

## **Ghana: Selected Issues**

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GHANA

**Selected Issues**

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Approved by the African Department

June 16, 2008

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# I. INFLATION FORECAST TARGETING IN A LOW INCOME COUNTRY: THE CASE OF GHANA<sup>1</sup>

## A. Introduction

1. **Over the past two decades, numerous monetary authorities have used inflation targeting to solve a chronic inflation problem.**<sup>2</sup> They announced numerical inflation reduction targets for the medium-term and in some cases a long-run target, which may be interpreted as a price stability objective.
2. **Although, in the end, most of these countries achieved the goal they sought, the disinflation phase was often uneven, with inflation outcomes outside the target range.** Roger and Stone (2005) found that the frequency of outcomes outside the range for countries with inflation targets was 60 percent. In retrospect, monetary policy in some cases responded too vigorously to these deviations in an attempt to get inflation quickly back to the target.
3. **Indeed, early IT strategy put heavy emphasis on achieving annual reductions in the inflation rate on schedule, as a way to establish central bank commitment to price stability.** This was an essential objective because monetary policy credibility had been badly eroded by high and persistent inflation such as the Great Inflation of the 1970s and 1980s. Policymakers were also aware of the credibility problem implied by the theory of time-inconsistency in monetary policy. While this theory holds that short-run political time horizons create the time-inconsistency, the proposed solutions, e.g. by Barro and Gordon (1984) and Rogoff (1985), recommend that policymakers take a longer-run view. In practice, the focus on hitting short-run targets soon ran into difficulties, largely because of lags in the policy transmission mechanism. The effects of forceful policy reactions would stretch beyond their intended short-run purpose, pushing inflation to the other side of the target range and requiring actions to reverse it.
4. **A lesson from this experience is that a modern approach to IT—which can be described as inflation forecast targeting (IFT)—should be more flexible and forward-looking as well as providing better communication.** Credibility is not helped by policy actions that attempt to keep inflation within a target range every single year. Experience has shown that common shocks can be so large that such a goal may not be feasible, let alone desirable. Moreover, the objective of short-run output stability may influence policy actions, without harming credibility, as long as this influence is unbiased over time. A central bank can strengthen its credibility by openly focusing its policy on more than just hitting annual

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<sup>1</sup> This paper was prepared by Ali Aliche, Marshall Mills, Douglas Laxton, and Hans Weisfeld.

<sup>2</sup> Examples of countries that have introduced inflation-reduction targets are Brazil, Canada, Chile, Colombia, Czech Republic, Hungary, Israel, Korea, Mexico, New Zealand, Peru, Poland, and the United Kingdom (Mishkin and Schmidt-Hebbel, 2001, Table 2).

targets, recognizing that its actions involve short-run trade-offs and being mindful of undesired effects on output and employment. IFT instead emphasizes longer-term results, the framework committing monetary policy to a low-inflation goal, and accountability and transparent communications. Under IFT, central banks publish regular monetary policy reports that contain their forecast for inflation, associated macroeconomic variables, and at least a qualitative indication of the likely course of the policy interest rate; some have gone so far as to publish an explicit forecast for the policy interest rate.<sup>3</sup> Each of the elements of the flexible approach requires that the policymakers have realistic, coherent models of the monetary policy process, from policy instruments to objectives.

5. **While Ghana is one of several emerging market economies to adopt IT, it may be the only low-income country to have done so (REO April 2008).** An important consideration for adopting an IT regime was that the existing framework, which was based on targeting monetary aggregates, proved to be increasingly infeasible as the demand for money changed rapidly in the wake of major structural transformation.

6. **As a small, open low-income economy, Ghana faces several major challenges in its conduct of disinflation policy:**

- It is highly vulnerable to supply shocks.
- Deviations from inflation targets tend to be larger during disinflation than with stable low targets.
- Inflation expectations can be volatile based on past experience.
- The technical capacity of Bank of Ghana (BoG) is sufficient, though still evolving.

Despite these challenges, the IFT approach can effectively deliver a program of inflation reduction for Ghana while limiting output loss.

7. **To support this approach, we constructed a model-based framework for disinflation under IT with the following features:**

- It explicitly models inflation expectation dynamics. Inflation expectations and policy responses depend on policy credibility.
- It replaces the Taylor rule for interest rate setting with a time invariant objective function.
- It avoids the shortcomings of inadequate communication strategies.

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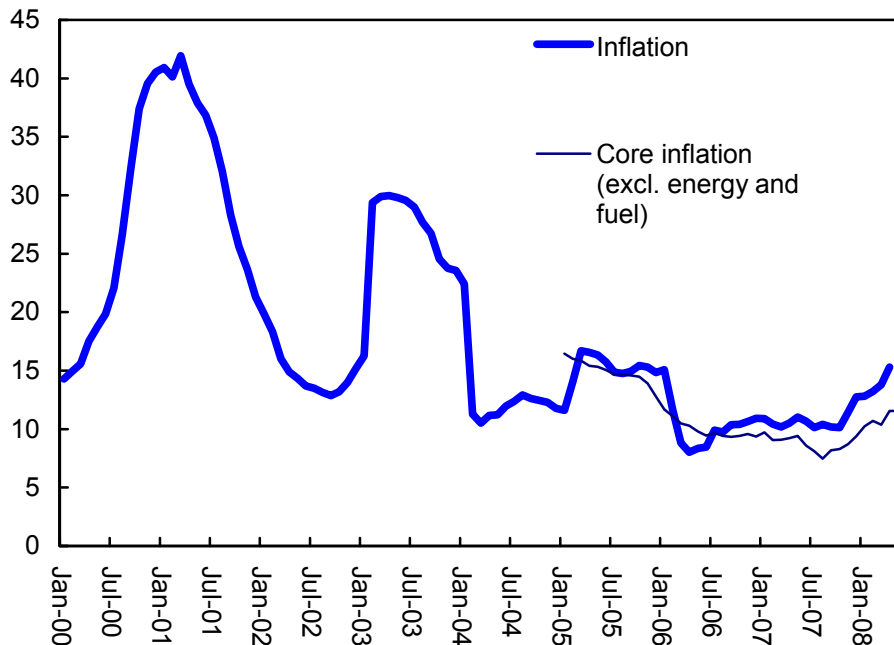
<sup>3</sup> Examples are the Reserve Bank of New Zealand, the Norges Bank, the Riksbank, and the Czech National Bank.

- It generates plausible results for responding to shocks.
8. **This approach offers responses to the questions facing any central bank thinking of disinflation:**
- What is an appropriate pace of disinflation?
  - Should a long-run target be announced?
  - Should the disinflation targets be revised following a shock? What sort of flexibility is appropriate in the execution of policy?

### B. Recent Inflation Trends in Ghana

9. **Ghana has historically experienced volatile and often high inflation rates** (Figure 1). Recently it suffered bouts of high inflation in 1999-2000 and 2002-03, which were related to external shocks, unsustainable macroeconomic policies and exchange rate depreciation. A period of disinflation began in 2004 that brought inflation down to near 10 percent in 2006, where it roughly stabilized until late 2007.

Figure 1. Ghana: CPI Inflation, 2000-2008  
(Percent year-on-year)



10. **The BoG formally adopted IT in May 2007 after three years of informal IT management.** It has been building the main institutional, analytical, and communications elements of this framework since 2002. With the enactment of the 2002 Bank of Ghana Act, the BoG had in place all of the key institutional components of modern central banking,

especially independence and a statutory mission of price stability. In addition, central bank credit to the government each year is limited by law to 10 percent of total revenue collected that year, but in practice the government has not resorted to any central bank financing for the last several years. The target range for CPI inflation is set jointly by the government and the BoG as part of the budget. Staff describe the current regime as “inflation-targeting lite” because exchange rate stability is an important secondary objective and because operational transparency has not developed sufficiently to classify it as a full-fledged IT regime.

11. **When the BoG formally launched IT, it established a large measure of goal transparency, aiming for disinflation over three years to achieve stability around 5 percent, with a range of -/+1 percent.** It also announced a fairly straight-line path of intermediate inflation targets to get to 5 percent. In support of IT, the BoG has also developed a forecasting model and a detailed communication strategy. After each Monetary Policy Committee (MPC) meeting (every other month), it issues a press release and holds a press conference, chaired by the BoG Governor, at which it explains its decision. A detailed monetary policy report is then published.

12. **In October 2007, inflation started to pick up again due both to demand shocks (from an expansionary fiscal policy and strong private sector credit growth) and to supply shocks (from higher international fuel and food prices—see staff report for further details).** The BoG has noted that core CPI inflation—that excludes energy and utilities—has been lower than the headline but has also begun to rise. In response, the BoG has raised the policy rate by a cumulative 350 basis points since November 2007. These inflation developments have posed an early challenge for the IT regime. The current straight line disinflation path and communication strategy seem too rigid to respond well. As a result, the BoG credibility that was built up over the last four to five years may be at risk.

