency depreciations have partially offset the downward trend in inflation in LIDCs.

17. Despite a declining trend, some LIDCs face inflation pressures linked to currency depreciation (Figure 7). Helped by low global inflation, inflation in LIDCs has been on downward trajectory since the double-digit peak in 2011, averaging 7½ percent in 2014, but is projected to have picked up slightly to 7¾ percent in 2015.

- For LIDCs with fixed exchange rate regimes, average inflation is estimated to decline marginally in 2015, from 5.1 percent to 4.9 percent—excluding countries where domestic inflation has surged (above 30 percent) due to conflict situations (*Yemen*, *South Sudan*). Euro-pegged countries have generally seen inflation contained at low levels (such as *Cote d'Ivoire*, *Republic of Congo*), but often at the expense of declining international reserves.
- For LIDCs with flexible exchange rate systems, average inflation is assessed to rise in 2015 from 7.6 to 8.5 percent—with exchange rate depreciations in response to adverse terms of trade shocks an important contributory factor in some cases. But initial pass-through pressures have been contained in several countries, supported by monetary tightening: large depreciations in *Mozambique*, *Nigeria*, *Uganda*, and *Zambia* (Figure 6, Panel E) are expected to produce only modest increases (1–2 percentage points) on single-digit inflation rates. Among the larger diversified exporters, *Myanmar*, uniquely, saw a projected doubling of inflation in 2015 (to 12 percent), with *Ghana* containing already elevated inflation to some 15 percent.

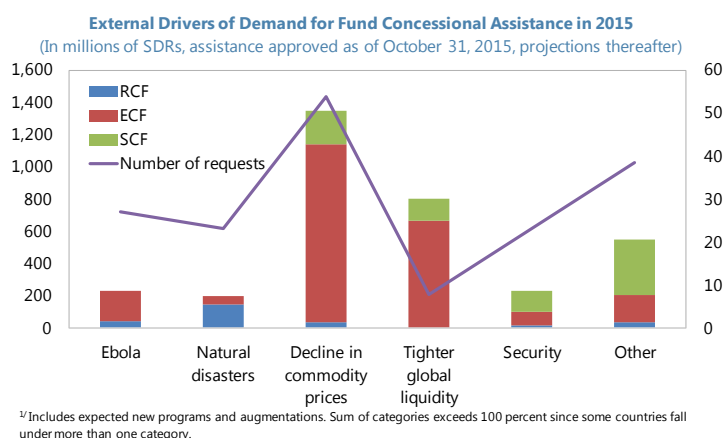
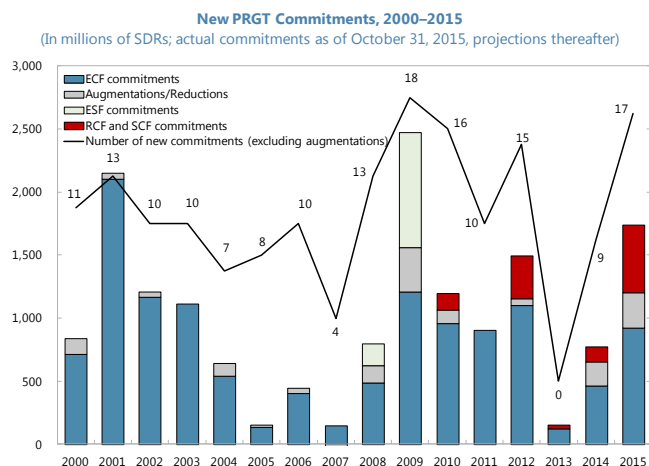
Box 2. 2015 PRGT Loan Demand: Recent Trends and Near-Term Outlook*

IMF concessional financing has increased sharply in 2015. Total new commitments (excluding program augmentations) up to September have already largely exceeded the total annual amount in 2014. About 77 percent of the 2015 PRGT commitments was accounted for by two programs: an ECF for *Ghana* and a precautionary SBA-SCF for *Kenya*. In addition, there were five ECF augmentations which amounted to SDR 158 million. Based on staff surveys and pending requests, total commitments (including augmentations) in 2015 are estimated to increase to about SDR 1.7 billion, the highest level since the global financial crisis.

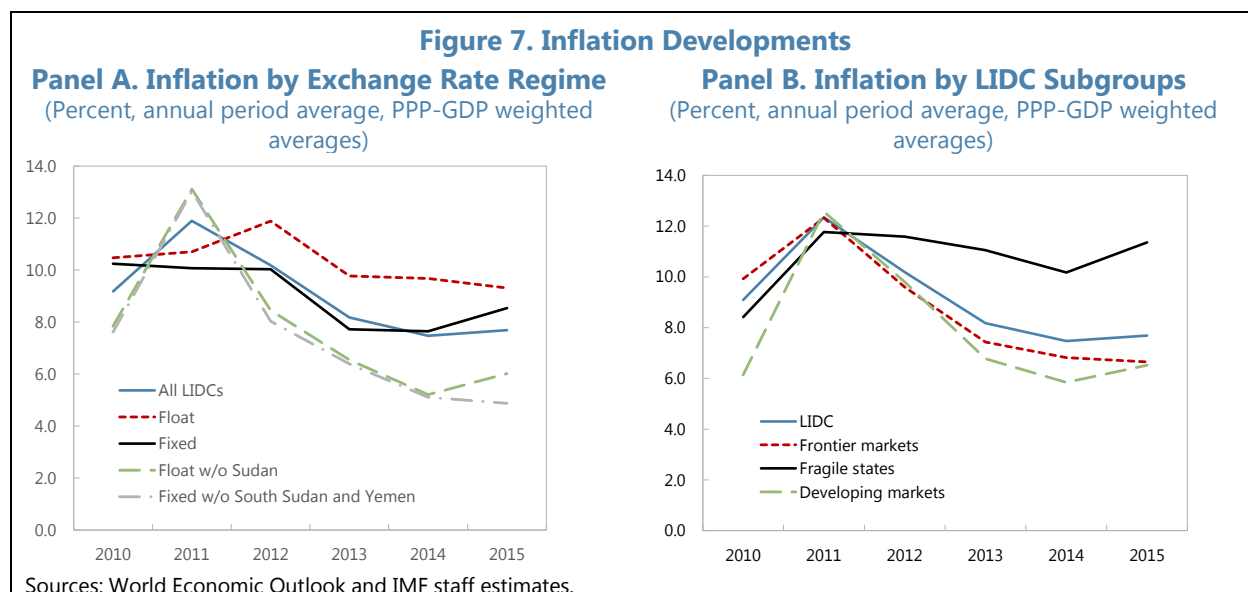
Greater Fund financial support to low-income countries (LICs) is a direct response to adverse global conditions as well as domestic pressures. The slowdown in commodity prices and tighter global liquidity conditions are key drivers of higher demand this year. For example, *Ghana's* ECF is expected to help address financing gaps from a decline in oil revenues and difficulties in accessing international financial markets; *Kenya's* SCF-SBA also aims to address difficulties related to tightening global liquidity conditions and possible worsening of the security situation. Other factors include the Ebola epidemic, security-related issues, and natural disasters.

Recent reforms unlocked additional resources for LICs. The 50 percent increase in access to the Fund's concessional facilities under the reform in July 2015 provides a timely enhancement of the financial safety net for LICs. Since the reform, several augmentations, and new program requests—including *Mozambique* (decline in commodity prices); *Niger* (security-related issues); and *Sierra Leone* (for Ebola and lower commodity prices)—have been either approved or are in the pipeline for the remainder of 2015.

PRGT subsidy resources remain adequate to accommodate a temporary period of high demand. The 2015 increase in demand is not unusual by historical standards and illustrates the volatile nature of demand for concessional resources. The PRGT's subsidy endowment can accommodate such temporary increases in demand, with the PRGT's three-pillar strategy targeting an average lending capacity of SDR 1¼ billion which is robust under a wide range of demand scenarios. At the same time, mobilization of new loan resources for the PRGT of SDR 11 billion from current and prospective new lenders, has started to secure adequate financing beyond 2016.



* Prepared by Gilda Fernandez and Iza Rutkowska.



D. The Near-Term Outlook

18. The global outlook confronting LIDCs in 2016 is expected to involve a modest pick-up in aggregate growth, with only marginal movements in commodity prices from 2015 levels.

The envisaged pick-up in growth is contingent on major advanced economies continuing to benefit from supportive monetary conditions and some improvement in conditions in emerging market economies in economic distress.¹⁴ Transitions weighing on the outlook include the expected gradual tightening of U.S. monetary policy and the ongoing rebalancing of the Chinese economy: capital flows to emerging and frontier markets are also expected to fall significantly. More generally, the balance of risks to the outlook is assessed as being tilted to the downside.

19. The implications for individual LIDCs, again, depends heavily on the composition of trade and, in some cases, the extent of reliance on commercial external financing:

- For commodity exporters, a further deterioration of the terms of trade is not expected—but rather maintenance into the medium-term of low export prices, as compared with the levels prevailing in 2011–13. Countries that used fiscal space and foreign reserves to limit the adverse impact of low export prices in 2015 will be operating with reduced policy space.
- For diversified exporters, the prospects for a limited pick-up in global demand, coupled with broad constancy of commodity prices, offer a relatively benign external environment—simplistically, a repeat of 2015—although those dependent on external financing look set to face higher borrowing costs.

¹⁴ See IMF (2015a) and IMF (2015f).

20. Against this backdrop, staff projections for 2016 envisage some rebound in growth for commodity exporters and some pick-up in already-robust growth for diversified exporters (see Table 2).

- The headline growth figures for commodity exporters—with (weighted) average growth increasing from 3.0 percent to 4.8 percent—are distorted by a huge swing in output levels in conflict-affected *Yemen*: the experience of *Nigeria*, with growth falling from 6.3 percent in 2014 to 4.0 percent in 2015 and then increasing slightly to 4.3 percent in 2016 is more representative.

Table 2. Selected Macroeconomic Indicators
(PPP-GDP weighted averages)

	2014	2015 Est.	2016 Projections	2017-2019 Projections
Growth (Percent)				
Average LIDCs	6.0	4.8	5.8	6.0
Commodity Exporters	5.7	3.0	4.8	5.2
Diversified Exporters	6.3	6.3	6.6	6.6
Inflation (Percent)				
Average LIDCs	7.5	7.7	7.3	6.3
Commodity Exporters	9.4	9.6	8.7	7.1
Diversified Exporters	5.9	6.1	6.1	5.6
Fiscal Balance (Percent of GDP)				
Average LIDCs	-3.3	-4.2	-4.0	-3.5
Commodity Exporters	-2.4	-3.9	-3.2	-2.9
Diversified Exporters	-4.1	-4.5	-4.6	-3.9
Current Account Balance (Percent of GDP)				
Average LIDCs	-3.1	-4.5	-4.7	-4.1
Commodity Exporters	-2.6	-4.0	-4.2	-3.9
Diversified Exporters	-3.5	-5.0	-5.1	-4.2

Sources: World Economic Outlook and IMF staff estimates.

- Diversified exporters are expected to record strong growth, with the six largest countries all recording growth in the range of 6½–8½ percent, only marginally changed from 2015 levels.¹⁵ Growth is set to pick up in countries affected by natural disasters in 2015 (*Liberia, Nepal*), emerging from political instability (*Madagascar*), or with close linkages to *Russia (Krygyz Republic)*.
- Inflation* is expected to show little movement across countries recording single-digit levels, while declining from elevated levels in conflict-afflicted countries (*South Sudan, Yemen*) and countries pursuing stabilization programs (*Ghana, Malawi*).

21. Fiscal positions are expected to improve somewhat across commodity exporters, reflecting policy efforts to adjust to more constrained revenue situations and reduce the elevated deficits recorded in 2015. But projected adjustment efforts are expected, on average, to reverse less than half the increase of 1.5 points of GDP recorded in 2015 (Table 2)—with levels of fiscal deficits exceeding 6 percent of GDP in several cases (including *Mongolia, Zambia*, and conflict-hit *Yemen* and *South Sudan*). There is no clear trend in fiscal positions across diversified exporters, with *Bangladesh* and *Uganda* increasing outlays to finance public investment, *Ghana* and *Kenya* pursuing fiscal consolidation. There are no significant shifts in external current account positions envisaged for 2016, except in countries where large investment projects are scaling up (or down); reserve coverage measures are expected to show little movement, albeit with some erosion among a few of the larger commodity exporters (*Mongolia, Nigeria*).

22. The outlook is subject to downside risks, both external (discussed above) and domestic in nature. Key domestic risks include policy slippages, particularly in countries facing tight financing constraints; natural disasters (the frequency of which is increasing (Section 2); and political instability

¹⁵ *Bangladesh, Vietnam, Myanmar, Ethiopia, Kenya, and Tanzania.*

and conflict. Adverse external shocks to countries with already eroded policy space could trigger significant contractions, augmented by (forced) pro-cyclical adjustments. Incoming high-frequency data suggest that some downside risks to growth are materializing for a number of LIDCs.

E. Policy Challenges

23. A recurrent theme in the preceding discussion has been the diversity of country situations, including variations in income levels, balance of payments structures, fiscal positions, capacity levels, and the role of mega-projects (scaled relative to GDP). There is a corresponding diversity in messages for policy-makers which, in LIDCs more than in richer/larger economies, cannot be easily deduced from a review of the macroeconomic accounts. But, some general messages emerge from developments (national and international) over the past 18 months.

24. First, the era of high commodity prices has likely ended for the foreseeable future, implying that countries dependent on commodity exports must adjust to a new less favorable environment. The declines of commodity prices in 2014–15 are rooted in fundamental shifts in supply conditions (oil) and demand patterns (for many minerals), rather than cyclical factors, and hence will likely not be soon reversed. In the near-term, the pace of adjustment (to budgetary policies, real exchange rates) in commodity exporters may be tempered by the use of existing policy space to support domestic demand (borrowing room, reserve levels) or by accessing financial support from multilateral financial institutions. Over the medium term, adjustment cannot be avoided and, if development objectives are to be achieved, will need to include strong efforts to boost domestic revenue mobilization and achieve diversification into new export products that can replace lost commodity revenues—policy messages that are forcefully articulated in the Addis Ababa Action Agenda (see United Nations, 2015).

25. Second, the large shocks experienced by commodity exporters, with the ensuing domestic economic fallout, offer a reminder of the merits of building macroeconomic policy space: fiscal positions (including public debt levels) that provide countries with room to avoid pro-cyclical adjustment in downturns, foreign reserve levels that allow a smoothing of external adjustments, grounded inflation expectations that provide space for monetary easing. Judgment as to the appropriate timing for building policy space (rather than, say, accelerating public investment) will depend on country circumstances—but the general prescription of preparing for a rainy day is sound. The rising vulnerability levels discussed in Section 2 point to the need for early action in many cases. For LIDCs facing difficult trade-offs between boosting development spending and building buffers, the multilateral financial institutions represent an important potential source of policy space, through their role in providing counter-cyclical financial support.

26. Finally, the concerns about repricing risk and limits on market access articulated during the recent period of surging sovereign bond issuances by LIDCs have materialized in some cases (Figure 6, Panel D). This is not an argument against tapping commercial markets when funds are cheap—rather a reminder of the importance of sound debt management strategies in situations where investor sentiment can quickly sour.

GROWING VULNERABILITIES

27. The first section of this report noted that lower commodity prices and tightening of external financing conditions has adversely affected many LIDCs, although the effects have been far from uniform: many commodity exporters have been hit hard, but growth has held up well across diversified exporters.

28. This section explores the following issues:

- How have macroeconomic and financial vulnerabilities in LIDCs evolved in recent years, given changing domestic and external conditions?
- How would the near-term outlook for LIDCs be affected by plausible adverse shocks to the global economy, drawing on scenarios in line with recent *World Economic Outlook* and *Global Financial Stability Reports*.
- How is the process of climate change likely to affect LIDC's vulnerabilities over the longer term?