### C. Standard Model

13. **In the standard neo-Keynesian model in use at the Fund for several countries, the central bank sets an inflation target path dependent on current inflation and its long-run inflation objective and employs a Taylor-type rule to determine the policy (interest) rate, subject to the following behavioral equations:**

- An output gap equation (actual minus potential output—a gauge of excess demand—as a function of the interest rate, the exchange rate, and external demand);
- An inflation rate equation (an expectations-augmented Phillips curve); and
- An exchange rate equation (a relation embodying uncovered interest parity, a variable risk premium, and long-run purchasing power parity).

14. **In the standard model, the central bank’s credibility is proxied by a parameter and is captured to some extent by the degree to which households form inflation**

**expectations in a forward-looking rather than a backward-looking fashion.** The standard model works reasonably well for countries that have already achieved low inflation rates, even though there is evidence that shows that a well managed IT framework will over time strengthen central bank credibility.<sup>4</sup> However, it is less appropriate for Ghana because during disinflation periods credibility is likely to change over time, which is not endogenously captured in the standard model.

#### **D. Model for Disinflation under Inflation Forecast Targeting**

**15. Our framework adds to the standard model three novel features relevant to a policy of inflation reduction:**<sup>5</sup>

- An endogenous credibility process. Starting from a situation in which agents initially expect inflation to remain high policymakers may build credibility over time by providing a sufficient track record that anchors inflation to the target.
- A monetary policy loss function that recognizes costs of fluctuations in output and interest rates, as well as costs of deviations of inflation from target—in place of a conventional interest rate reaction function for the policy interest rate. The advantage of the loss function approach over reaction functions is that the responsiveness of interest rates will change automatically over time and will be more aggressive in responding to shocks when credibility is low.
- A non-linear Phillips curve. In practical terms, this means that the relationship of inflation and output gap depends on how big the output gap is. For very high output gap cases (high excess demand), small increases in output gap will translate into big increases in inflation. However, for reasonably low levels of excess demand, the relationship could be closer to a linear one. A non-linear Phillips curve serves to generate a number of important predictions and policy implications that are missing from linear models that presume high levels of policy credibility. First, the model suggests that it can be easier to lose credibility than it is to regain once lost as it takes time and a period of significant slack in the economy to re-anchor inflation expectations. Second, this formulation strongly favors gradualism to prevent unnecessary cumulative output losses associated with disinflation.

**16. Our simulation results based on this model suggest that monetary policy should enable the BoG to reduce inflation while limiting output losses.** The model is calibrated on the basis of a wide range of international experience and is frequently refined using a continuing iterative feedback process. Note that these results are simply indicative; they do not constitute staff recommendations but are merely one of several inputs into staff

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<sup>4</sup> See for example Kamenik and others (2008) and International Monetary Fund, 2006, Country Report No. 06/229, pp. 12-17 (Washington), <http://www.imf.org/external/pubs/cat/longres.cfm?sk=19354.0>

<sup>5</sup> For details of the two models, see Appendices I and II, and the forthcoming IMF Working Paper, titled “Disinflation under an Inflation-Forecast-Targeting Regime.”



assessments.<sup>6</sup> Model results should always serve as only one of several inputs into decision making by monetary policy-makers.

### E. Simulation Results: Dynamic Responses to Shocks

17. **We first study disinflation under imperfect and perfect credibility in the absence of shocks.** Thereafter, we introduce supply and demand shocks and study both the policy reaction and the paths of all other economic variables.

#### Baseline—Disinflation under Imperfect Credibility

18. **In the extended model, credibility is imperfect in the sense that people do not have full confidence that the central bank will achieve its announced objectives, and may not even believe that the bank will try to achieve them.** In forming expectations of inflation, they give considerable weight to the recent history of inflation and to the risk that policymakers might have a covert high-inflation agenda. Monetary policy is assumed, however, to have some credibility: in the process of forming expectations; we set the initial weights at 0.4 on the announced low-inflation policy and at 0.6 on the alternative possibility of a high-inflation policy. Furthermore, the central bank can earn an increased stock of credibility—moving the low-inflation weight towards unity—only by delivering an actual drop in inflation toward the official objective.

19. **Monetary policy in the model follows a loss-minimizing strategy to get to the assumed ultimate inflation target of 5 percent.** We posit initial conditions similar to those prevailing in Ghana in the second quarter of 2008. The economy is experiencing excess demand pressures and has suffered an external price shock: inflation is high; growing fiscal deficits and easy monetary conditions are stimulating further inflation. In numerical terms, to start the model simulations we set the 2008:2 rate of inflation at 15.3<sup>7</sup> percent, the annual output gap (excess demand) at 0.5 percent; and the short-term rate of interest controlled by the central bank at 16 percent. The initial real interest rate is below 1 percent and hence much less than the assumed natural equilibrium rate of about 3 percent. We suppose that the central bank announces an ultimate target for the inflation rate of 5 percent in 2008:3 and immediately starts implementing the loss-minimizing policy to this end.

20. **The charts in Figure 2 show the simulated disinflation path.** Given the level of inflation expectations at the outset and lags in the expectations process, the central bank has to raise the policy rate substantially to achieve the desired increase in the real interest rate. Optimal policy in the model—in the sense of achieving targeted disinflation with minimum

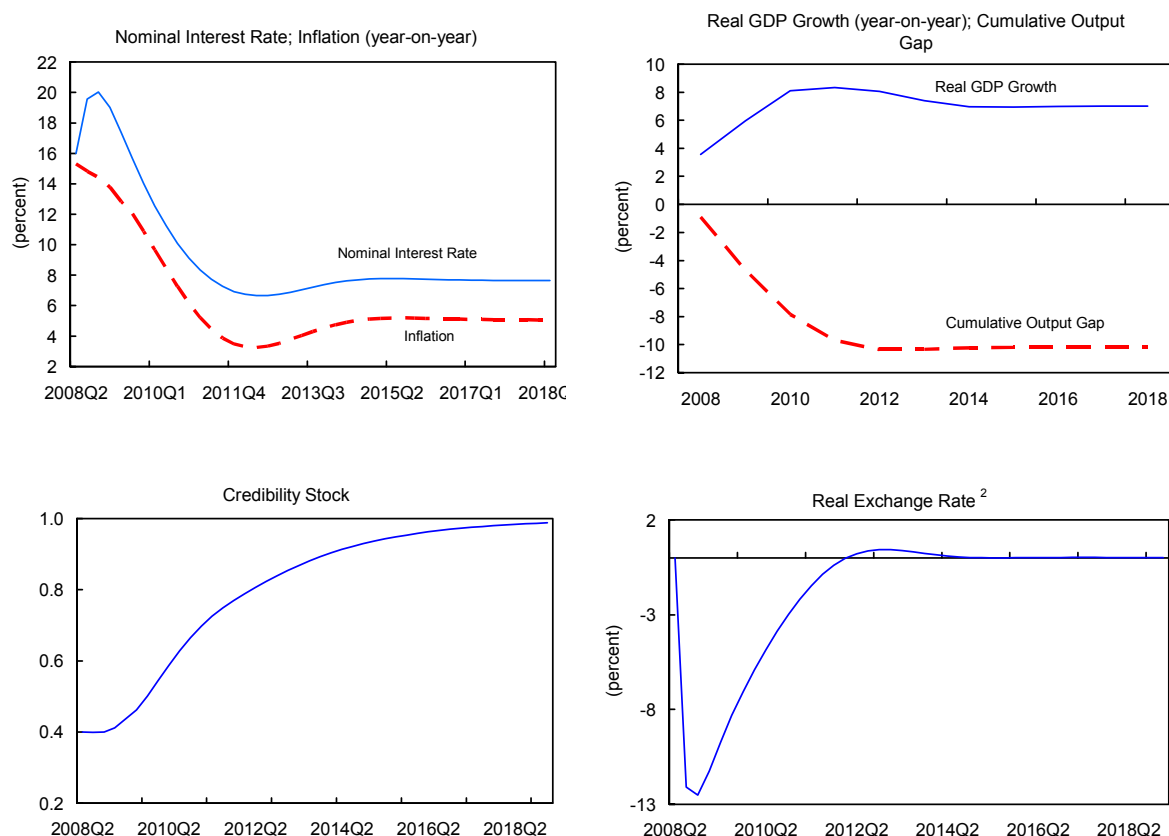
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<sup>6</sup> The model was formulated in close cooperation with the authorities but is the sole responsibility of IMF staff; it does not reflect the conclusions of BoG analysis.

<sup>7</sup> This was end-April 2008 inflation (year-on-year).

loss in output—involves raising the interest rate to 19.6 percent in 2008:Q3, and to peak of 20 percent in 2008:Q4.

Figure 2. Ghana: Baseline IT, 2008-2018 <sup>1</sup>



Source: IMF staff calculations.

<sup>1</sup> All variables are quarterly, except for Real GDP growth, which is annual because quarterly GDP data are not reported in Ghana.

<sup>2</sup> Increase represents depreciation of the cedi.

21. **This has an immediate impact on the nominal price of foreign exchange: the domestic currency appreciates against the US dollar.** This combined with the higher domestic inflation rate compared to the United States implies that the real exchange rate appreciates by 12 percent. The increased interest rate and reduced real price of foreign exchange (real appreciation of the domestic currency) both reduce demand for domestic output. This eliminates excess demand: the annual output gap declines from a +0.5 percent to -1.5 percent (indicating excess capacity) by 2008:4, and to a trough of -3.9 percent in 2009:4. This excess capacity represents the short-run output sacrifice required for disinflation in the model.

22. **Low credibility results in upward-biased expectations. During the inflation-reduction phase people expect a higher inflation rate than monetary policy actually delivers.** Since expectations have a direct effect on actual inflation in the Phillips curve,

monetary policy has to be tighter than if people had 100 percent confidence in the objectives, and the loss of output and employment is greater. Thus, low credibility worsens the short-run inflation-output tradeoff.

23. **Excess productive capacity does reduce the rate of inflation though. In response, the public gradually revises downwards its expectations of future inflation and gives increased weight to the announced 5 percent target. By mid-2011 actual inflation reaches this rate.** Thus, monetary policy reduces the inflation rate by 10 percentage points over 3 years, an average reduction of just above  $3\frac{1}{3}$  percent per year. The corresponding sacrifice ratio (the cumulative output loss divided by the inflation reduction) is just below 1. By historical standards, despite the initial moderate credibility, this would represent a fairly rapid low-cost disinflation (Roger and Stone 2005).

24. **By 2014 the economy would be almost on its full long-run equilibrium path (barring new shocks). The stock of credibility is close to unity and the output gap is virtually zero.** The real exchange rate stabilizes at its initial equilibrium value, but the nominal exchange rate continues to rise, reflecting the domestic-US inflation differential.

#### **Disinflation under Perfect Credibility**

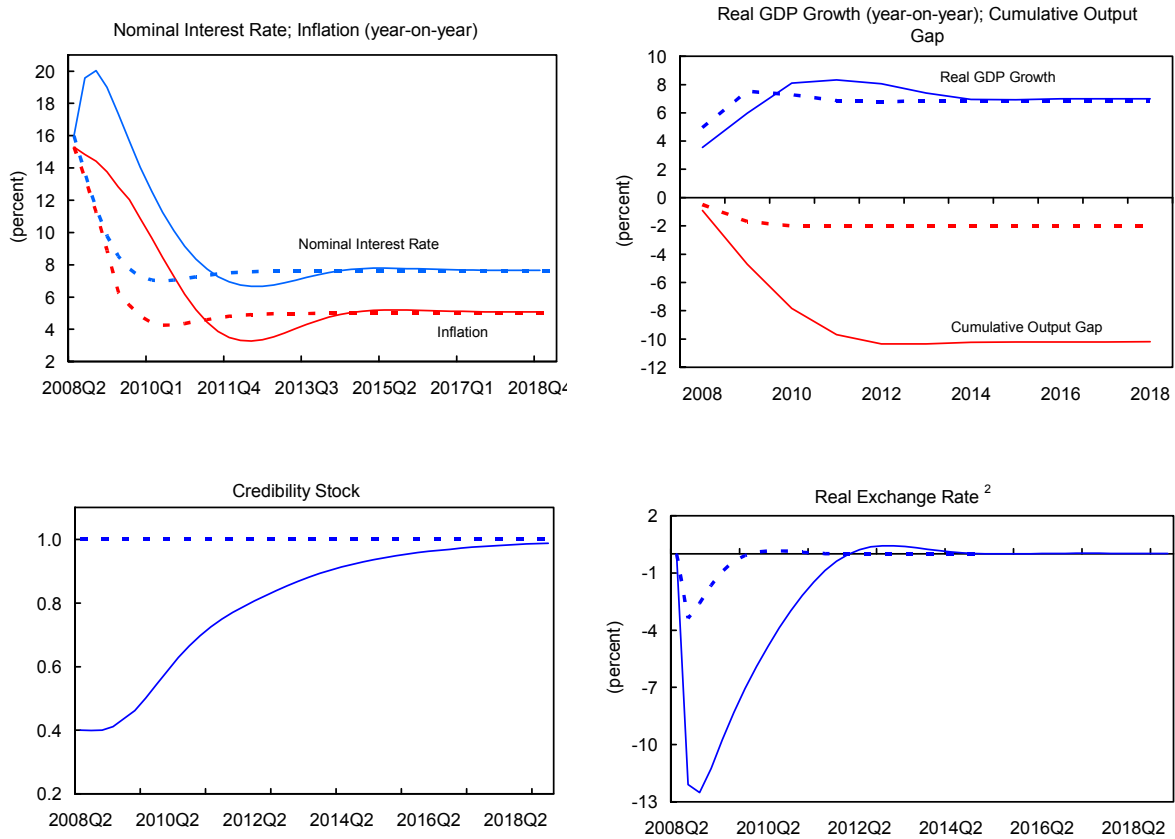
25. **This sub-section repeats the baseline but it assumes that the public has full confidence from the outset in the target announced by the central bank.** This assumption implies the fastest path of disinflation consistent with loss minimization. The results show inflation declining to the 5 percent range just six quarters after the announced policy takes effect (Figure 3). The reduction in expected inflation itself raises the real interest rate above the natural rate without an increase in the nominal rate. Indeed, the nominal rate declines through the disinflation phase, as the inflation premium goes down. The sacrifice ratio over the six-quarter inflation-reduction period is less than 0.1—almost negligible.

#### **Supply Shock**

26. **The first experiment here is a significant increase in the rate of inflation caused by an increase in world energy and food prices, which calls for a strong policy response.** A stagflationary supply shock of this type clearly presents a very difficult problem for monetary policy in the absence of well-anchored inflation expectations. Policy has to guard against an inflationary spiral as the short-run increase in inflation may cause people to expect

Figure 3. Ghana: Baeline with Full Credibility, 2008-2018 <sup>1</sup>

Dotted = Full credibility; Solid = Endogenous credibility

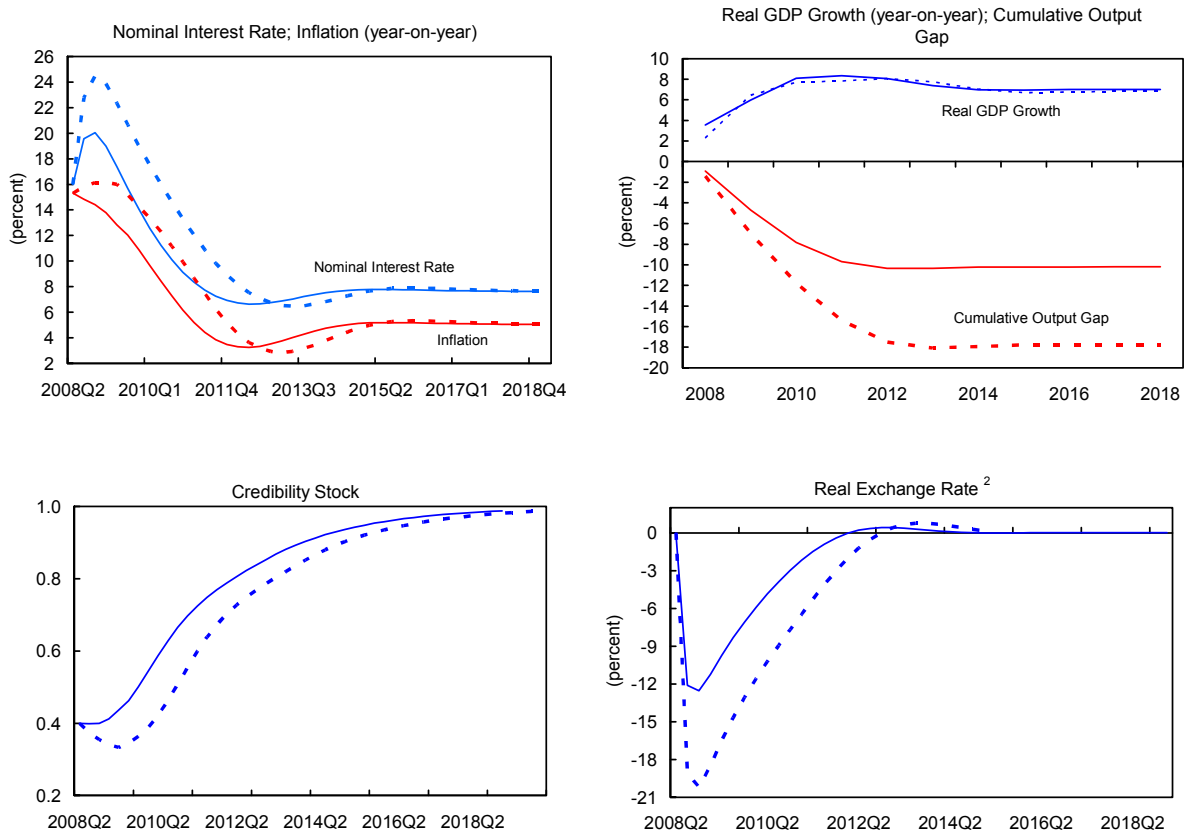


Source: IMF staff calculations.