A. Current Vulnerabilities

29. The analysis here draws on methodologies outlined in previous IMF assessments of vulnerabilities in low income countries.¹⁶ We first look at the risk of experiencing a sharp decline in economic growth (measured by a Growth Decline Vulnerability Index (GDVI)): vulnerability is assessed on the basis of external sector, fiscal, growth, and institutional factors, with countries being ranked as low, medium, or highly vulnerable.¹⁷ We then look at recent developments in regard to debt vulnerabilities across LIDCs and at macro-financial vulnerabilities in frontier market countries.

Trends in LIDCs' Macroeconomic Vulnerabilities

30. The vulnerability of LIDCs to an adverse growth shock has increased significantly across regions and subgroups over the past two years:

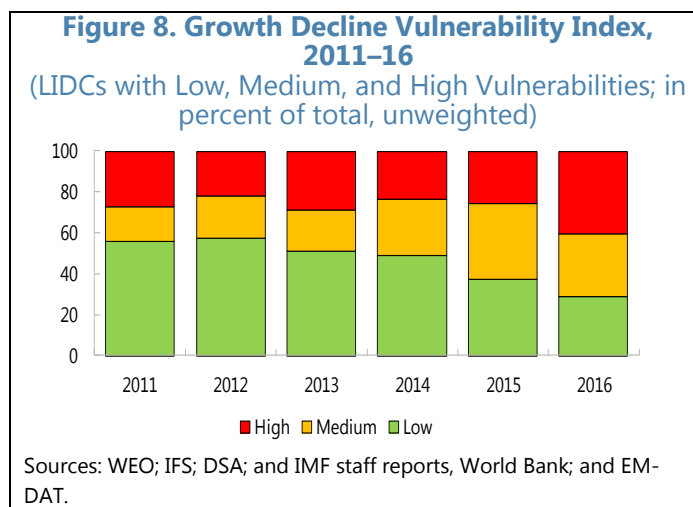
- The share of LIDCs deemed to be highly vulnerable has risen substantially (see Figure 8), reaching 40 percent as of 2016.¹⁸ This is a level not seen since the immediate aftermath of the global financial crisis in 2008–09.

¹⁶ See, in particular, IMF (2013a), and IMF 2014a, Box 2 for further discussion.

¹⁷ The GDVI methodology is built on assessment of vulnerabilities at the sectoral level, focusing on the external, fiscal, and "real economy" sectors (the last reflecting a composite of growth performance, institutional capacities and income inequality). Recent analytical work to strengthen the methodology is described in Appendix I.

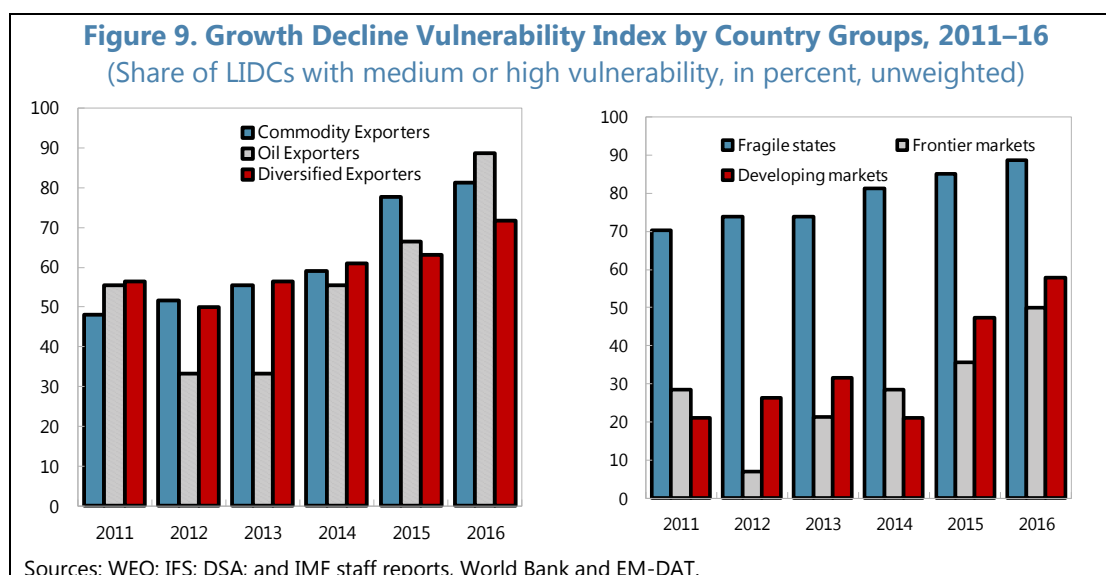
¹⁸ The assessment of vulnerability at the outset of 2016 is based on 2015 data.

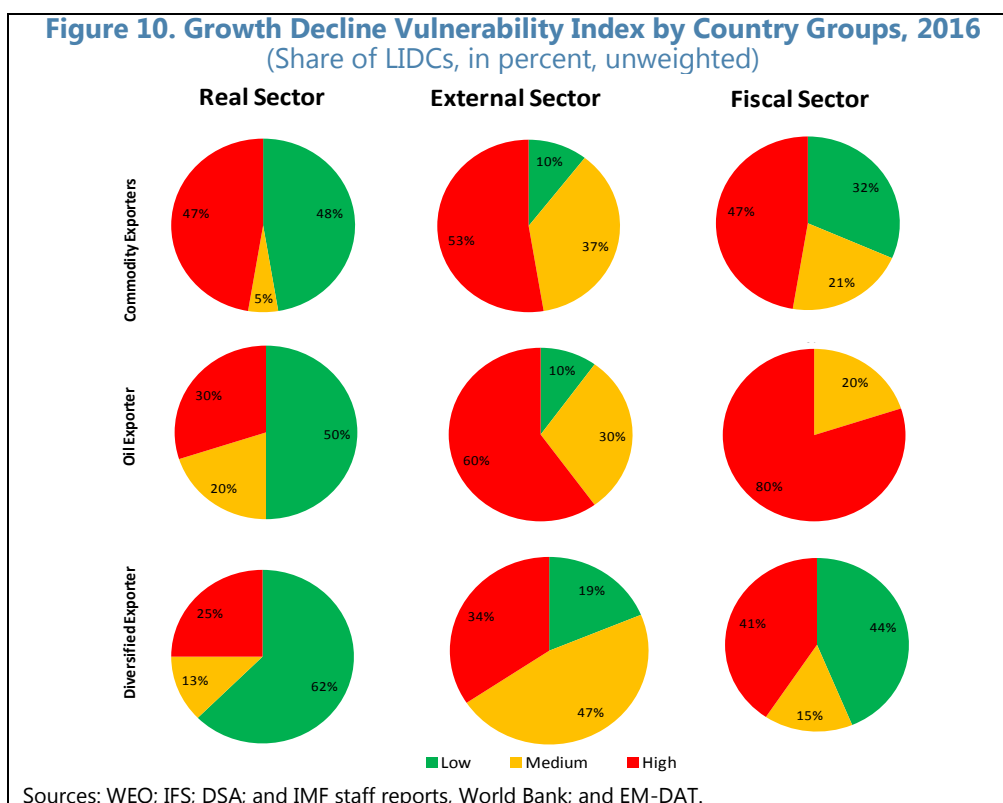
- The increase in vulnerability levels (measured by the share of countries deemed medium or highly vulnerable) has occurred across all country groupings (fragile states, frontier markets, developing markets) and among both commodity exporters and diversified exporters (Figure 9). The increase in vulnerabilities has been especially marked among commodity exporters, with oil exporters most severely hit.



- Sources of vulnerability differ across exporter groupings (Figure 10). Weak external sector positions are now the primary source of vulnerability among commodity exporters; fiscal positions are the lead source of vulnerability in diversified exporters (although the share of this grouping at medium/high risk from fiscal positions is much lower than for commodity exporters).

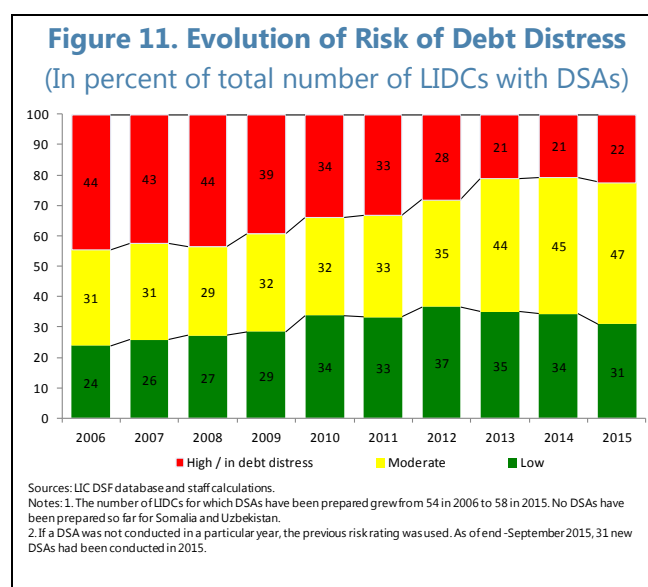
31. The evolution of vulnerabilities in 2014–15 is largely accounted for by two factors: (i) a weakening in fiscal and external buffers over time, and (ii) the 2014–15 drop in commodity prices. Expansive policy stances, initiated in many LIDCs during the global financial crisis, were maintained as the global environment improved, supporting growth but also producing a gradual weakening of fiscal and external positions that was reflected in the upward drift in vulnerabilities through 2014 (Figure 9, left panel). The 2014–15 commodity price shocks then hit many commodity exporters hard, with marked increases in fiscal and current account deficits (see Section 1) that boost vulnerability ratings. Diversified exporters did not fare as badly in the recent period, with vulnerability ratings helped by continued strong growth performance but still rising in some countries due to wider fiscal deficits.





32. Debt sustainability assessments (DSAs) for LIDCs point to a weakening of debt positions in some countries in 2014–15, reversing the steady improvement recorded for LIDCs as a whole over the past decade (Figure 11).¹⁹ The number of countries involved is modest, but the changes are reflective of the general shift in economic conditions discussed in Section 1.

- Some thirty percent of LIDCs are currently deemed to be at low risk of encountering external debt distress, with over one-fifth assessed as being at high risk of, or already in, debt distress.²⁰ The remaining LIDCs are classified as being at moderate risk.



¹⁹ For a discussion of the evolution of public debt vulnerabilities in low income countries during the 2007–14 period, see IMF (2015g); the focus here is on developments since 2014.

²⁰ DSAs for low-income countries are conducted on a regular basis (ideally annually) by the staffs of the IMF and the World Bank, using the Low Income Country Debt Sustainability Framework (LIC-DSF). DSAs yield a rating on the risk of the country encountering external debt distress: low, moderate, high risk, or “in debt distress”.

- During 2014 and the first nine months of 2015, there were eight rating downgrades and five upgrades (with six downgrades and three upgrades in 2015).
- Among downgrades, four countries (*Cameroon, Ethiopia, Republic of Congo and Zambia*) moved from low to moderate risk; four (*Central African Republic, Ghana, Mauritania and Mongolia*) from moderate to high risk. The downgrades have in most cases resulted from higher levels of external borrowing.
- Of the five upgrades, two countries (*Nepal and Tajikistan*) moved from moderate to low risk, three countries (*Comoros, Democratic Republic of Congo and Haiti*) improved from high to moderate risk. Several of the upgrades resulted from a change in the DSA methodology.²¹

33. The discussion above has pointed to a significant increase in macroeconomic vulnerabilities in LIDCs in the wake of the 2014–15 commodity price shocks. Key policy messages from these developments include:

- Policy space has been seriously eroded in many commodity exporters (Figure 10), implying that slow adjustment to the new external environment would leave countries severely exposed to new adverse shocks (see sub-section B below), putting macroeconomic stability itself at risk. Countries that have moved into “high vulnerability” territory should focus on accelerating adjustment to the new commodity price environment through a mix of fiscal tightening (cutting non-priority outlays and untargeted subsidies, “quick-win” tax measures, possibly slowing implementation of public investment plans) and accepting greater exchange rate depreciation (where relevant), buttressed by monetary tightening to contain any sustained jump in inflation.
- Vulnerabilities continue to drift upwards in diversified exporters. With strong growth remaining the norm in this grouping, countries have room to re-calibrate macroeconomic policies towards strengthening fiscal and external positions—an option that should be exercised in countries where vulnerabilities have reached, or are approaching, elevated levels.

Macrofinancial Vulnerabilities in Frontier Markets

34. Financial vulnerabilities in LIDCs are evaluated in IMF (2014a), where it was concluded that vulnerabilities had abated since the global financial crisis, with financial sector stability typically supported by a strong domestic funding base and limited reliance on external financing. That said, it was noted that asset quality was a key risk factor, particularly in countries where bank lending is politicized and/or credit is growing rapidly; that credit growth in some countries was a cause for concern; and that developments in financially evolving frontier markets warranted close attention. This broad assessment is unchanged.

²¹ The discount rate used to calculate the present value of future payments in the LIC-Debt Sustainability Framework was increased from 3 percent to 5 percent in September 2013.

35. We look here at the evolution of macrofinancial vulnerabilities in frontier markets, drawing on the financial vulnerability index and z-score methodology utilized in IMF (2014a) and looking at the macroeconomic risks from rising interest rates on sovereign bonds.²²

36. As in 2014, the financial vulnerability index suggests that financial systems in more than half of the frontier market economies face sizeable risks, typically stemming from the rapid pace of credit growth and the sizeable share of bank lending denominated in foreign currency (Table 3). For

the eight countries classified as being at “high risk,”²³

vulnerabilities reflect some combination of high shares of domestic credit in foreign

currency (seven cases),²⁴

fast credit growth over the last three years (five cases),²⁵ and low bank capital buffers (three cases).

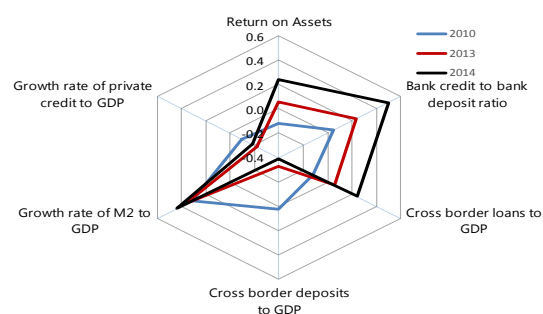
37. Use of the z-score methodology points to a broadly similar set of risks in frontier market economies as a group, while also suggesting that these risks have been increasing (Figure 12).²⁶ Risk factors that have been increasing over time include the scale of cross-border lending, the ratio of bank credit to deposits, and the (falling) average rate of return on assets.

Table 3. Financial Vulnerability Index

	Number of Countries						Share of Countries					
	2009	2010	2011	2012	2013	2014	2009	2010	2011	2012	2013	2014
Low	3	2	4	4	5	5	21	14	29	29	36	36
Medium	0	1	2	3	0	1	0	7	14	21	0	7
High	11	11	8	7	9	8	79	79	57	50	64	57
Total	14	14	14	14	14	14	100	100	100	100	100	100

Source: IMF staff estimates.

Figure 12. Frontier Markets' z-Scores^{1/}



Source: Bankscope, BIS, and IMF staff estimates.

1/ Unweighted averages

²²The financial vulnerability index for frontier markets is based on five variables: capital adequacy ratio, return on assets, the ratio of bank loans to bank deposits, cumulative three-year growth of the credit-GDP ratio, and the ratio of foreign liabilities (cross border loans and deposits) to domestic credit. For further discussion of the methodology, see IMF 2014a, Appendix III.