<sup>1</sup> All variables are quarterly, except for Real GDP growth, which is annual because quarterly GDP data are not reported in Ghana.<sup>2</sup> Increase represents depreciation of the cedi.

higher inflation in the future and to lose confidence in the announced 5 percent objective. The loss-minimizing policy calls for considerable and repeated increases in the interest rate—by 450 basis points over eight quarters—relative to the baseline (Figure 4). In levels, the interest rate peaks at 24 percent in 2008:4. This reaction, and the large, though short-lived, appreciation of the exchange rate that accompanies it, does not prevent a prolonged divergence of inflation from target. Twelve quarters after the shock, inflation is still 3 percentage points above the baseline rate. The reasons for this are (i) the lagged response of the output gap to the interest rate and exchange rate; and (ii) the adverse, self-reinforcing, impact of the increase in inflation on expectations and credibility.

Figure 4. Ghana: Negative Supply Shock, 2008-2018 <sup>1</sup>  
Dotted = Negative shock; Solid = Baseline



Source: IMF staff calculations.

<sup>1</sup> All variables are quarterly, except for Real GDP growth, which is annual because quarterly GDP data are not reported in Ghana.

<sup>2</sup> Increase represents depreciation of the cedi.

27. **The second experiment considers a supply shock of the opposite sign, against which BoG does not have to raise the interest rate as much to contain inflationary pressures** (Figure 5). The inflation does fall below the baseline for an extended period, but this is in line with the announced policy objective, and boosts the stock of credibility. The potential size and duration of the effects of supply shocks on the inflation rate, even when a policy provides appropriate resistance, is a major reason for avoiding rigid adherence to short-run target ranges during the disinflation process.

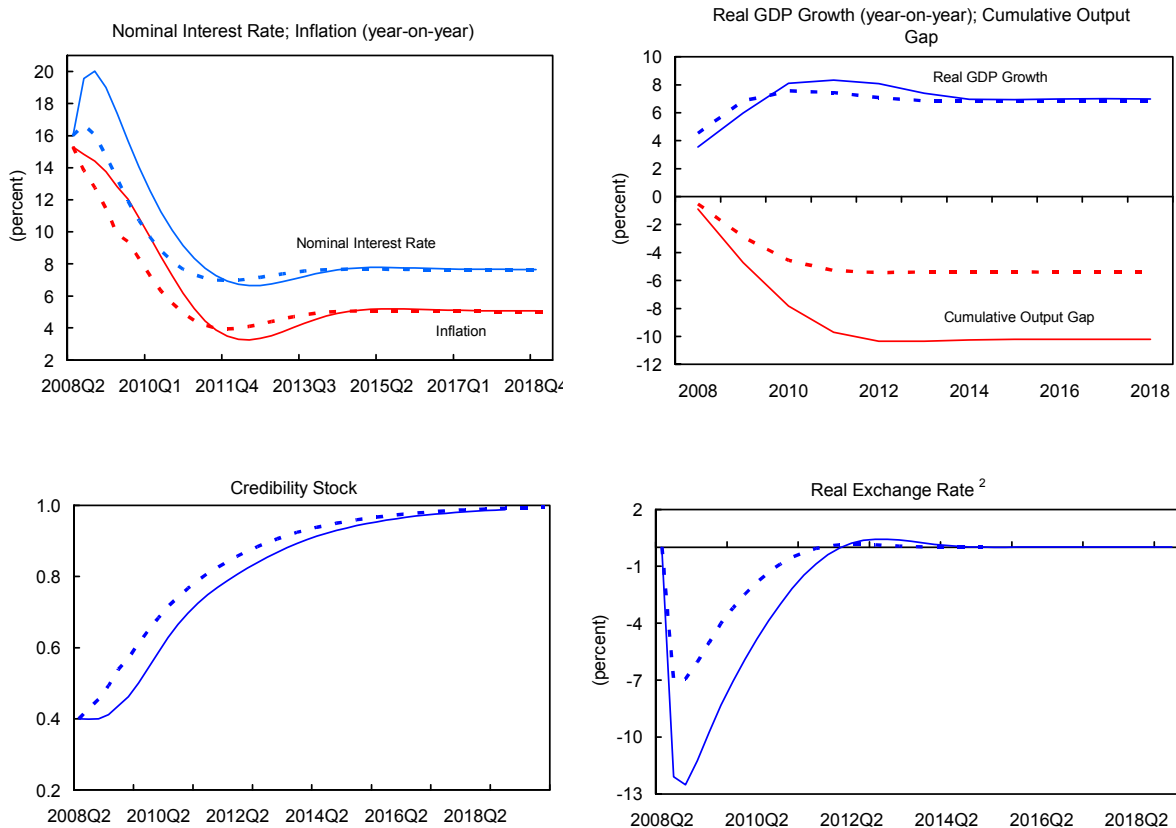
28. **With full credibility, the central bank raises the interest rate, relative to baseline, by less than 100 basis points.** <sup>8</sup> The real price of foreign exchange shows a small, brief

<sup>8</sup> Results for this case are not reported but are available from the authors.

increase. The modest tightening, resulting in a small negative output gap, is sufficient to keep inflation close to 5 percent, because public expectations of inflation are anchored firmly to the target. This result is in line with the experience of the past two decades in countries that have moved from high inflation to stable low inflation. In the 1970s and 1980s, unstable expectations transformed shocks that under good monetary policy regimes only should have price-level implications—e.g. energy price increases and currency depreciations—into inflation spirals. Monetary policy contained the problem eventually, but only with very tight monetary policies, and at the cost of a substantial output loss. Since the early 1990s, however, many central banks have re-established low-inflation and monetary policy credibility. The public now has confidence that the low-inflation policy objective will prevail, even after substantial price shocks. This in some cases has virtually eliminated the second and third round effects of such shocks on the price level. A beneficial supply shock where there is full monetary policy credibility has symmetric implications to the adverse shock (results not reported). The non-symmetries during the process of inflation reduction and credibility-building are no longer present.

Figure 5. Ghana: Positive Supply Shock, 2008-2018 <sup>1</sup>

Dotted = Positive supply shock; Solid = Baseline



Source: IMF staff calculations.

<sup>1</sup> All variables are quarterly, except for Real GDP growth, which is annual because quarterly GDP data are not reported in Ghana.

<sup>2</sup> Increase represents depreciation of the cedi.

## Demand Shock

29. **The results for the expansionary shock, e.g., a change in government spending equivalent to 0.5 percent of GDP (not reported) are similar to, but more pronounced than the baseline (not reported).** This is because the baseline also was a situation of excess demand in the economy. For the expansionary shock, the appropriate policy reaction is a prompt sharp change in the interest rate, and hence in the exchange rate. Firm interest rate reaction effectively mitigates the impact on the goal variables, output and inflation. The contractionary shock requires a slightly more moderate policy reaction. One reason for the asymmetry between the effects of the two shocks is that in the case of the expansionary shock, unlike the contractionary one, the central bank has to offset the potential weakening of credibility. In effect, the drop in demand in the second experiment does some of the disinflationary work for monetary policy.

## Costs of Delaying Interest Rate Increase under Imperfect Credibility

30. **Our simulations show that if policymakers delay their response shocks, serious inflationary consequences will follow.** Suppose policymakers announce a 5 percent inflation target in 2008:3 but put off the required large interest rate increases until 2009:2 out of concern to maintain the level of output. The simulated response shows serious inflationary consequences (Figure 6). For several years the deviation between the inflation and the baseline rate widens—to over 5 percent in 2011. The inflation rate would rise from about 15 percent currently and remain in double digits until 2011. After an initial hesitation, the interest rate has to play catch-up, and eventually rise far above the baseline—to above 25 percent in 2009:4. From a historical perspective, this would not be unprecedented—e.g., in the early 1980s the U.S. Federal Reserve and the Bank of Canada had to raise short-term interest rates above 20 percent to stop double-digit inflation. Short-run low interest rate policy, in the face of inflation, eventually turns into a high interest rate policy.

31. **An erosion of credibility is, not surprisingly, a large part of the problem.** The stock of credibility declines as the inflation rate fails to decline. Relative to baseline, the simulated loss in the stock of credibility has significant implications. The delay in raising the interest rate does keep demand high in the short run—excess demand intensifies for several quarters. But disinflation requires that a negative output gap eventually open up, and after 2 years, the gap is wider than in the baseline. Thus, the cost of the monetary policy delay is several years of stagflation.

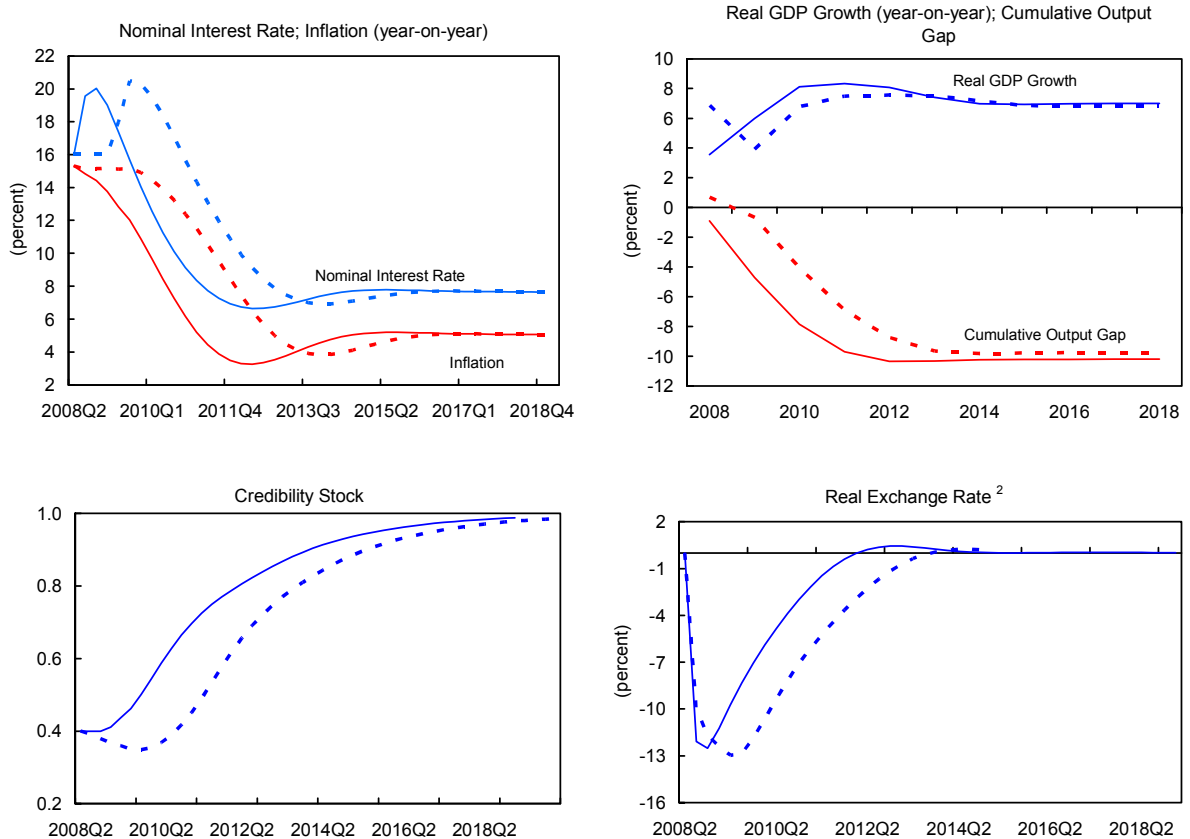
## F. Recommendations for Ghana

32. **To respond to Ghana's current challenges for disinflation, the BoG could shift to a more flexible IT regime presented above as IFT, drawing on a model like the one described.** As noted, Ghana's challenges are far from unique—IT often encounters problems in the disinflation phase. To respond to these difficulties, IFT is more forward-looking and flexible than the earlier form of IT; indeed, the inflation forecast should be used as an ideal

intermediate target in these circumstances. Clearly, a solid forecasting model is an essential element of this approach, and the model presented above could provide a good starting point.

**33. This approach stresses that the key to credibility lies not in hitting precise short-run targets but in a consistent record of policy actions that get the inflation rate back on target within two or three years—a critical difference that applies well to Ghana**

Figure 6. Ghana: Positive Demand Shock with Delayed Policy Response, 2008-2018 <sup>1</sup>  
Dotted = Positive demand shock; Solid = Baseline



Source: IMF staff calculations.

<sup>1</sup> All variables are quarterly, except for Real GDP growth, which is annual because quarterly GDP data are not reported in Ghana.

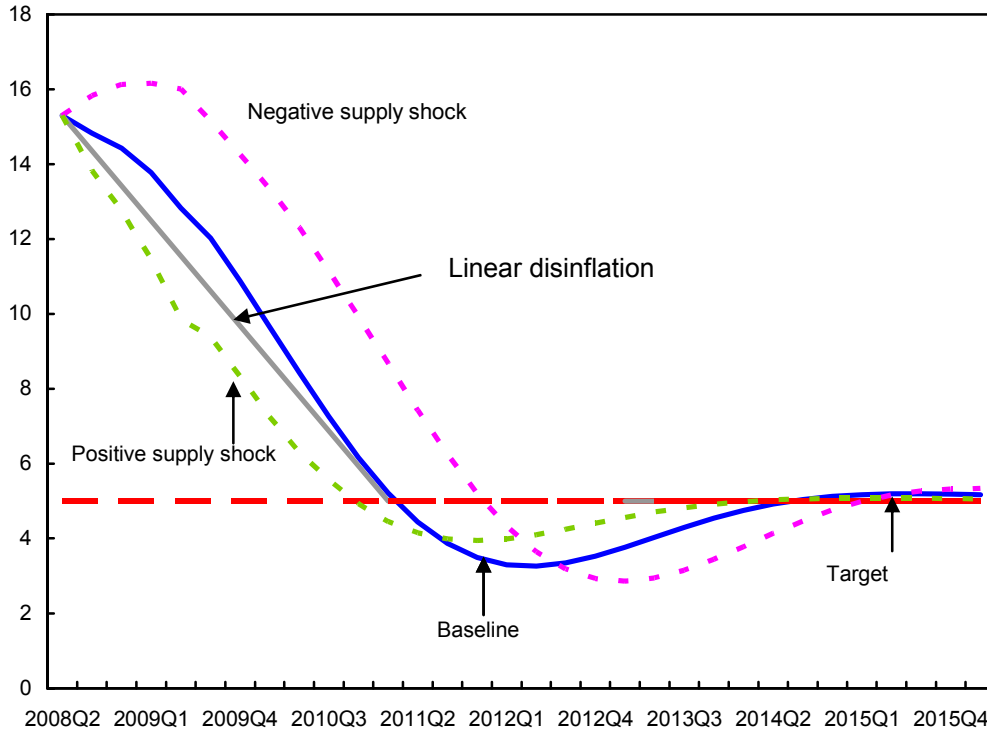
<sup>2</sup> Increase represents depreciation of the cedi.

**currently.** Figure 7 contrasts a traditional “straight-line hard target” approach to disinflation with a more flexible and modern IFT approach. The optimal path in the baseline scenario differs from the linear path (due to lags and concerns over output losses), and in the event of shocks, the optimal path diverges even further from the linear path. These divergences need not necessarily weaken credibility; a large body of evidence on IT—in countries with widely differing features and initial conditions—indicates that long-term expectations do gravitate



over time to the low-inflation targets pursued by a committed monetary policy (which eventually earns strong credibility), despite short-term deviations.

Figure 7. Ghana: Linear versus Optimal Disinflation <sup>1</sup> 2008-2015 (year-on-year, percent)



Source: IMF staff calculations.

<sup>1</sup> The optimal disinflation paths are as follows: Baseline (no shocks), Positive supply shock (of 0.5 percent of GDP), and Negative supply shock (of -0.5 percent of GDP).