²³ The assessment of “high risk” should be seen as flagging potential vulnerabilities rather than providing an assessment of immediate risk to banking systems.

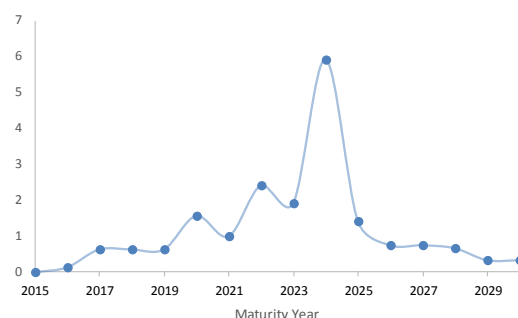
²⁴ Substantial shares of credit in foreign currency constitute a source of fragility even if banks avoid incurring net open foreign exchange positions: foreign currency loans pose a risk to asset quality if borrowers are not hedged. The large currency depreciations recently recorded in several LIDCs may impair asset quality via this route.

²⁵ Distinguishing between “rapid” and “excessive” credit growth is difficult; a recent staff analysis of credit growth in sub-Saharan Africa did not find compelling evidence of excessive growth (IMF 2015h).

²⁶ The z-scores are standardized measures of how close an observation is to the historical mean of a given variable, with a smaller score indicating lower risk (IMF 2014a, Section 2). The frontier market group includes 14 countries, with z-scores first derived for each country from common means and standard deviations of frontier LICs, and a group score being calculated as a simple average of country scores. The indicators used seek to capture both domestic and foreign influences on financial stability.

38. Rising yields for frontier market government debt pose a risk for sovereigns that are reliant on foreign borrowing. As noted in Section 1, spreads on sovereign bonds have increased markedly for several frontier market economies over the past year—albeit with large variations across countries that, in the main, reflect differences in country fundamentals and prospects (Figure 6, Panel D). Rollover risks on debt already issued (whether re-pricing risk or lack of access) should remain limited in the near term, as only modest volumes of Eurobonds will be falling due in the next few years (Figure 13). But rising yields pose a threat to countries where new external commercial financing is an important element of near-term spending plans. These countries face difficult choices, trading off the merits of domestic versus external borrowing and/or adjusting fiscal plans to fit the envelope of financing available on terms consistent with maintaining debt sustainability.

Figure 13. Eurobonds Maturity Amount
(In billions US dollar)



Source: Dealogic.

39. Taken together, the preceding analysis points to concerns about financial stability and external financing risks in several, but not all, frontier market economies. The methodologies used here serve to identify potential risk factors. National agencies responsible for financial system stability need to conduct detailed assessments of these risks to identify the specific nature of the problems at play and the remedial measures needed. Similarly, public debt managers need to reassess fiscal financing plans in light of rising external funding costs, with a view to containing any adverse debt dynamics. Technical support from external agencies, including the Fund, can provide assistance in these exercises.

B. Scenario Analysis: Vulnerability of LIDCs to Global Shocks²⁷

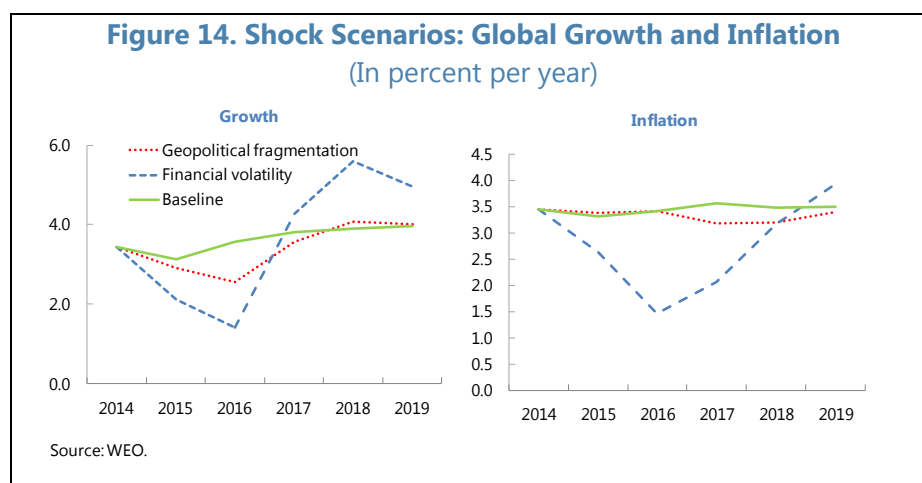
40. LIDCs remain vulnerable to global shocks. Trade continues to be the main spillover channel from advanced and emerging economies both through volume and price effects, but there are also important linkages via investment flows and remittances.

41. The effects of two global shock scenarios on LIDCs are examined here, drawing on scenarios from recent *World Economic Outlook* and *Global Financial Stability Reports*:²⁸

²⁷ The scenario analysis was prepared jointly with Andrew Edward Hodge, Marialuz Moreno Badia, and Aiko Mineshima (all FAD).

²⁸ The methodology employed in fleshing out these scenarios is discussed in Box 3.

- **A global financial volatility scenario** involves a reassessment by investors of underlying risks and growth prospects, amplified by low market liquidity and reemergence of financial stress in systemic advanced countries. The heightened volatility delays monetary policy normalization and limits economic risk-taking worldwide. Global output falls by 2.7 percentage points relative to baseline during the three-year period 2015–17, with the sharpest difference in 2016, temporarily depressing oil prices by 22 percent and non-oil commodity prices by 11 percent.²⁹
- **A prolonged geopolitical tensions scenario** considers the consequences of a series of regional conflicts. In this scenario, global output falls by 1.5 percentage points relative to baseline during the three-year period 2015–17, oil prices are 8 percent above the baseline in 2016, while other commodity prices soften slightly.



42. The financial volatility scenario entails significant macroeconomic effects for many LIDCs and creates sizeable external financing needs (Figure 15). Due to weaker foreign demand, LIDC output would be lower by 1.2 percentage points relative to baseline by the end of the three-year period; with slower GDP growth and a drop in commodity export revenues, fiscal positions would deteriorate by a cumulative 1.5 percent of GDP; and public debt ratios would rise by 2.4 percent of GDP relative to baseline (reflecting the combined effect of lower GDP and higher fiscal deficits). Current account deficits would deteriorate by a cumulative 4.6 percent of GDP, with reserve coverage declining by about one month of imports. Given the shock to commodity prices, commodity exporters would be more adversely affected than diversified exporters. The resulting cumulative external financing gap by end-2017 is estimated at about US\$51 billion. The effects could be larger if global financial volatility were to result in sudden stops or reversals in capital inflows to frontier countries.

²⁹ The financial volatility scenario is a short to medium-run scenario where output levels (rather than growth rates) are negatively affected in the early years before catching up with baseline forecasts in later years (hence the high GDP growth rates in outer years). The analysis of the impact on LIDCs focuses on the period 2015–17.

43. The geopolitical fragmentation scenario yields a more limited impact on LIDCs' output levels, fiscal positions, and financing needs (Figure 16), given the smaller decline in global output and mixed impact on international commodity prices. Output in LIDCs would be lower by 0.8 percentage points relative to the baseline, fiscal positions would deteriorate by a cumulative 0.2 percent of GDP, and public debt ratios would rise by 1 percent of GDP by end-2017. In the aggregate, current account balances would deteriorate by a cumulative 0.6 percent of GDP, but oil exporters would see current account balances helped by somewhat higher oil prices. The cumulative external financing needed to maintain adequate reserves in LIDCs is estimated to be US\$19 billion.

Figure 15. Impact of Financial Volatility Shock
(Cumulative deviation from baseline over three years)

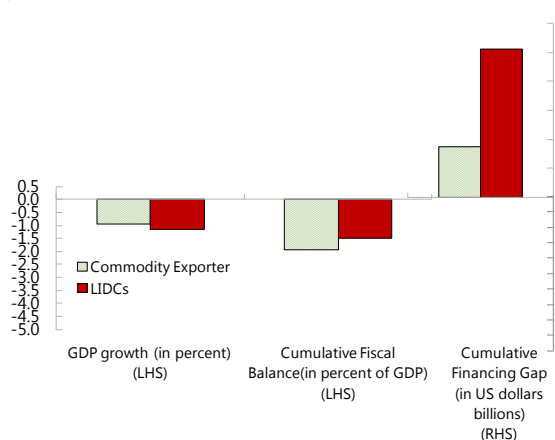
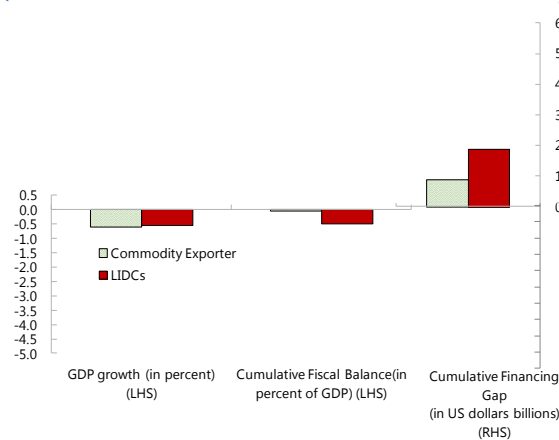


Figure 16. Impact of Geopolitical Shock
(Cumulative deviation from baseline over three years)



Source: WEO and IMF staff estimates.

Box 3. Methodology for Scenario Analysis

Scenario analysis is a tool for evaluating the macroeconomic impact on LIDCs of global economic shocks. It allows an assessment of the adequacy of external buffers and fiscal positions in the aftermath of global shocks. The scenarios analyse the transmission of changes in commodity prices, remittances, and demand shifts in major economies upon the economic growth, external balances and fiscal balances of LIDCs, which have been developed using various econometric estimations (IMF, 2013a).

The impact of a global shock on LIDCs' economic growth is determined via change in external demand (assumed to evolve in line with partner countries' growth) and terms of trade. To assess the impact on external balances, changes in exports, imports, remittances, and FDI are taken into account. With respect to the fiscal sphere, the impact on fiscal revenue is estimated as a weighted average of revenue from general economic activity, assumed to evolve in line with nominal GDP, and revenue from natural resources where relevant, incorporating country-specific historical elasticities of commodity revenue with respect to commodity prices. Following a "passive approach," nominal primary expenditure is assumed to remain unchanged at the baseline level.

All changes in the current account are assumed to be financed out of reserves, and broadly, a country is assessed to have an additional external financing need if the post-shock reserve coverage ratio is less than the minimum adequate level, set uniformly at three months of imports for simplicity. More precisely, for countries whose pre-shock reserve coverage exceeded three months of imports, the external financing need is the amount of financing needed to bring the reserve coverage ratio back to three months; and for countries where pre-shock reserve levels were less than three months of imports, the external financing need is the amount of financing needed to restore the stock of reserves to its pre-shock level.

C. Climate Change: A Growing and Lasting Source of Vulnerability³⁰

44. The process of climate change is expected to exacerbate vulnerabilities and could over time have a significant adverse impact on many LIDCs. “Climate change” refers here to the gradual increase in global mean temperature and related developments such as rising sea levels and increased frequency of extreme weather events. There is a broad scientific consensus that man-made emissions of greenhouse gases are a key driver of ongoing climate change.³¹

45. The international community aims to limit the global mean temperature increase to 2°C by containing greenhouse gas emissions, but this goal appears increasingly at risk.³² The scale of global warming realized over time will depend on the vigor with which countries implement mitigation measures, in line with commitments made at the UN climate change conference in December. Absent such intervention, indications are that the global mean temperature increase could reach 4°C or more by the end of this century—producing a severe change in climate conditions in many parts of the world.

Physical Impact

46. Proximity to the equator is expected to be associated with greater exposure to the adverse effects of climate change:

- While **temperature increases** are projected to be smaller closer to the equator, these come on top of higher baseline temperatures, yielding above-average increases in the frequency and duration of extreme heat. Under a 2°C warming scenario, the share of the land surface affected by extreme heat is projected to be 30 percent in the Middle East and North Africa, 30–40 percent in Latin America/Caribbean, and 45 percent in Sub-Saharan Africa (SSA), as compared, for example, with 10–15 percent of land in Europe and Central Asia.³³
- **Sea-level rise** for countries nearer to the equator will be higher than the global mean—with a strong impact on small island states and low-lying countries (such as Bangladesh).
- **Water sustainability.** Projected global warming is expected to lead to higher precipitation variability and increased evapotranspiration in warmer climates: in a 2°C warming scenario, water runoff is expected to fall by 30–50 percent in SSA and 10–30 percent in Latin America.

47. The projected effects of climate change on Sub-Saharan Africa—the region containing more than one-half of LIDCs—are severe. Figure 17 highlights seven transmission channels,

³⁰ Parts of this section draw on World Bank 2012, 2013, and 2014.

³¹ See Intergovernmental Panel on Climate Change (IPCC, 2014), World Bank 2012, 2013, and 2014, and Stern (2008).

³² See IPCC (2014).

³³ Land areas subject to extreme heat would more than double under a 4°C global warming scenario.

illustrating i) how impact cumulates over time and ii) the non-linear relationship between mean global temperature increases and impact, notably on land affected by highly unusual heat.

Figure 17. Impacts in Sub-Saharan African

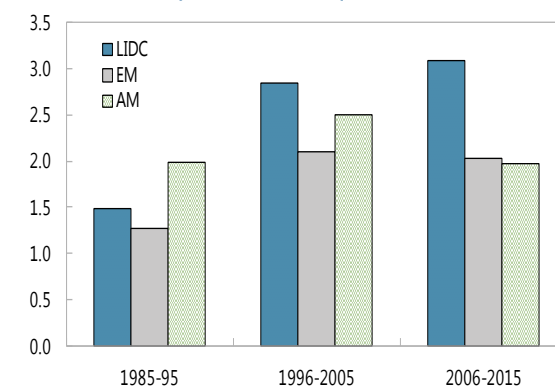
Risk/Impact		Observed Vulnerability	1.5°C (≈2030s)	2 °C (≈2040s)	3 °C (≈2060s)	4 °C and Above (≈2080s)
Heat Extremes	Unusual Heat	Virtually absent	Land area affected by highly unusual heat 25% → 45% → 70% → >85%			
	Unprecedented Heat	Absent	3-5% → 15% → 35% → >55%			
Aridity		Increased Drying	Area of hyper-arid and arid regions grow by Little change expected → 3% → 10%			
Drought	Southern, Central and West Africa	Increasing drought trends observed since 1950.	Increasing drought risk	Severe drought risk	Extreme drought risk	Extreme drought risk
	East Africa		Decreasing drought risk			
Sea-level rise (1985-2005)		About 21cm to 2009	By 2040s: 30cm → 30cm → 30cm → 30cm By 2070: 50cm → 50cm → 50cm → 50cm By 2080-2100: 70cm → 70cm → 90cm → 105cm			
Water	Runoff		30-50% decreases in annual runoff for parts of West Africa and Southern Africa.			
Food			Crop growing areas are projected to overlap on average 56% → 12% → 3%			
			Reduction in crop yields Around 0 → -5% → -11% → -20%			
Coast		Tanzania has 800km of coast line where impact can already be seen.	People affected by flood per year by 2100 without adaptation 11 million → 18 million			

Source: Based on World Bank (2013), Tables 3.1 and 3.4.

Note: Warming levels are relative to pre-industrial temperatures. The arrows indicate the range of warming levels assessed in the study. Adaptation measures are not assessed in these tables.

48. LIDCs already experience greater frequency and severity of natural disasters than better-off countries. Over the period 2006–15, after controlling for country size, LIDCs are hit about one and a half times as often by climate-related disasters (droughts, floods, and storms combined) than more developed countries (Figure 18). This frequency is seen as part of a longer-term trend increase, notwithstanding some stabilization in recent years. Droughts in particular appear to affect LIDCs more frequently than other countries. Also, the share of the population affected by natural disasters is substantially higher in LIDCs than elsewhere.³⁴

Figure 18. Frequency of Natural Disasters in LIDCs and the Rest of the World, 1985–2015
(Average Annual Number of Droughts, Floods, Storms per million square kilometers)



Source: EM-DAT and IMF estimates.

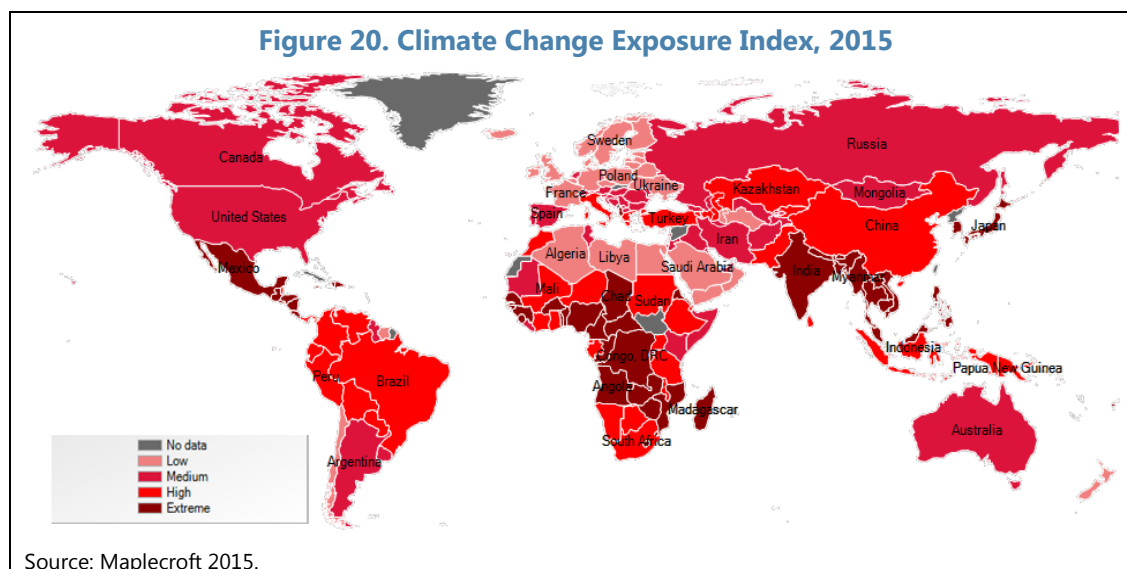
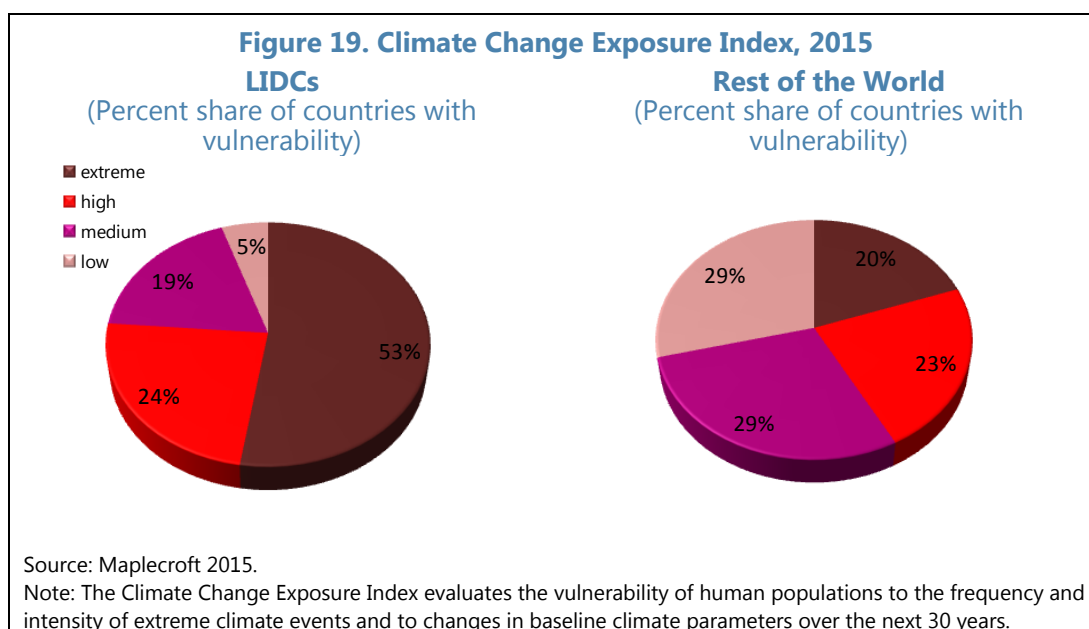
49. Cross-country assessments of vulnerability to the effects of climate change indicate that LIDCs are typically at greater risk than more developed countries. Drawing on the changes to climate parameters over the next 30 years predicted by the Intergovernmental Panel on Climate Change, Maplecroft (2015) develops a climate change vulnerability index, reflecting the likely frequency and intensity of extreme climate-related events and changes in major climate parameters (Figures 19–20). More than three-quarters of LIDCs are assessed as being either highly or extremely vulnerable to climate change, compared to some two-fifths of other countries.

Economic and Social Impact

50. Climate change is expected to adversely affect output levels, particularly in LIDCs with weak institutions and weak infrastructure: an influential study by Dell et al. (2012) concludes that output in poor countries falls by 1.3 percent relative to baseline for each 1°C rise above the national mean temperature.³⁵

³⁴ During the period 2006–15, on average 1.5 percent of LIDCs' populations were affected by natural disasters. The share of the population affected by climate-related disasters is higher in LIDCs than elsewhere—some two times higher than in EMs and ten times higher than in AMs, based on data from Emergency Events Data Base. A disaster is registered if at least one of these conditions is met: (i) 10 or more fatalities; (ii) 100 or more people "affected;" (iii) a call for international assistance; and (iv) declaration of a state of emergency. People "affected" by a disaster include those injured, homeless/displaced, or requiring immediate assistance, but exclude fatalities.

³⁵ See Farid et al. (2015), forthcoming, for further discussion and references.



51. The impact on output and labor productivity in agriculture—the dominant source of employment in LIDCs—is expected to be particularly marked. Rising temperatures and greater rainfall volatility, coupled with more frequent droughts, have sizeable adverse effects on agricultural output and incomes, with the impact being significantly greater in countries where crop land is typically not irrigated.³⁶ Increased vulnerability of the agricultural sector will inevitably imply heightened risks to food security.³⁷

³⁶ See Barrios et al. (2008, 2010), Dell and others (2014), Lanzafrance (2014), and Garcia-Verdu et al. (forthcoming).

³⁷ Beyond slowing growth, e.g. by lowering agricultural output, climate change-related natural disasters can generate large costs by destroying infrastructure and other capital stock. There is substantial uncertainty regarding the size of these costs, however. (The leading Emergency Events Data Base does not account for uninsured losses associated with recurrent, extensive disasters, particularly in LICs.) This makes it difficult to compare these costs to fiscal buffers.

52. The stresses placed on LIDCs subject to severe climate change will likely translate into significant migration pressures and heightened risk of conflict.³⁸ Increasing fragility along these lines can be expected to have a significant adverse impact on medium-term growth (as analyzed in IMF 2014a, Box 1).

Strengthening LIDCs' Resilience to Climate Change

53. Containing climate change will require a global effort to limit carbon emissions to levels consistent with an acceptable increase in mean global temperatures. The COP-21 conference in December seeks to produce agreement on national targets for emissions containment that collectively achieve this objective, with countries then facing the challenge of implementing measures sufficient to achieve these targets.

54. LIDCs contribute only marginally to global carbon emissions, but will need to devote significant resources to building resilience to climate change. Support from the international community in the form of concessional climate finance will play a key role in helping LIDCs tackle adaptation challenges without compromising on developmental objectives.

55. National policies to enhance resilience to climate change in LIDCs will need to contain several components. Key elements include: (i) risk identification and adaptation assessments, integrated into budget planning; (ii) self insurance, by building fiscal and reserve buffers; (iii) risk reduction through targeted investments in infrastructure; (iv) risk transfer through multilateral risk-sharing mechanisms and precautionary instruments; and (v) enhanced disaster management capacity.³⁹ Support from development partners to build domestic capacity and from multilateral actions to develop affordable hedging and catastrophe insurance markets will be an essential ingredient if national efforts to build resilience are to succeed.

CAPITAL INFLOWS AND MACROECONOMIC IMPLICATIONS

56. This section examines the recent experience of LIDCs with capital inflows and capital account policies, and analyzes the economic impact of these inflows. Although capital inflows can mobilize external savings to boost domestic investment, allow for technology transfer and efficiency gains, and promote financial sector deepening, they can also pose risks when underlying economic policies are weak; and debt-creating flows are also generally associated with higher macroeconomic and financial volatility (see for example, IMF 2012, Bluedorn and others, 2013, Rodrik and Subramanian, 2009).

³⁸ See World Bank (2014).

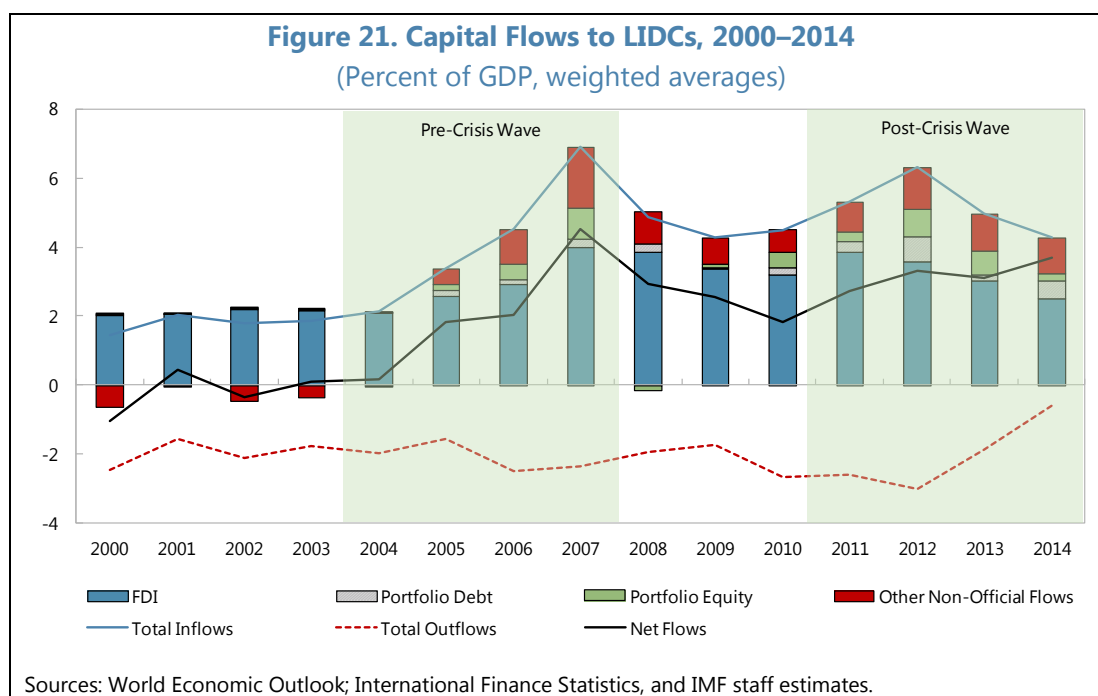
³⁹ See Cabezón et al. (2015) and Farid et al. (2015), forthcoming, for a full discussion.

57. The section is organized as follow. It starts by presenting stylized facts on the nature of capital inflows to LIDCs and looks at trends in LIDCs' policies on capital account liberalization.⁴⁰ It then analyzes the impact of capital inflows to LIDCs on domestic demand—investment and consumption—using case studies to augment the statistical analysis, concluding with some key policy messages that can be drawn from analysis.

A. The Facts: Trends in Capital Inflows and Capital Account Openness

Level, Composition and Pace

58. Capital inflows to LIDCs increased sharply during the 2000s, reflected in two waves before and after the global financial crisis.⁴¹ In the period preceding the crisis, total capital inflows rose from some 2 percent of GDP in the early 2000s to 7 percent of GDP in 2007; after a temporary decline during the crisis, inflows rebounded, reaching 6 percent of GDP in 2012 (Figure 21). Box 4 reviews the measures of capital flows and its composition that are used here.



⁴⁰ See IMF 2011 and IMF 2013b for an examination of capital flows to sub-Saharan Africa.

⁴¹ The sample of LIDCs includes 52 countries (with eight countries excluded due to limited data availability). The sample of emerging markets (EMs) used in the analysis here includes 38 countries: all emerging market and developing economies (WEO definition) except a) LIDCs, b) small states (population less than 1.5 million) and c) G-20 member countries, whose capital and financial markets are typically much deeper and more developed than other EMDEs.

Box 4. Measuring Capital Flows¹

This section uses the following concepts of capital flows and its components:

Total capital inflows refer to the *net* changes in domestic resident liabilities to foreigners (e.g., a positive sign denoting a net increase in liabilities and a negative sign denoting a net decrease in liabilities). *Total capital outflows* refer to the *net* changes in foreign assets owned by domestic residents.

Net capital flows refer to the difference between total inflows and total outflows. With many LIDCs still maintaining substantial restrictions on residents' investments abroad, net capital flows to LIDCs are typically driven by total inflows—that is, by the activities of non-residents.

The analysis here focuses on the behavior of total capital inflows and the following components: (i) *direct investment*; (ii) *portfolio investment*; (iii) *other non-official investment*.

(i) *Direct investment* refers to cross-border investment associated with a resident in one economy having control (more than 50 percent of the voting power) or a significant degree of influence (10 percent or more of the voting power) on the management of an enterprise that is resident in another economy. Direct investment can include both equity and debt investment (for example, inter-company loans).

(ii) *Portfolio investment* is defined as cross-border transactions and positions involving debt or equity securities. This category also includes domestically issued securities that are bought by non-residents (e.g. domestic government bonds).

(iii) *Other non-official investment* includes bank deposits, corporate and bank loans and trade credit; “non-official” refers to the recipient. Transactions relating to the government or monetary authority in capital inflow recipient LIDCs are therefore excluded from this category.²

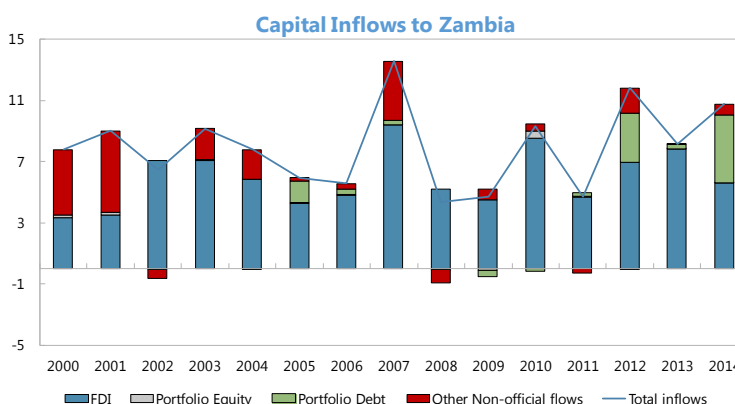
We use the case of *Zambia* to illustrate the concepts above. Total capital inflows averaged around 8 percent of GDP in 2000–2007 and almost 9 percent of GDP during 2011–14. FDI accounted for some 70 percent of inflows, mostly directed to the mining sector (which accounted for two-thirds of the stock of FDI at end-2014).