34. **Transparent communications are essential to build credibility in this flexible approach.** Transparency is needed with respect both to policy objectives and to the way in which current policy actions are intended to achieve them—operational transparency. Ghana already has an element of goal transparency (the medium-term target of 5 percent inflation) but could greatly strengthen its operational transparency. Doing so requires that the monetary policymakers have realistic, coherent models of the monetary policy process, from policy instruments to objectives, which they communicate openly.

35. **In particular, the BoG can consider two new steps to strengthen communication:**

- publish its forecasts for inflation, the output gap and the policy rate after each MPC meeting. These forecasts would be revised after each meeting, creating continuous flow of information about the BoG's reactions to developments; and

- explain *ex ante* how it would react to different shocks (as in Figure 7), providing further transparency and predictability. Indeed, by “tying its own hands” in advance, the BoG may even insulate itself more from political influence.

36. **Operational transparency magnifies the impact of the central bank’s policy on expectations, which in turn reinforces its effectiveness.** The Norges Bank has adopted this communication strategy with considerable success. It publishes model-consistent fan charts for all these forecasts, along with examples in the form of risk assessments explaining how it is likely to respond to future shocks. Market participants have begun to anticipate its policy moves, effectively enlisting them as allies in the monetary policy process. This anticipation can be seen in the muted reaction of market interest rates to MPC announcements after this policy was adopted. The impact of shifting to this approach could be enhanced considerably by publishing a policy paper explaining the new approach and including how it would likely react to different future shocks.

## G. Conclusions

37. **In adopting IT while still a low-income emerging-market economy, Ghana has been a trail-blazer.** Its recent adverse inflation developments are reason not to abandon IT, but to improve the framework by adopting a more flexible and forward-looking approach to IT.

38. **To support this approach, this paper presents a model that recognizes the difficulties facing Ghana, among them less than perfect credibility of announcements of inflation reduction and policymaker aversion both to movements of output from its potential level and to variability in the interest rate.** The model emphasizes the importance of the BoG building credibility over time through consistent pursuit of a low-inflation goal. The nominal anchor is the ultimate target for low inflation; from this foundation, and for given initial conditions, a sequence of short-run inflation-forecast targets maybe derived. A loss-minimizing monetary policy would not be locked into a rigid predetermined path of inflation reduction with fixed near-term targets.

39. **The model simulations bear out some intuitive lessons about how monetary policy needs to react in response to shocks during disinflation.** The effects of supply shocks on inflation can be large and of significant duration, even with an appropriate policy response—this is a reason to avoid rigid non-credible commitments to short-term inflation-reduction targets. Even so, the BoG must be prepared to raise interest rates to a level that dampens demand and visible reduce in inflation. Any delay in responding (e.g., out of concern for near-term output losses) damages credibility, ultimately bringing on higher inflation and more prolonged output losses (in a word, stagflation).

40. **The key to transparency and communications in this approach is “saying what you do and doing what you say.”** By providing the public with its forecasts for inflation,

output gap, and policy rates, the BoG could better shape expectations despite recent rises in inflation. Explaining ex ante how the BoG would react to different shocks would help market participants anticipate policy moves.

41. **There are many aspects of this model that could be considered for other emerging low-income economies that wish to enhance their monetary policy framework, including incorporation of credibility as an endogenous variable and enhancing the operational transparency and communication strategy of the central bank.** These could be useful not only for countries considering a move to IT but also for countries which wish to introduce a more formal and credible commitment to low inflation generally.

## References

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## APPENDIX I. THE STANDARD MODEL<sup>9</sup>

1. **The standard model, presented in Berg, Karam, and Laxton (2006a, b), has four behavioral equations, which feature both variables in terms of deviations from equilibrium values, i.e., as gaps, and in levels:**

### Output gap equation

2. **The output gap equation is an IS curve that relates the output gap to expected and past output gaps, the real interest rate gap, the real exchange rate gap, and the foreign output gap:**

$$ygap_t = \beta_{id} ygap_{t+1} + \beta_{lag} ygap_{t-1} - \beta_{RRgap} RRgap_{t-1} + \beta_{zgap} zgap_{t-1} + \beta_{USygap} ygap_t^{US} + \varepsilon_t^{ygap},$$

where  $ygap$  is the output gap,  $RRgap$  is the real interest rate gap in percentage points,  $zgap$  is the real exchange rate (measured so an increase is a depreciation, in percentage points), and  $ygap^{US}$  is the foreign output gap. The output gap is measured as the deviation, in percentage points, of actual output from a measure of the trend or equilibrium level of GDP (a positive number indicates that output is above trend). Economic agents are assumed to know the model and have rational expectations.

### Phillips Curve

3. **The Phillips curve relates inflation to past and expected inflation, the output gap, the exchange rate, and possibly key world market prices such as oil prices; the Phillips-curve equation may be split into two, one for overall inflation and one for core inflation:**

$$\pi_t = \alpha_{\pi d} \pi 4_{t+4} + (1 - \alpha_{\pi d}) \pi 4_{t-1} + \alpha_{ygap} ygap_{t-1} + \alpha_z [z_t - z_{t-1}] + \varepsilon_t^\pi,$$

where  $\pi$  is the annualized month-on-month inflation rate,  $\pi 4$  is the four-quarter change in the CPI, and  $z$  is the real exchange rate.

### Taylor Rule

4. **The variant of the Taylor rule chosen here determines the policy interest rate as a function of the output gap and expected inflation:**

$$RS_t = \gamma_{RSLag} RS_{t-1} + (1 - \gamma_{RSLag}) * (RR_t^* + \pi 4_t + \gamma_\pi [\pi 4_{t+4} - \pi_{t+4}^*] + \gamma_{ygap} ygap_t) + \varepsilon_t^{RS},$$

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<sup>9</sup> This appendix has taken largely verbatim from Argov et al. (2007).

where  $RS$  is the monetary authorities' nominal interest rate and  $*$  denotes equilibrium values.

### Exchange Rate Equation

5. **The exchange rate equation imposes uncovered interest parity (IP), an arbitrage condition that says that real interest rates (on investments in different currencies) will be equalized across countries, up to a country risk premium.** A real exchange rate definition is used to write the conventional IP condition as a real IP condition as follows:

$$z_t = \delta_z z_{t+1} + (1 - \delta_z) z_{t-1} - [RR_t - RR_t^{US} - \rho_t^*] / 4 + \varepsilon_t^z,$$

where  $RR^{US}$  is the foreign real interest rate and  $\rho^*$  is the equilibrium risk premium. The first two terms on the right hand capture agents' real exchange rate expectations.

6. **Equilibrium values are determined on the supply side. To preserve simplicity, the supply-side variables are assumed to follow simple stochastic processes not shown here for brevity.** In practice this means that the analyst must make assumptions about equilibrium values, based on a variety of sources, including judgmental estimates or econometric analyses.

## APPENDIX II. THE MODEL

1. Our model of inflation with endogenous credibility has the following main components:

- Inflation Equation—An Expectations-Augmented Phillips curve
    - Expectations process and credibility
    - Nonlinear output gap effect
  - Output Gap Equation
  - Exchange Rate-Real Interest Rate Parity Equation
  - Monetary Policy Loss Function
2. We explain each of these components below.

### **Inflation Equation—An Expectations-Augmented Phillips curve**

3. The inflation equation is as follows:

$$\pi_t = \lambda_1 * \pi 4_t^e + (1 - \lambda_1) * \pi 4_{t-1} + \lambda_2 * \left( \frac{y_{t-1}}{y_{\max} - y_{t-1}} y_{\max} \right) + \lambda_3 * \Delta z_t + \varepsilon_t^\pi$$

where,  $\pi 4_t^e$  and  $\pi 4_{t-1}$  are the forward-looking and backward-looking components of inflation,  $y_{t-1}$  is the output gap in period  $t-1$ ,  $y_{\max}$  is the maximum output gap possible.  $z$  (in logs) is the real exchange rate (measured so an increase is a depreciation, in percentage points) and  $\Delta z_t$  is changes in real exchange rate ( $z_t$ ) from last period's level ( $z_{t-1}$ ).  $\lambda_1$ ,  $\lambda_2$  and  $\lambda_3$  are model parameters and  $\varepsilon_t^\pi$  is the supply shock.

The terms in the equation, from left to right, represent:

- backward and forward-looking components to the expectations process—with an endogenous credibility stock in the forward-looking component

$\lambda_1 * \pi 4_t^e + (1 - \lambda_1) * \pi 4_{t-1}$  where,  $\pi 4_t = \frac{1}{4} \sum_{i=1}^4 \pi_{t+i}$  and  $\pi 4_t = \frac{1}{4} \sum_{i=1}^4 \pi_{t-i}$ . We will characterize how inflation expectations— $\pi 4_t^e$ —are formed in the next sub-section.