While non-FDI inflows averaged about 30 percent of total inflows to *Zambia* before and after the crisis, the composition of these inflows has changed over time.

Portfolio debt inflows were close to nil in early 2000s, increasing slightly to 0.5 percent of GDP in the pre-crisis period of 2004–2007 (mainly foreign investment in the domestic bond market). Post-crisis, these inflows averaged 2 percent of GDP through 2014, boosted by two Eurobond issuances.

Portfolio equity inflows have been of minimal significance, averaging 0.1 percent of GDP in 2011–12.

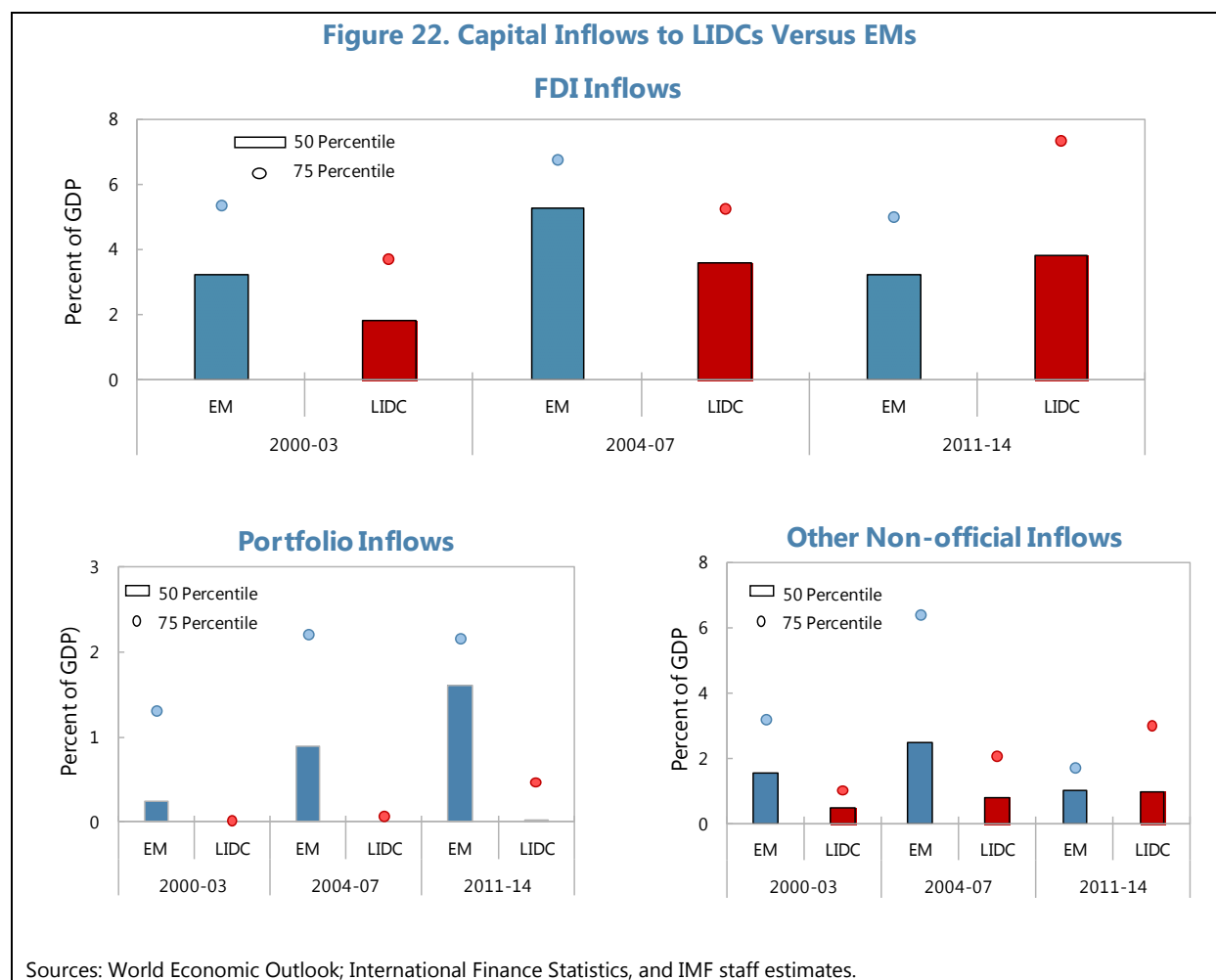
Other non-official investment inflows were significant in the pre-global crisis period, accounting for one-quarter of total inflows, and accounted for about 6 percent of total inflows in 2011–14. The quality of data on these flows is not high.



¹ Contributors: Juliana Araujo, Byung Kyoon Jang and Tobias Rasmussen.

² The definition adopted excludes other investment flows to the official sector (the general government and monetary authorities), whether or not originating from official or private sources (the underlying data source provides a breakdown by debtor but not by creditor). There is no distinction between official flows and nonofficial flows for FDI and portfolio flows.

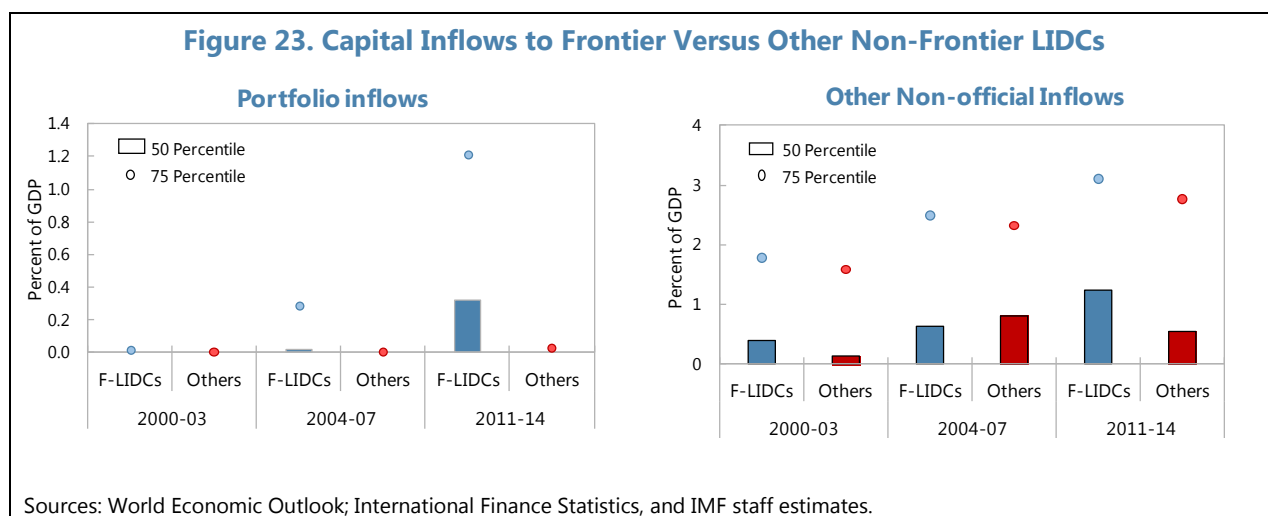
59. The post-crisis wave of inflows to LIDCs has been more broad-based, with sharp increases across all components of inflows (Figure 22). Unlike the first wave, the second wave was characterized by a rise in the level of portfolio inflows to LIDCs, with an increase in Eurobond issuances and domestic debt purchases by non-residents, reflecting both more favorable global financial conditions and stronger domestic economic conditions (see below). LIDCs typically experienced a sharper rise in FDI inflows post crisis compared to EMs (Figure 22, Panel 1), owing in part to the upswing in commodity prices during this period and LIDCs' higher dependency on commodity exports.⁴² In contrast, although portfolio inflows to LIDCs rose in the post-crisis wave, they still lagged behind EM levels, and while non-official inflows to LIDCs were typically at levels similar to EMs post crisis (Figure 22, panels 2–3; Araujo and others (2015)).



60. Among LIDCs, the uptick in portfolio inflows has been driven by a handful of, mostly frontier, LIDCs (Figure 23, Panel 1, see also IMF 2013b, 2014c and 2014d). Of the 13 LIDCs that have

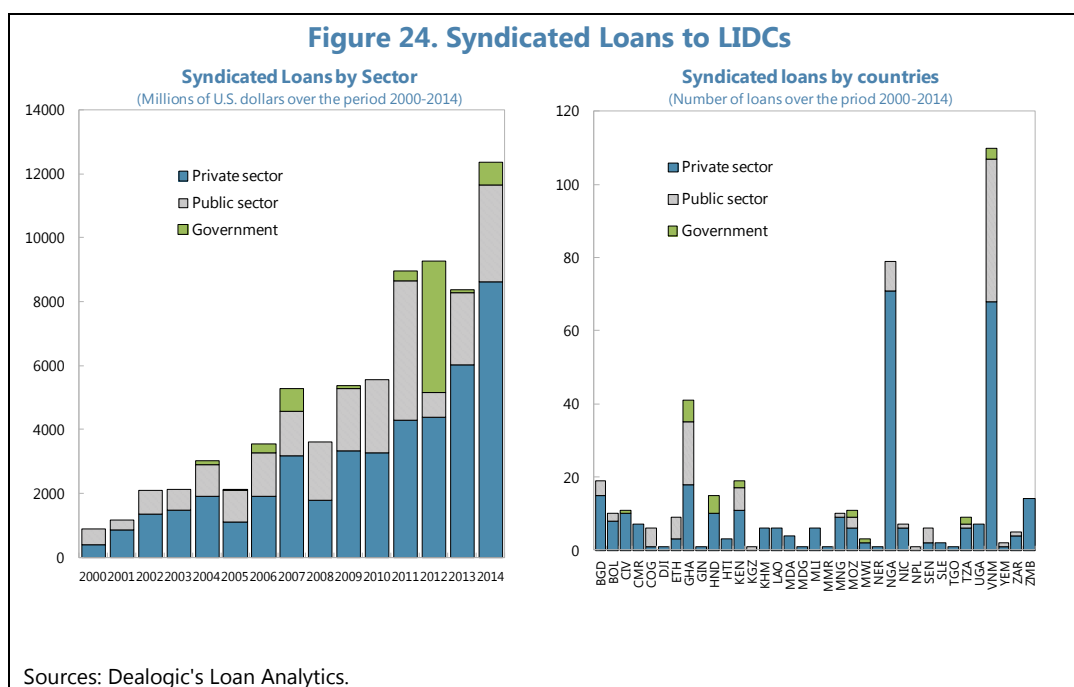
⁴² The correlation between capital inflows (both FDI and non-FDI) to LIDCs in the past two decades and commodity prices has been around 0.7–0.8.

issued sovereign bonds since 2005, 10 are frontier economies, with the number of issuances increasing post-crisis. Examples of recent issuers include *Mongolia* (with a 2012 issue equivalent to 20 percent of GDP) and *Kenya* (with a debut issue of more than 3 percent of GDP in 2014). *Côte d'Ivoire*, *Ethiopia*, *Ghana*, *Senegal*, *Vietnam*, and *Zambia* also issued sovereign bonds in 2014. Although foreign investor participation in domestic debt markets is confined to a handful of LIDCs, it has become an important feature in a few countries: for example, in *Ghana*, non-resident holdings accounted for about one third of domestic debt in the last five years, in *Zambia* close to 15 percent in 2014 (IMF 2015i, 2015g). Other non-official inflows are of growing importance in frontier economies, while less so in other LIDCs (Figure 23, Panel 2).



61. The rise in other non-official inflows in part reflects the sizeable increase in LIDCs' cross-border bank exposure vis-à-vis syndicated loans, particularly after the crisis (Figure 24, left panel). These loans amounted to more than US\$73 billion over the period 2000–2014, and were directed more broadly across all LIDCs (Figure 24, right panel). Most of these loans went to private sector financial and non-financial enterprises (including public sector enterprises), with some US\$6 billion going directly to governments.⁴³ Private sector loans went primarily to oil and gas, mining, telecommunications, construction, transportation, and financial service sectors. While *Nigeria*, *Ghana* and *Vietnam* attracted a large share of these bank loans, in some cases cross-border bank loans have been significant in relation to GDP—4.6 percent of GDP in *Cambodia* in 2011, 3 percent of GDP in *Mongolia* in 2012, and 1.2 percent of GDP in *Kenya* in 2014.

⁴³ Data on syndicated loans are taken from Dealogic's Loan Analytics on a loan-by-loan basis. The aggregate figures reported in the section refer to cross-border lending to the private sector, comprising financial and non-financial entities, to public entities and to the government (excluding lending by multilateral banks and institutions); see Cerutti and others (2015) for details. Volumes on syndicated loans are not directly comparable to other non-official flows (as recorded in the balance of payments), covering only bank lending and new loans. Syndicated loans to governments have been concentrated in eight LIDCs (for example, *Ghana*, *Kenya*, *Tanzania*, and *Vietnam*).

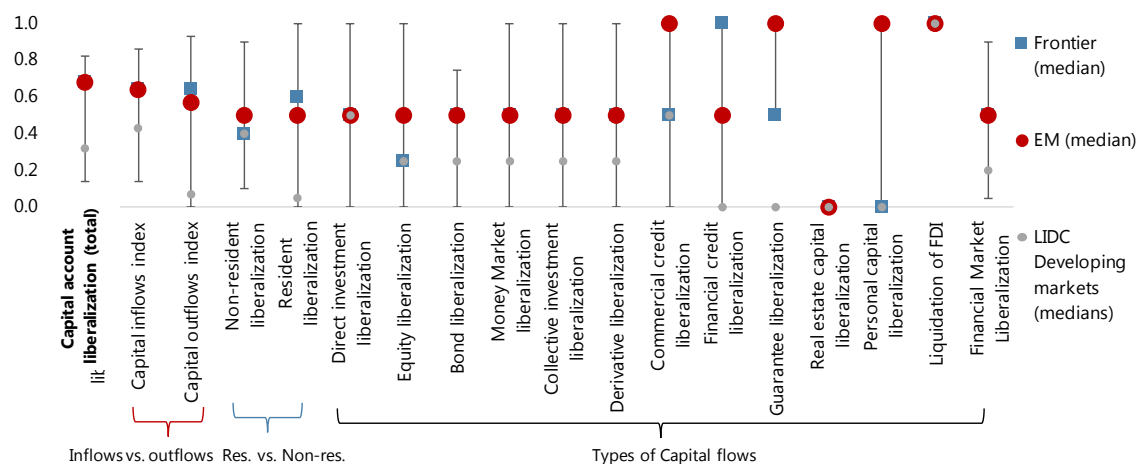
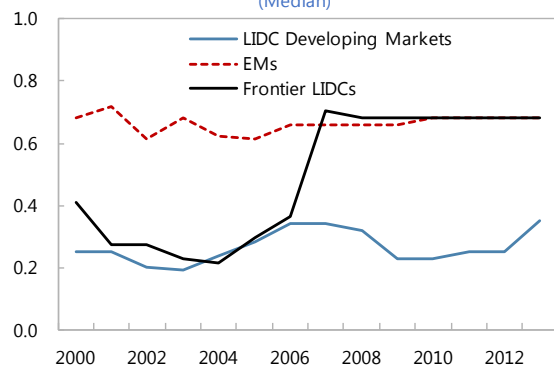
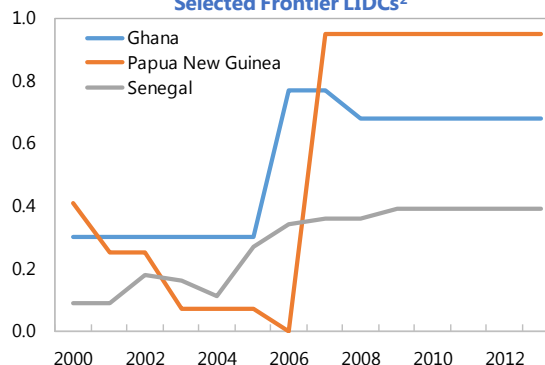
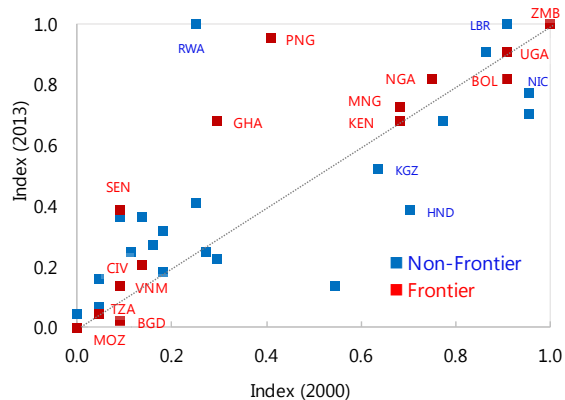
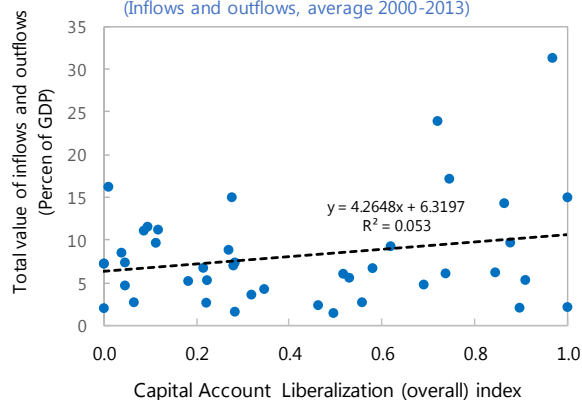


Capital Account Policies

62. Capital account policies in LIDCs have not changed significantly in recent years, except in frontier economies. An index of *de jure* capital account liberalization⁴⁴ suggests that, while LIDCs are typically more closed than EMs, frontier LIDCs have opened their capital accounts at a faster pace and are now typically as open in *de jure* terms as EMs, both in terms of overall capital account openness—see Figure 25, Panel B, where the index ranges from zero (closed) to one (fully open)—and across most asset classes (Figure 25, Panel A).

63. Among frontier LIDCs, the trend towards more open capital accounts also masks country-specific differences (Figures 25, Panels C–D). Some countries have long had quite open capital accounts (*Bolivia*, *Uganda* and *Zambia*); others have remained moderately open over time, with little net change in the last decade (*Kenya*, *Nigeria*); some have remained with almost closed capital accounts even now (*Tanzania*, *Mozambique*). In contrast, *Ghana* and *Papua New Guinea* and, to a lesser extent, *Senegal*, have made significant changes to their capital account policies over the past decade. *Papua New Guinea* completely liberalized almost all asset categories in 2007; *Ghana* passed a new Foreign Exchange Act in 2006, allowing non-residents to purchase certain types of domestic government securities; *Senegal* undertook liberalization in gradual steps—first eliminating capital controls on inward FDI and foreign borrowing by residents, and then harmonizing capital account rules with other WAEMU members in 1999.

⁴⁴ See Annex II for details.

Figure 25. Capital Account Liberalization in LIDCs**Panel A. Capital Account Openness by Subcategories, 2013 (Median)¹****Panel B. Total Capital Account Liberalization Index (Median)****Panel C. Total Capital Account Liberalization in Selected Frontier LIDCs²****Panel D. Overall Capital Account Liberalization Index, 2000 vs. 2013³****Panel E. De Facto Capital Flows and De Jure Capital Account Liberalization⁴**
(Inflows and outflows, average 2000-2013)

Sources: Wang-Jahan index, and IMF staff estimates.

Notes:

¹The range shows the top and bottom quartile for frontier economies. For definitions of the various asset categories, see Annex 1.

Financial market liberalization indicates the average liberalization of equity, bonds, money market, collective investment, and derivatives

²Higher index indicates greater liberalization³The first available data point was used if the country did not have an index in 2000.⁴Total flows is the sum of the absolute value of inflows and the absolute value of outflows, in percentage of GDP.

64. Most non-frontier LIDCs continue to maintain relatively closed capital accounts, with a few exceptions. *Liberia* and *Nicaragua* have been relatively open since the early 2000s, while Rwanda undertook sweeping liberalization policies across all asset types in the late 2000s. A few countries have moved in the opposite direction—for example, *Honduras* and *Kyrgyz Republic* introduced capital flow management measures on equity and money markets during the global financial crisis.

65. There is a very weak association between the scale of capital inflows and *de jure* measures of capital account openness (Figure 25, Panel E). This likely reflects the central importance of foreign direct investment in capital flows to LIDCs—a form of investment that is typically welcomed in many countries, including among non-frontier LIDCs, with otherwise tightly controlled capital accounts. Moreover, capital inflows are generally driven by both domestic and external factors, and more open economies need not attract more capital inflows, particularly if domestic economic conditions are not attractive for foreign investors (see the next sub-section).

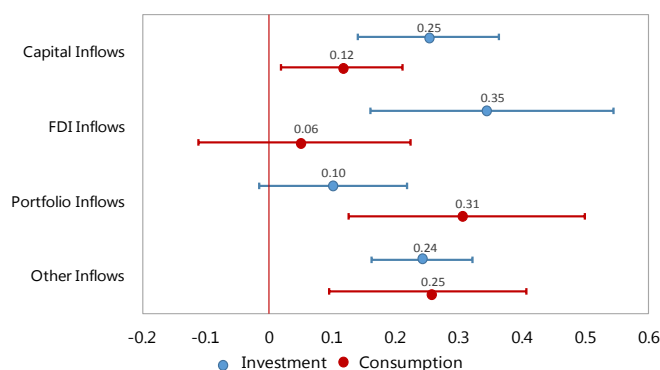
B. Capital Flows, Domestic Demand, and Policy Challenges

66. Having documented the capital inflow experience in LIDCs, this subsection assesses to what extent inflows have supported domestic demand in LIDCs—focusing on the relative association between such inflows and investment and consumption. It ends with a brief discussion of the policy challenges relating to inflows that LIDCs are likely to face in the current global environment.

67. A statistical analysis for a sample of 41 LIDCs during 1990–2014 reveals a significant association between capital inflows and both

consumption and investment (Figure 26).⁴⁵ A 1 percentage point of GDP increase in capital inflows is associated with a 0.25 point increase in the investment-to-GDP ratio, which partly reflects the

Figure 26. Capital Inflows and Domestic Demand



Source: IMF staff estimates.

Note: The chart plots the estimated coefficients and the associated 90% confidence intervals, of a set of regressions in which the dependent variable is, alternatively, investment and consumption (as a share of GDP) and the set of control variables include: the four capital flows variable (as a share of GDP, included one at the time), the lagged value of the dependent variable, the log of real per capita GDP, real GDP growth, the domestic real interest rate, the ratio of credit to the private sector over GDP and year and country fixed effects.

⁴⁵ The relationship between gross capital flows (CF) and the different components of domestic demand is estimated using the following empirical specification:

$$\text{DEMAND}_{i,t} = \alpha \text{DEMAND}_{i,t-1} + \beta \text{CF}_{i,t} + \gamma X_{i,t} + \delta_i + \Theta_t + e_{i,t}$$

where DEMAND is either investment or consumption as a share of GDP, the vector $X_{i,t}$ includes a set of standard control variables (real per capita GDP, GDP growth, the real interest rate and the ratio of credit to the private sector over GDP), δ_i are country fixed effects, and Θ_t are year fixed effects. The coefficient α measures the persistence of investment and consumption. The results are also robust to including additional control variables, such as the prevalence of fixed versus flexible exchange rate regime. The effect of capital inflows on investment are also

(continued)

large FDI share in total inflows; and a one-tenth of a percentage point increase in the consumption-to-GDP ratio.

68. The relation between portfolio inflows and investment is weak.⁴⁶ Portfolio inflows are more strongly correlated with consumption than with investment—a one percentage point of GDP increase in portfolio inflows is associated with a 0.3 percentage point increase in the consumption-GDP ratio, but only a 0.1 percentage point increase in the investment-GDP ratio.⁴⁷ Other non-official flows have similar links to consumption and investment.

69. Evidence from case studies suggests that recent portfolio debt issuances have coincided not only with increases in public investment but also public consumption, yielding a drop in public savings in some cases. That said, with a few exceptions, debt vulnerabilities still remain lower in most LIDCs than before the global financial crisis (see IMF 2015g, and Annex III for details):

- In *Vietnam*, government current spending and fiscal deficits increased in the wake of the recent sovereign bond issuances (in 2010 and 2014), without a significant acceleration in public investment; there was also a concurrent surge in credit growth. *Ghana* and, to a lesser extent, *Senegal*, have had similar experiences (IMF 2014d).
- *Mongolia* experienced a significant deterioration in macroeconomic conditions after large debt issuances in 2012: there was a marked increase in public investment but also some increase in public consumption. Relatedly, public debt rose from below 40 percent of GDP in 2011 to an estimated 90 percent of GDP in 2015.
- *Zambia* issued three Eurobonds in 2012, 2014 and 2015, totaling US\$3 billion, with proceeds associated with increases in both public investment and public consumption; in recent years, the increase in recurrent spending has exceeded the increase in capital spending.

70. More generally, the post-crisis wave of capital inflows has not coincided with any broad-based strengthening of domestic policies across many LIDCs. Among frontier LIDCs, the rise in inflows during 2004–07 was accompanied by some reserve accumulation and no notable deterioration in fiscal or external balances (Figure 27). By contrast, the surge in capital inflows during 2011–14 was associated with wider fiscal and current account deficits, little change in foreign reserve buffers, and appreciation of currencies in several cases.

confirmed using an instrumental variable approach, in which capital inflows to emerging markets are taken as an instrument for capital inflows to LIDCs.

⁴⁶ As expected, FDI inflows are the most strongly correlated with investment among alternative types of inflows. These results are in line with other studies (see Bosworth and Collins (1999) and Mody and Murshid (2005) on emerging and developing countries, and Mileva (2008) on transition economies).

⁴⁷ The stronger association with consumption could reflect, among other factors, the use of available financing for priority spending, such as health and education (see IMF 2015g).

71. The implications for capital flows to LIDCs of a general cutback of flows to emerging market and developing economies (EMDEs) will very much depend on country circumstances:

- The ability of LIDCs to successfully issue sovereign bonds over the past several years has been associated with both external factors—for example, lower global interest rates and lower global financial volatility—but also domestic income levels and macroeconomic conditions (see Presbitero and others, forthcoming; IMF 2015g).
- The pricing of new external funding for LIDCs is also influenced by both international and domestic factors. An analysis of push and pull factors driving sovereign bond yields in LIDC and EMs confirms the role of both external factors and the quality of domestic macroeconomic policies in influencing yields (Box 5): higher yields are significantly correlated with higher current account and fiscal deficits, elevated public debt levels, and lower foreign reserve levels.
- Combining these two perspectives, a wider cutback of capital flows to EMDEs is unlikely to sharply squeeze access to funding for all LIDCs. Countries with stronger domestic fundamentals may experience some upward movement in funding costs on bond issues and, potentially, on project funding costs. Countries with weaker domestic fundamentals could see much sharper movements in external funding costs (as seen in Section I), potentially requiring significant re-calibration of fiscal policies and investment plans.

72. Policy messages from the preceding discussion include:

- *Linkage of sovereign bond issues to boosting public investment does not imply that funds raised are used to boost public investment on a one-to-one basis.* Given fungibility of general budgetary resources, bond issues can instead contribute to a rise in public consumption (and a fall in public savings) alongside higher public investment—with the former effect having the potential to dominate the latter. A wider assessment of national borrowing and spending plans is needed to form a view on the merits of specific issuance plans.⁴⁸
- *Domestic fundamentals play a key role in determining both the access to and pricing of external funding.* This has a benign implication: LIDCs with solid macroeconomic and institutional fundamentals and political stability can augment domestic savings with external funds at manageable financing costs. But there is also a less benign corollary: slippages in domestic macroeconomic management and/or serious political shocks can produce a sharp deterioration in both access to, and pricing of, external funding, yielding a potentially significant adverse shock to fiscal and external positions and to debt dynamics.
- *The discussion here has not examined the wider policy challenges surrounding the management of non-FDI inflows into LIDCs,* including the appropriate pace and sequencing of capital account liberalization. The general issues involved, focused on emerging market economies, are looked at in detail in IMF 2012 and various related papers, including Ostry (2011) and IMF (2015j).

⁴⁸ This is the view underpinning the Fund's approach to assessing borrowing plans in the context of the new Debt Limits Policy (DLP, see IMF 2014e).

Figure 27. Evolution of Macroeconomic Aggregates in Frontier LIDCs, 2000–14

(Changes in percent)



Sources: World Economic Outlook; International Finance Statistics, and IMF staff estimates.

Notes: First column corresponds to the difference between the 2004–2007 and 2000–2003 period averages; second column corresponds to the difference between the 2011–2014 and 2007–2010 period averages.

Box 5. Determinants of LIDC Sovereign Spreads—Push Versus Pull Factors¹

We examine here the determinants of international bonds spreads for a sample of LIDCs and the relative importance of global versus domestic factors. The analysis is based on a panel study of 57 frontier and middle-income countries over 2009–15. The estimated specification is as follows:²

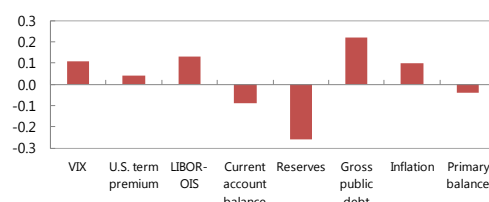
$$\ln(\text{Spread})_{it} = \alpha + \beta_0 VIX_{t-1} + \beta_1 (\text{TermPrem})_{t-1} + \beta_2 (\text{Funding Cost})_{t-1} + \beta_3 \Delta(\text{Oil Price})_t + \beta' X_{it-1} + c_i + \theta_t + \varepsilon_{it}$$

Spread_{it} refers to the J.P. Morgan EMBIG spread, c_i is a country-specific dummy, while θ_t is a period dummy. Among the global marker variables, VIX is the VIX index of volatility, TermPrem is the U.S. term premium approximated by the difference between the 10-year and the three-month yield, Funding Cost refers to the three-month Libor-OIS (overnight indexed swap) spread and $\Delta(\text{Oil Price})$ is the change in the price of Brent. The X_{it-1} vector of macroeconomic fundamental variables includes the lagged values of real GDP per capita levels, international reserves, primary balance, public debt, the current account, a dummy for oil exporters and its interaction term with oil-price shocks.³

The standardized coefficients of most determinants are presented in Figure 1. The results suggest that, among global factors, higher global risk aversion (VIX index), higher funding costs and the U.S. term premium are positively associated with spreads, while oil prices, possibly reflecting the impact of stronger global demand conditions, are negatively correlated. As expected, stronger country-specific macroeconomic fundamentals are associated with lower sovereign spreads—beyond GDP per capita, country spreads are most sensitive to changes in reserves and the public debt-to-GDP ratio. In an alternative specification, it is shown that an increase in oil prices is associated with lower sovereign spreads for both oil exporters and importers (the latter possibly reflecting the fact that non-oil commodity prices and global liquidity levels have tended to move with oil prices in recent years), but the effects are twice as strong for oil exporters.