- non-linear output gap effect ( $\lambda_2 * (\frac{y_{t-1}}{y_{\max} - y_{t-1}} y_{\max})$ ).
- exchange rate pass-through ( $\lambda_3 * \Delta z_t$ ).

4. In line with the evidence, the equation contains a mechanism that changes the formation of expectations from a drifting, backward-looking, process to one which is anchored by the low-inflation target.

### Expectations process and credibility

5. Inflation expectations are formed as follows:

$$\pi 4_t^e = \gamma_t * \pi 4_{t+4} + (1 - \gamma_t) * \pi 4_{t-1} + b_t + \varepsilon_t^{\pi^e}$$

6. **The first two terms in the equation for expected inflation comprise a weighted average of a model—consistent forecast of the 4—quarter inflation rate (forward-looking component) and the inflation rate observed last quarter (backward-looking component).** The weight on the forward-looking component,  $\gamma_t$ , evolves between 0 (no credibility) and 1 (full credibility)—and is therefore a measure of the stock of credibility.

7. **We use these scenarios to define a credibility coefficient** In order to define the evolution of the credibility stock, we postulate that the public sees a possibility for one of two inflation regimes—'L' and 'H', for 'Low' and 'High' inflation. In the 'L' scenario, inflation would converge to the announced inflation target of  $\pi_t^*$ <sup>10</sup>. The 'H' scenario corresponds to a suspicion in the public mind that monetary policy might deliver an inflation rate much higher than the announced target—we suppose that rate to be very high, say 40 percent. Under the H scenario, inflation would converge to 40 percent. We use these scenarios to define a credibility coefficient:

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<sup>10</sup> The inflation target is defined as the mid-point of the targetting range.



$$\eta_t = \frac{(\pi 4_t^H - \pi 4_t)^2}{(\pi 4_t^H - \pi 4_t)^2 + (\pi 4_t^L - \pi 4_t)^2}$$

8. **The coefficient  $\eta_t$  gauges the extent to which inflation outcomes are seen as consistent with the 'Low' inflation scenario.** Consider two extreme cases:<sup>11</sup> In the 'L' case, inflation converges gradually to the inflation target and  $\eta_t$  converges to 1, since the term  $(\pi 4_t^L - \pi 4_t)$  in the denominator of the equation above equals 0;<sup>12</sup> In the 'H' case on the other hand,  $\eta_t$  equals 0, implying complete lack of credibility. Credibility is lost—people give increased weight to a suspected high inflation scenario—if inflation outcomes are above the announced target.<sup>13</sup>

9. **The credibility stock ( $\gamma_t$ ) then evolves in the following autoregressive form:**

$$\gamma_t = \rho * \gamma_{t-1} + (1 - \rho) * \eta_{t-1} + \varepsilon_t^\gamma$$

10. **An increase in  $\eta_t$  results in a rise in the weight on the forward-looking component of expectations.** This ties inflation more tightly to the target, such that the central bank has to do less in response to shocks and that convergence to the target rate is faster. Disturbance term  $\varepsilon_t^\gamma$  represents a shock to central bank credibility, which may be positive or negative.

$b_t$ , the inflation expectations 'bias' is simply defined as a proportion of the deviation of a weighted average of hypothetical inflation expectations from the inflation target, where the weights reflect the credibility stock ( $\gamma_t$ ):

$$b_t = 0.2 * (\gamma_t * \pi 4_t^{e,L} + (1 - \gamma_t) * \pi 4_t^{e,H} + \pi_t^*)$$

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<sup>11</sup> We can think of inflation as specified in equations 6 and 7 to evolve according to a first-order, stationary autoregressive process, reverting in the long run to a targeted level of inflation in the 'L' case and 10.8% in the 'H' case. The parameter values on lagged inflation are indicative of the rate of convergence to the steady state with high persistence values implying a longer time to converge.

<sup>12</sup> This term is the expectation error of the low hypothetical inflation expectation.

<sup>13</sup> The convergence rate parameter of the credibility stock was calibrated to 0.7, i.e., it takes 1.5-2.0 years for credibility to rebuild from some below-full level of initial credibility.

Based on this equation, as credibility approaches unity, the bias converges to zero, since  $\pi 4_t^{e,L}$  will tend to converge to the inflation target.

Under the no credibility scenario ( $\gamma_t = 0$ ), the inflation bias is positive and is proportional to the difference between the high hypothetical inflation expectations and the target.<sup>14</sup>

### Nonlinear Output Gap

11. **Empirical evidence suggests that the output gap effect on inflation is nonlinear (e.g. Debelle and Laxton, 1997).** In the Phillips curve we introduced an exponentially

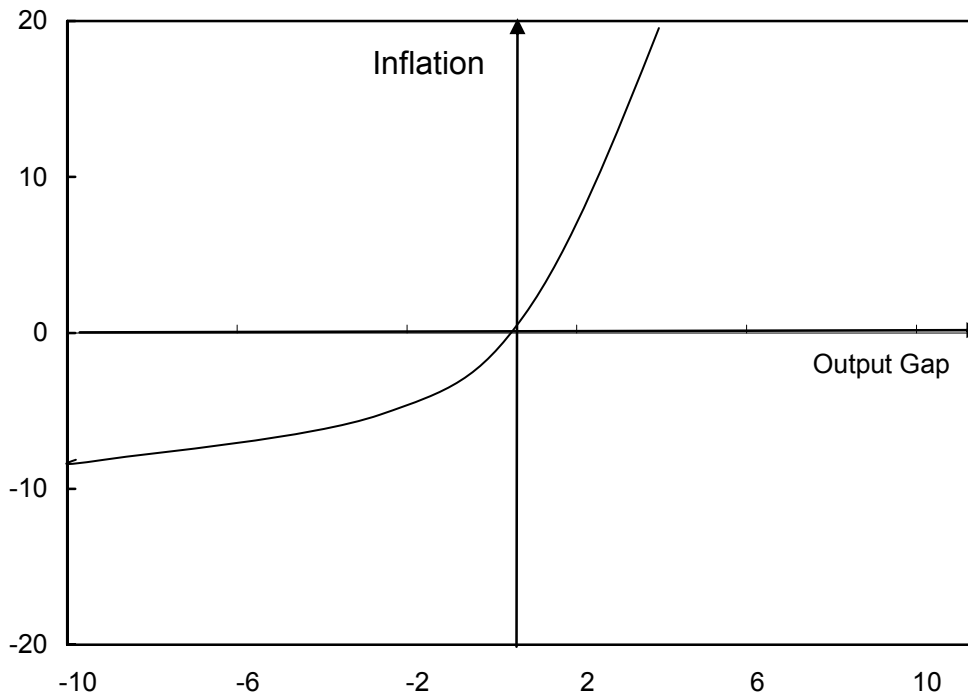
increasing impact on inflation, as follows:  $\lambda_2 * \left( \frac{y_{t-1}}{y_{\max} - y_{t-1}} y_{\max} \right)$ .

12. **The parameter  $\lambda_2$  captures the marginal effect of inflation for small values of the output gap.** This term implies that output gap cannot exceed a maximum value of  $y_{\max}$ . We set  $y_{\max}$  equal to 5 percent in the model simulations. Thus, as the gap approaches 5 percent, it has a diverging positive effect on the inflation rate (see Figure 8). This puts a limit on the extent to which expansion of demand can stimulate an increase in output: at  $y_{\max}$ , increases in demand result only in increasing inflation. Because of the non-linearity, an economy operating with an output gap near the maximum will subsequently have to incur long periods of negative output gaps to restore the desired inflation rate.

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<sup>14</sup> Clear evidence of inflation bias stemming from a credibility problem is seen in the behavior of the inflation premium in the UK bond market before 1997 (World Economic Outlook, op cit.).

Figure 8. Non-linear Phillips Curve, an Example  
Inflation (percent); Output Gap (percent of GDP)



Source: Staff calculations.

### Output Gap Equation

13. **Domestic output depends on the real interest rate, the real exchange rate, and demand in the rest of the world, represented by the United States.**<sup>15</sup>

14. **The equation is written in terms of deviations from equilibrium values.** The output gap is the deviation, in percentage points, of actual output from a measure of the trend or equilibrium level of GDP (a positive number indicates that output is above trend). It is a function of the gap between the actual real interest rate and its equilibrium value, the real

<sup>15</sup> Representations such as this one are usually motivated with a first-order condition consistent with optimizing consumers with habit formation. See Smets and Wouters (2003) or Laxton and Pesenti (2003) for a linearized version of the Euler equation for consumption that depends on lagged and expected consumption, real interest rates and a habit-persistence parameter. However, habit persistence alone cannot account for a very large weight on the lagged output gap, which is resolved in DSGE models by adding investment to the model and significant adjustment costs associated with changing the levels of investment.

exchange rate gap, and the US output gap. Dynamics are added through the influence of past and future domestic output gaps, and lagged reactions to the interest rate and exchange rate:

$$y_t = \beta_1 * y_{t-1} + \beta_2 * y_{t+1} - \beta_3 * (rr_{t-1} - \overline{rr}) + \beta_4 * (z_{t-1} - \overline{z}) + \beta_5 * y_t^{US} + \varepsilon_t^y$$

Where  $rr$  is the real interest rate in percentage points,  $y_t^{US}$  is the U.S. output gap, and  $\overline{\cdot}$  denotes the equilibrium value of a variable. The term  $\varepsilon_t^y$  represents a demand shock.