Using these estimates, we compare fitted and actual spreads for a number of LIDCs to analyze if their market bond prices are in line with “fundamentals”. The first panel of Figure 2 presents this comparison for sovereign spreads in 2014, the second panel for July 2015. Misalignments are generally small, confirming that LIDCs’ spreads tend to respond to both global and domestic economic and financial conditions. The exceptions are Ghana in 2014, and Ghana, Mozambique and Zambia in 2015, which experienced higher than predicted spreads, possibly reflecting greater than usual investor concerns.

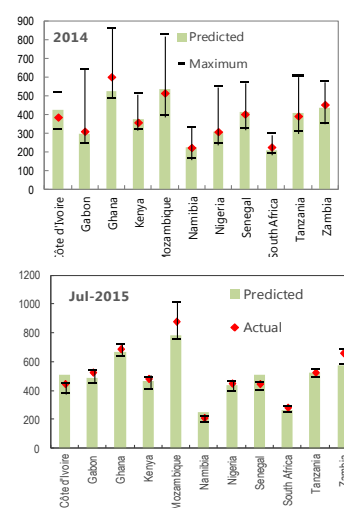
Standardized Coefficients of the Determinants of Sovereign Spreads



Note: LIBOR-OIS = the three-month London interbank offered rate-overnight index swap; VIX = Chicago Board Options Exchange Volatility Index.

Sources: Bloomberg, L.P.; and IMF staff calculations.

Sovereign Spreads



Sources: Bloomberg, L.P.; and IMF staff calculations.
Note: Actual and predicted spreads are average values for the periods to which they refer. Lines denote the distance from the minimum and maximum.

¹ The box was prepared by Emmanouil Kitsios and Francisco Roch.

² For details on the estimation methodology and results see IMF (2015k).

Annex I. LIDCs and Subgroups

	Frontier Markets (14)	Fragile States (28)	Developing Markets (19)
Commodity Exporters (27)	Bolivia Mongolia Mozambique Nigeria Papua New Guinea Zambia (6)	Afghanistan Burundi Central African Rep. Chad Congo, Dem. Rep. Congo, Rep. Eritrea Guinea Guinea-Bissau Malawi Mali Sierra Leone Solomon Islands South Sudan Sudan Yemen, Rep. Zimbabwe (17)	Burkina Faso Mauritania Niger Uzbekistan (4)
Diversified Exporters (33)	Bangladesh Cote d'Ivoire ¹ Ghana Kenya Senegal Tanzania Uganda Vietnam (8)	Comoros Cote d'Ivoire ¹ Djibouti Haiti Kiribati Liberia Madagascar Myanmar Sao Tome and Principe Somalia Togo (11)	Benin Bhutan Cambodia Cameroon Ethiopia Gambia, The Honduras Kyrgyz Republic Lao PDR Lesotho Moldova Nepal Nicaragua Rwanda Tajikistan (15)

Note: see IMF (2014a) for the details of the classification. The number of countries are shown in the parentheses.

¹ Cote d'Ivoire is included in both the "frontier market" and "fragile state" groups.

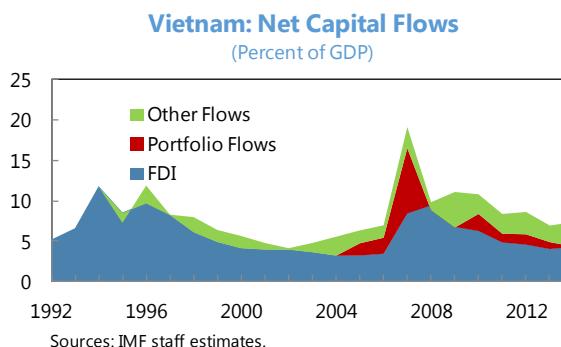
Annex II. Capital Account Liberalization: *De Jure* Index

The Wang-Jahan index of capital account liberalization index is based on openness policies on 12 categories of the capital account. For each category a value of 0 (closed) or 1 (open) is assigned based on a country's *de jure* policy on capital inflows or outflows, and the overall index is a simple average of the capital inflows and capital outflows index. The various categories include:

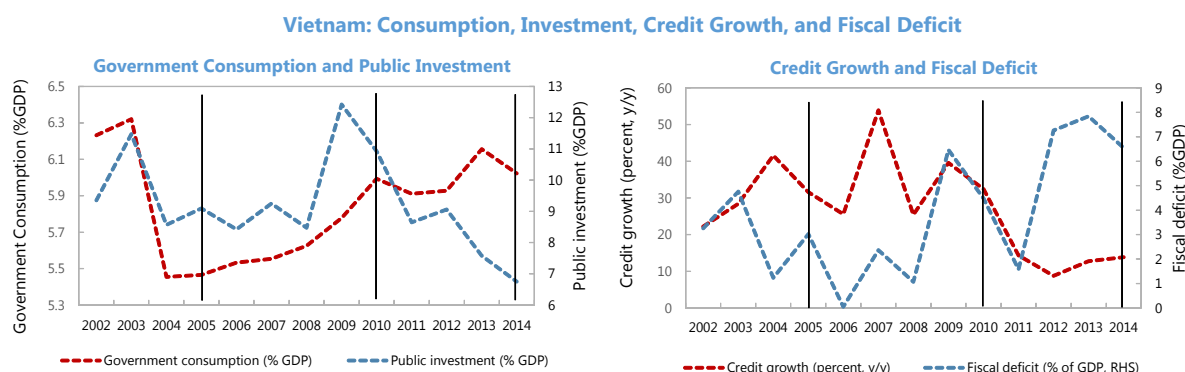
1. **Equity.** Transactions involving shares and other securities of a participating nature, excluding those investments for the purpose of acquiring a lasting economic interest which are addressed as a foreign direct investment.
2. **Bond.** Bonds or other debt securities with an original maturity of more than one year. The term other debt securities includes notes and debentures.
3. **Money market.** Securities with an original maturity of one year or less, including short-term instruments like certificates of deposits and bills of exchange, among others.
4. **Collective Investment.** Share certificates and registry entries or other evidence of investor in an institution for collective investment such as mutual funds and investment trusts.
5. **Derivatives and other instruments.** Operations in rights, warrants, financial options and futures, secondary market operations in other financial claims (including sovereign loans, receivables, and discounted bills of trade), forward operations, swaps of bonds and other debt securities, and operations in foreign exchange without any other underlying transaction (spot or forward trading on the foreign exchange markets, forward cover operations).
6. **Commercial Credit.** Operations directly linked with international trade transactions or with the rendering of international services.
7. **Financial Credit.** Credits other than commercial credits granted by all residents, including banks to nonresidents or vice versa.
8. **Direct Investment.** Investments for the purpose of establishing lasting economic relations both abroad by residents and domestically by non residents (for example, for the purpose of producing goods and services, and, to allow investor participation in the management of an enterprise).
9. **Direct Investment Liquidation.** The transfer of principal, including the initial capital and capital gains of a foreign direct investment as defined above.
10. **Guarantees.** Guarantees, sureties, and financial backup facilities provided by residents to nonresidents and vice versa. It also includes securities pledged for payment or performance of a contract—such as warrants, performance bonds, and standby letters of credit—and financial backup facilities that are credit facilities used as a guarantee for independent financial operations.
11. **Real Estate.** The acquisition of real estate not associated with direct investment, including, for example investment of a purely financial nature in real estate or the acquisition of real estate for personal use.
12. **Personal capital transaction.** Transfers initiated on behalf of private persons and intended to benefit other private persons. It includes transactions involving property to which the promise of a return to the owner with payments of interest is attached (e.g., loans or settlements of debt in their country of origin by immigrants) and transfers effected free of charge to the beneficiary (for example, gifts and endowments, loans, inheritances and legacies, and emigrants' assets).

Annex III. Experience with Capital Inflows in Selected Countries¹

Vietnam. FDI flows have dominated net external capital flows since the 1990s. Most of the FDI flows traditionally came from the neighboring region and targeted the manufacturing sector, textile and clothing sectors at first and most recently electronics assembly. However, non-FDI inflows have also picked up, particularly in 2007–08, when Vietnam joined the World Trade Organization, but also in recent years—as authorities increased borrowing from international capital markets in 2010 and 2014.

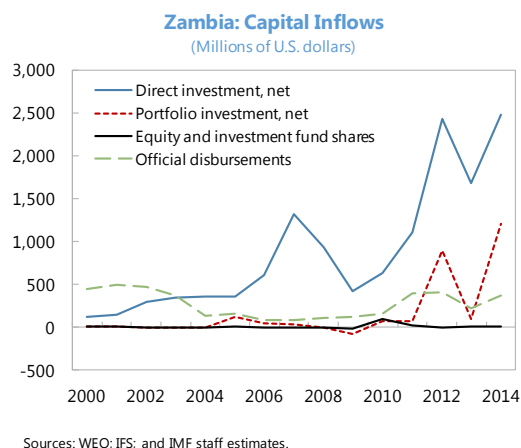


The issuance of Eurobonds has coincided with periods of relatively large budget deficits without a significant acceleration in public investment. In fact, public investment to GDP ratio has declined since the bond issuance in 2010. Non-FDI flows have also posed significant challenges in terms of a large pick up in credit growth. This coupled with weak regulatory controls, particularly in the stock market, compounded a credit boom in the second half of 2000s. The authorities implemented some early measures before the financial crisis to tighten stock market regulation and supervision and limit risks for the banking system but they were not sufficient. The economic situation deteriorated sharply in 2008 weighted further down by the global financial crisis. Capital flows contributed to a second credit boom which briefly boosted growth until the bursting of the real estate bubble in 2011. Subsequently, credit growth has been relatively muted, until a recent acceleration since mid-2015.



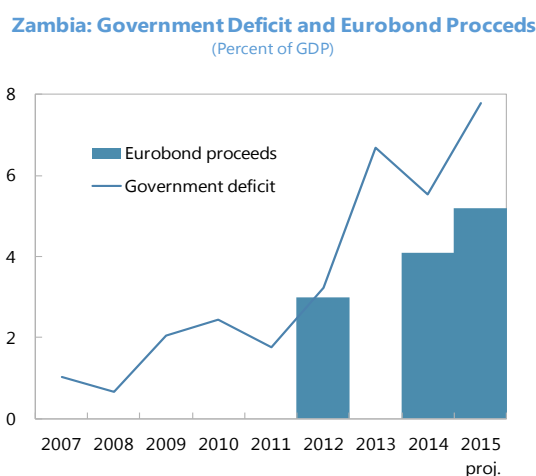
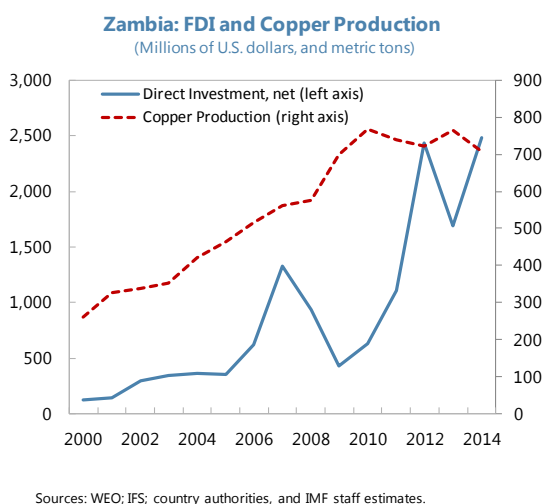
¹ Prepared by Dafina Glaser, Sarwat Jahan, Klaus Hellwig, Byung Kyoon Jang, Koshy Mathai, Svitlana Maslova, Tobias Rasmussen, and Jiangyan Yu.

Zambia. Foreign direct investment and, since 2012, portfolio flows via Eurobond issuances have been the main sources of capital inflows to Zambia. Grants and official lending have declined over time, although there have been some increases in official lending since 2011, mainly due to increased disbursements from China. Other capital flows such as private equity inflows and commercial banks' foreign borrowing have been relatively minor, the latter particularly in recent years. There have been no capital controls, and measures regulating portfolio investments or banks' cross-border funding were abolished in the 1990s.

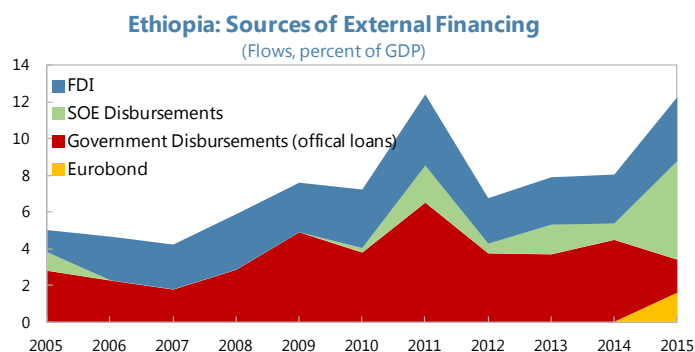


FDI has been a key driver of Zambia's mining industry, enabling a tripling of copper production and laying the foundation for a broader economic rebound. The surge in FDI, along with a pickup in domestic private investment, helped keep overall investment levels high at close to 30 percent of GDP despite a reduction in donor-financed capital spending.

Although proceeds from Zambia's entry on the Eurobond market were earmarked for specific investment projects, mainly in transport and energy they have also been associated with higher public consumption. In recent years, government's spending on recurrent items has increased more than its capital spending, among others as a result of an almost 45 percent average increase in civil servants wages in late 2013. With revenue only increasing slightly, higher overall expenditure has led to a widening deficit.

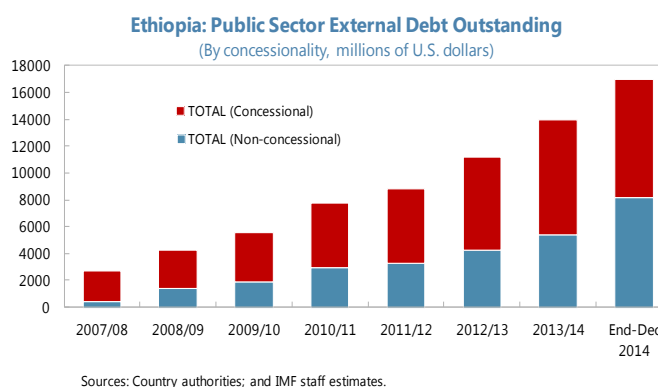


Ethiopia. Capital inflows are dominated by public sector borrowing, of which an increasing share is by state-owned enterprises (SOE). However, FDI has been playing a growing role in financing investment, particularly in manufacturing, agriculture and real estate. In December 2014, the government issued its first Eurobond, raising US\$1 billion. Beyond the Eurobond, portfolio investment has been absent due to the government's tight control over the capital account (the country has no stock market and foreigners are not allowed to purchase domestic financial instruments).



Capital inflows have been associated with sharp increases in public investment. Indeed, the share of capital spending in central government expenditure increased from 51 percent in 2008/09 to an average of 57 percent between 2010 and 2015. Foreign borrowing has also been instrumental in financing SOE investment. The share of capital goods in imports increased from 32 percent in 2009 to 42 percent in 2015 while that of consumer goods decreased from 31 percent to 27 percent. The Eurobond proceeds are intended to finance imports related to export-oriented projects such as investments in the power transmission infrastructure, sugar factories, and the development of industrial parks. As the proceeds are only being used gradually to finance such imports (with less than half used by mid-2015), there has been a temporary buildup in foreign exchange reserves (with the excess amounting to US\$ 450 million in June 2015, or 15 percent higher than before the Eurobond was issued).

However, the growing amount of non-concessional borrowing has increased Ethiopia's external vulnerability. With agricultural commodity exports as its main source of foreign exchange, the country is highly exposed to terms of trade shocks. Ethiopia's low export base overall (as a share of GDP) also presents repayment risks. As a result, Ethiopia's risk of external debt distress is assessed as "moderate." And with an external debt level of 26 percent of GDP, a growing share of which is non-concessional, additional borrowing may be less readily available once global credit conditions begin to tighten.



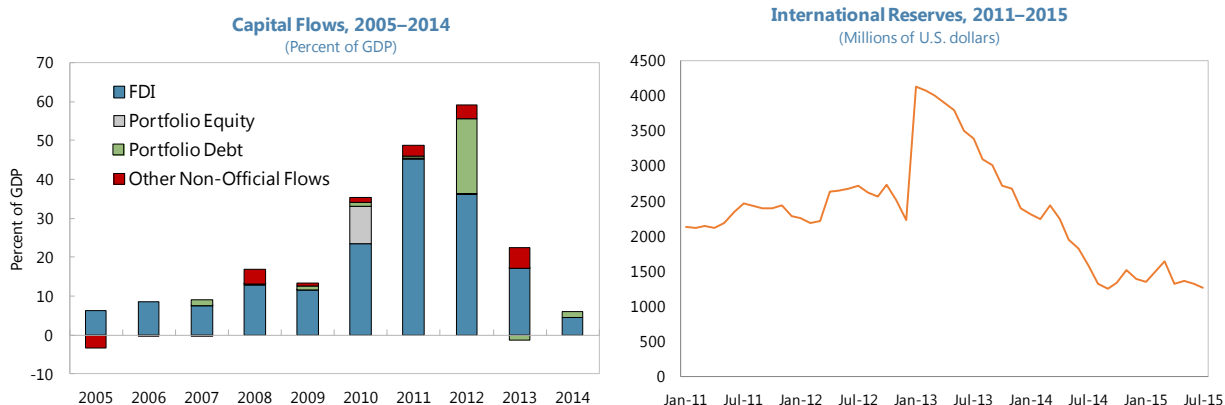
Mongolia. Capital inflows to Mongolia are dominated by FDI, which is highly correlated with global commodity prices given its large commodity endowment. However, in 2012, against the backdrop of a period of abundant global liquidity, Mongolia successfully issued more than 20 percent of GDP of

public debt in its debut issuance (sovereign bonds of US\$1.5 billion and quasi-sovereign bonds of US\$0.6 billion at the global markets). Meanwhile, public debt increased from below 40 percent of GDP in 2011 to a projected 90 percent of GDP in 2015. Moreover, some private entities, notably the Trade and Development Bank (TDB) and Mongolia Ming Corporation (MMC), also took this opportunity to issue Eurobonds.

Although proceeds from Mongolia's bonds were earmarked for specific investment projects, they were also associated with a sharp increase in government consumption expenditure. The overall fiscal deficit rose to 9.1 percent of GDP in 2012 (5 percent of GDP higher than in 2011) in part due to an increase in on-budget expenditures by 20 percent, driven by large increases in civil servants' wages. Off-budget spending by the government-owned Development Bank of Mongolia (DBM) also increased as proceeds from the sovereign and quasi-sovereign bonds was used to finance public investment in roads as well as the loss-making state-owned coal producer. In fact, total government spending substantially increased in 2013 due to the increase in DBM's spending. The sovereign bond proceeds helped to raise reserves to a record high at end-2012. But, reserves subsequently fell as a result of persistent sales of foreign exchange in the spot and forward market in response to downward pressures on the currency.

Economic and financial conditions have deteriorated dramatically since the sovereign placement in 2012. With FDI and commodity prices sharply down in a loose macro policy environment, Mongolia has undergone an exchange rate depreciation of over 40 percent and lost more than 70 percent of its gross reserves. Mongolia's sovereign spread has risen to around 600 basis points, from just above 400 basis points at the time of issuance, and is now one of the highest in the group of frontier economies. Rating agencies have recently changed Mongolia's outlook from "stable" to "negative," and the authorities suspended their ambitious plan to raise US\$5 billion via sovereign bond issuance. To fill the financing gap, Mongolia increasingly relies on external borrowing by the quasi-fiscal entity (i.e. the DBM) as well as drawing down the swap line with foreign central banks.

Mongolia: Capital Flows and International Reserves



Appendix I. The Role of Macroeconomic and Structural Factors in Vulnerability

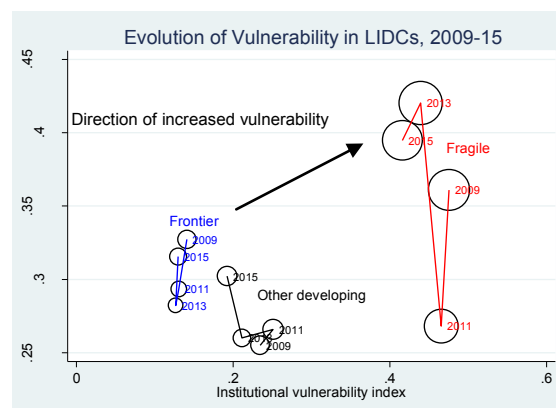
A new approach to understanding sources of vulnerability. The GDVI explains vulnerability to shocks as originating in either the fiscal, external, or real sectors. It aggregates information from vulnerability indicators, both in a short-term macroeconomic perspective, such as fiscal balances, and in a longer-term structural one, such as income inequality and institutional capacity.¹

To better identify the contribution of slow-moving structural characteristics to vulnerability, staff developed an extended GDVI by enriching the set of structural variables. The added structural factors are: (i) key governance variables—measures of voice and accountability, control of corruption, government effectiveness, political/security stability, regulatory quality, and rule of law; (ii) a measure of economic liberalization (the Heritage Foundation’s “Economic Freedom Index”); and (iii) a composite risk rating, drawn from the International Country Risk Guide of the PRS Group. Use of this richer set of measures of institutional capacity and political stability/security moderately improves the model’s overall predictive accuracy.²

The extended GDVI decomposes sources of vulnerability into macroeconomic and structural factors. A macroeconomic vulnerability index aggregates information from all variables in the GDVI except for the Gini coefficient of income inequality and institutional capacity.³ And a structural vulnerability index summarizes information from the Gini coefficient, institutional capacity and all new structural variables.

Plotting the macroeconomic and structural indices provides an intuitive representation of vulnerabilities.

The figure to the right shows the index of structural vulnerability on the horizontal axis and the index of macroeconomic vulnerability on the vertical axis. Bubble size is proportional to overall vulnerability. Depicting the evolution of vulnerabilities over 2009–15, the figure suggests that (i) vulnerabilities have generally grown in recent years; (ii) lower structural vulnerability is associated with less macroeconomic vulnerability; (iii) vulnerability from structural sources is highest in fragile states and lowest in frontier markets; and (iv) as would be expected, structural factors move more slowly than macroeconomic factors.



¹ The GDVI is based on the estimation of threshold values for the vulnerability indicators, above or below which one could identify a signal of increased vulnerability to crisis (e.g. low reserve coverage would raise a flag), and aggregating signals based on their explanatory power (see IMF 2011).

² The methodological innovations presented here are exploratory in nature and have not been used in this report’s main text. Staff also developed an alternative estimation framework to analyze the non-linear interactions between macroeconomic conditions and institutional quality. However, the gains in accuracy from considering these interactions were found to be limited, and the approach was not pursued further.

³ These variables are: real GDP growth, real GDP per capita growth, reserve coverage, real export growth, an exchange market pressure index, change in export prices, fiscal balance as a share of GDP, public debt as a share of GDP, fiscal revenue as a share of GDP, and real growth in government revenue.

References

- Adedeji, Olumuyiwa, Jana Gieck, and Vera Kehayova, forthcoming, "Food Shortages in Low-Income Countries: Macroeconomic Dimensions," Working Paper, Washington, International Monetary Fund.
- Arezki, Rabah, and Akito Matsumoto, 2015, "Commodity Market Developments and Forecast, with a Focus on Metals in the World Economy," *World Economic Outlook*, World Economic and Financial Survey, October, Washington, International Monetary Fund.
- Araujo, Juliana., A. C. David, C. van Hombecck, and C. Papageorgiou, 2015, "Capital Flows in Low-Income Developing Countries: Catching the Wave?," Working Paper No. 15/86, Washington, International Monetary Fund.
- Baldwin, Richard, 2011, "[Trade and Industrialisation After Globalisation's 2nd Unbundling: How Building and Joining A Supply Chain Are Different And Why It Matters](#)," NBER Working Paper No. 17716, December, Massachusetts.
- Barrios, S., Bertinelli, L., and Strobl, E., 2008, "The Impact of Climatic Change on Agricultural Production: Is It Different for Africa?" *Food Policy*, Vol. 33, 287–298.
- _____, 2010, "Trends in Rainfall and Economic Growth in Africa" A Neglected Cause of the African Growth Tragedy," *The Review of Economic and Statistics*, Vol. 32, No. 2, pp. 350–366.
- Bluedorn, John C., Rupa Duttagupta, Jaime Guajardo, and Petia Topalova, 2013, "Capital Flows are Fickle: Anytime, Anywhere," Working Paper 13/183, Washington, International Monetary Fund.
- Bosworth, Barry B., and Susan M. Collins, 1999, "Capital Flows to Developing Economies: Implications for Saving and Investment," *Brookings Papers on Economic Activity*, Vol. 30, pp. 143–180.
- Cabazon, E., Hunter, L., Tumbarello, P., Washimi, K., and Wu, Y., 2015, "Enhancing Macroeconomic Resilience to Natural Disasters and Climate Change in the Small States of the Pacific," Working Paper 15/125, Washington, International Monetary Fund.
- Cerutti, Eugenio, Galina Hale, and Camelia Minoiu, 2015, "Financial Crises and the Composition of Cross-Border Lending," *Journal of International Money and Finance*, Vol. 52, pp. 60–81.
- Center for Research on the Epidemiology of Disasters (CRED), Emergency Events Data Base (EM-DAT).
- Dell, M., Jones, B., and Olken, B., 2014, "What Do We learn from the Weather? The New Climate-Economic Literature," *Journal of Economic Literature*, Vol. 52, No. 3, pp. 740–798.

- _____, 2012, "Temperature Shocks and Economic Growth: evidence from the Last Half Century," *American Economic Journal: Macroeconomics*, Vol. 4, No. 3, pp. 66–95.
- Farid, Mai, Mick Keen, Michael Papaioannou, Ian Parry, Catherine Pattillo, Anna Ter-Martirosyan, forthcoming, "Fiscal, Macroeconomic and Financial Aspects of Global Warming," Staff Discussion Note, Washington, International Monetary Fund.
- Garcia-Verdu, R., Meyer-Cirkel, A., Sasahara, A., and H. Weisfeld, H., forthcoming, "The Impact of Climate Change on Agricultural Productivity," Working Paper, Washington, International Monetary Fund.
- Ghosh, Atish R., Mahvash S. Qureshi, Jun Il Kim, and Juan Zalduendo, 2014, "Surges," *Journal of International Economics*, Vol. 92, pp. 266–285.
- Gruss, Bertrand, 2014, "[After the Boom—Commodity Prices and Economic Growth in Latin America and the Caribbean](#)," Working Paper No. 14/154, Washington, International Monetary Fund.
- Intergovernmental Panel on Climate Change, 2014, "Climate Change 2014: Synthesis Report, Summary for Policymakers."
- International Monetary Fund, 2011, "Regional Economic Outlook: Sub-Saharan Africa," April, Washington.
- _____, 2012, "[The Liberalization and Management of Capital Flows: An Institutional View](#)," November, Washington.
- _____, 2013a, "Low-Income Countries Global Risks and Vulnerabilities Report," Washington.
- _____, 2013b, Sub-Saharan Africa: Keeping the Pace, *Regional Economic Outlook*, October, Washington.
- _____, 2014a, "Macroeconomic Developments in Low-Income Developing Countries," Washington.
- _____, 2014b, "Legacies, Clouds, and Uncertainties," *World Economic Outlook*, World Economic and Financial Survey, October, Washington.
- _____, 2014c, "Managing Volatile Capital Flows. Experiences and Lessons for Sub-Saharan African Frontier Markets," Departmental African Paper 14/01, Washington.
- _____, 2014d, "Issuing International Sovereign Bonds, Opportunities and Challenges for Sub-Saharan Africa," Departmental African Paper 14/02, Washington.
- _____, 2014e, "Reform of the Policy on Public Debt Limits in Fund-Supported Programs," December, Washington.

- _____, 2015a, "Adjusting to Lower Commodity Prices," *World Economic Outlook*, World Economic and Financial Survey, October, Washington.
- _____, 2015b, "Uneven Growth: Short- and Long-Term Factors," *World Economic Outlook*, World Economic and Financial Survey, April, Washington.
- _____, 2015c, "Vulnerabilities, Legacies, and Policy Challenges: Risks Rotating to Emerging Markets," *Global Financial Stability Report*, October, Washington.
- _____, 2015d, Middle East and Central Asia, *Regional Economic Outlook*, World Economic and Financial Survey, October, Washington.
- _____, 2015e, "IMF 2015 Spillover Report," June, Washington.
- _____, 2015f, "Global Prospects and Policy Challenges," The Group of Twenty, November, Antalya, Turkey.
- _____, 2015g, "Public Debt Vulnerabilities in Low-Income Countries – The Evolving Landscape," November, Washington.
- _____, 2015h, Sub-Saharan Africa: Dealing with the Gathering Clouds, *Regional Economic Outlook*, World Economic and Financial Surveys, October, Washington.
- _____, 2015i, "Eligibility to Use the Fund's Facilities for Concessional Financing, 2015," July, Washington.
- _____, 2015j, "Policy Considerations for Handling Capital Outflows," Washington.
- _____, 2015k, "Regional Economic Outlook, Sub-Saharan Africa: Navigating Headwinds," April, Washington.
- Lanzafame, M., 2014, "Temperature, Rainfall and Economic Growth in Africa", *Empirical Economics*, Vol. 46, No. 1, pp. 1–18.
- Mileva, Elitza, 2008, "The impact of capital flows on domestic investment in transition economies," ECB Working Paper 871, Frankfurt: European Central Bank.
- Mlachila, Montfort, and Misa Tabeke, 2011, "FDI from BRICs to LICs: Emerging Growth Driver?" Working Paper 13/183, Washington: International Monetary Fund.
- Mody, Ashoka, and Antu P. Murshid, 2005, "Growing Up with Capital Flows," *Journal of International Economics*, Vol. 65, pp. 249–266.

Nguyen, Anh D.M., Jemma Dridi, Filiz D. Unsal, and Oral H. Williams, 2015, "[On the Drivers of Inflation in Sub-Saharan Africa](#)," Working Paper 15/189, Washington: International Monetary Fund.

Presbitero, Andrea F., Dhaneshwar Ghura, Olumuyiwa S. Adedeji, and Lamin Njie, 2015, "International Sovereign Bonds by Emerging Markets and Developing Economies: Drivers of Issuance and Spreads," Working Paper (forthcoming), Washington, International Monetary Fund.

Rodrik and Subramanian, 2009, "Why Did Financial Globalization Disappoint?" *IMF Economic Review*, Vol. 56, pp 112-138, Washington, International Monetary Fund.

Stern, Nicholas, 2008, "The Economics of Climate change," *American Economic Association*, Vol. 92, No. 2, 1–37.

[Sutton, John, 2015, *Competing in Capabilities: The Globalization Process*, Clarendon Lectures in Economics \(Oxford University Press\).](#)

United Nations Department of Economic and Social Affairs, 2015, [Addis Ababa Action Agenda of the Third International Conference on Financing for Development](#), July (New York).

Verisk Maplecroft, Maplecroft Climate Change Vulnerability Index.

World Bank, 2012, "Turn Down the Heat: Why a 4°C Warmer World Must Be Avoided," Washington.

_____, 2013, "Turn Down the Heat: Climate Extremes, Regional Impact and the Case for Resilience," Washington.

_____, 2014, "Turn Down the Heat: Confronting the New Climate Normal," Washington.