### Exchange Rate-Real Interest Rate Parity Equation

15. **We assume real uncovered interest parity (IP) holds, up to a country risk premium. The expected increase in the exchange rate is equal to the domestic-foreign interest differential plus the risk premium.** The equation for the current exchange rate equation may thus be written (in logs) as:

$$[rr_t - rr_t^{US} - \delta]/4 = (z_{t+1}^e - z_t) + \overline{rr} + \overline{rr}_t^{US} + \varepsilon_t^z$$

Where,  $rr_t^{US}$  is the U.S. real interest rate and  $\delta$  is the equilibrium risk premium.

16. Expectations for the exchange rate are a weighted average of a forward-looking, model-consistent component, and a backward-looking component:

$$z_t^e = \varphi * z_{t+1} + (1 - \varphi) * z_{t-1}$$

17. **Portfolio preference shocks**, e.g. exchange market disturbances, which can be large for emerging market economies, are in the term  $\varepsilon_t^z$ .

### Monetary Policy Loss Function

18. **Under IT, almost by definition, the monetary policy loss function attaches a high cost to deviations of inflation from target.** In the short run, monetary actions also affect interest rates and output, and policymakers are averse to fluctuations in output from potential and to variability of the interest rate from one period to the next. Aiming to keep output at its potential level—i.e. minimizing the amplitude of the business cycle—has an obvious justification since this is a fundamental objective of macroeconomic policy.

19. **Aversion to interest rate variability, which is evident in the widely observed practice of central banks to adjust interest rates only gradually in response to changes in conditions, has a more technical rationale.** Whereas the policy interest rate controlled by the central bank is a very short-term rate, the market interest rates that affect spending and output are not so short-term. Effective transmission of policy actions requires that these market rates respond predictably, in line with movements in the policy rate. With low variability in the policy rate, financial markets can project that a change this quarter will have some duration in the quarters ahead. Longer-term rates, which incorporate expectations of the future policy rate, then respond relatively strongly to policy actions.<sup>16</sup>

20. **High quarter-to-quarter variability in the policy rate, on the other hand, reduces its impact on relevant market rates, and weakens the effectiveness transmission.**

21. **With these considerations in mind, the loss function in the model cumulates a weighted sum of:**

- squared deviations from the inflation target
- squared output gaps, and
- squared one-quarter changes in the policy interest rate

$$Loss_t = \sum_{t=1}^{\infty} \nu^t [\omega_1 * (\pi_t - \pi^*)^2 + \omega_2 * y_t^2 + \omega_3 * (rs_t - rs_{t-1})^2]$$

22. **The weights ( $\omega_i$ ) embody the costs policymakers attach to each of these items.**

The discount factor is denoted by  $\nu$ . Monetary policy minimizes this loss function, subject to the constraints imposed by the structure of the model. Monetary policy has choices with respect to the path towards the inflation target. This may be fast, if the cost of misses is high relative to the costs of output and interest rate instability. Or it may be slow, if the cost of targeting errors is relatively low.

23. **The quadratic loss function implies symmetric aversion to overshoots and undershoots with respect to the inflation target.** One might argue that policymakers' preferences would not be symmetric under a program of inflation reduction. They might regard an undershoot as a benign, though unexpectedly rapid, approach to the low-inflation objective, but an overshoot as a serious threat to the program. Despite the symmetric loss function, the full model does not imply symmetric policy responses. For example, endogenous credibility encourages a stronger interest rate response to overshoots than to undershoots.

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<sup>16</sup> On these lines, Woodford (2003) argues that a strategy of gradual interest adjustment may be optimal.

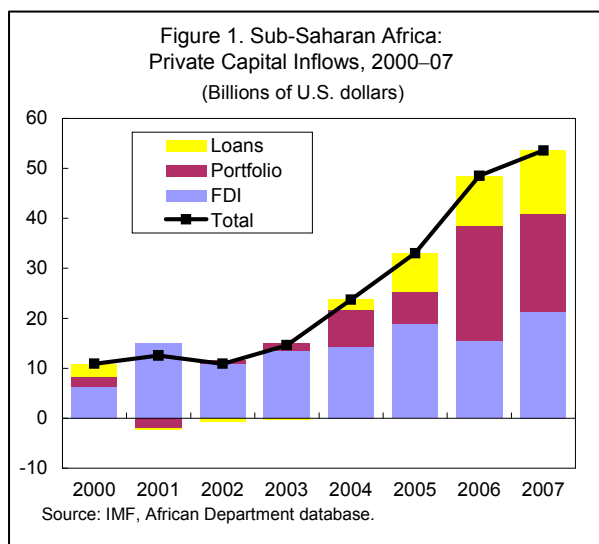
## II. CAPITAL ACCOUNT LIBERALIZATION AND PRIVATE CAPITAL FLOWS IN GHANA<sup>17</sup>

### A. Introduction

1. **Private capital flows to sub-Saharan Africa have more than quadrupled in the last seven years, and Ghana has been among the leading destinations** (Figure 1; Table 1; and IMF, 2008). While the region still accounts for a small proportion of capital flows worldwide, this outcome is related to the surge of global capital flows to developing and emerging market countries—and hence the beginning of the region’s integration into international capital markets.

2. **Ghana stands out among the main destinations in its recent strategy to attract and direct capital flows through the partial liberalization of its capital account.** The liberalization has taken place as part of a coherent policy package with careful sequencing, following successful macroeconomic stabilization supported by a PRGF arrangement and HIPC and MDRI debt relief. Starting in late 2006, non-residents were allowed for the first time to purchase domestic government securities, but only with restrictions on maturities and holding periods due to concerns over vulnerability. Limitations on foreign equity holdings were also lifted, but recent portfolio inflows have apparently been concentrated in investment in government securities.

3. **So far, Ghana’s strategy for liberalizing the capital account has yielded intended benefits in terms of increased capital inflows, domestic capital market development, and longer-term portfolio inflows.** In the Ghanaian context, maintaining limited capital account controls may have some merit at an initial stage of liberalization to reduce more volatile, short-term portfolio inflows. However, experience elsewhere has shown that sound macroeconomic policies are more important and more effective in managing risks than capital controls. Rising twin fiscal and current account deficits in 2006-08 have indeed increased Ghana’s vulnerability to sudden changes in flows, particularly as the global financial environment is becoming less favorable. Attracting portfolio inflows more to equity purchases (along with foreign direct investment) would also reduce vulnerability.



<sup>17</sup> This paper has been prepared by Marshall Mills.

4. **Compared to its peers in sub-Saharan Africa,<sup>18</sup> the levels and composition of Ghana's private capital flows present both some advantages and disadvantages in terms of balancing benefits and risks.** It has recently relied somewhat less on private capital inflows to finance its current account deficit than many other frontier emerging markets in the region (Table 1 and Box 2 of the staff report). The composition of inflows has mixed implications for vulnerability and growth, however. Ghana has received proportionally less private debt—the most volatile inflows in the region—than its peers but has received a fairly large proportion of portfolio inflows—the next most volatile inflows. Portfolio flows account for a larger percentage of GDP in Ghana than in several countries, and their concentration in government securities may have disadvantages (see below). Interestingly, Ghana is the only main recipient of increased private capital flows to have liberalized its capital account during the recent rise in flows—others either liberalized earlier but experienced rising inflows later (e.g., Uganda, Zambia) or have received inflows despite continuing significant restrictions (e.g., Mozambique).

Table 1. Private Capital Inflows to Selected Sub-Saharan African Countries, 2000 - 07  
(Millions of U.S. dollars, unless otherwise indicated)

		2000	2001	2002	2003	2004	2005	2006	2007	Total	Total as Percent of GDP <sup>1</sup>
<b>Ghana</b>	<b>Total</b>	<b>182</b>	<b>12</b>	<b>32</b>	<b>2</b>	<b>237</b>	<b>599</b>	<b>1,007</b>	<b>1,092</b>	<b>3,162</b>	<b>21.3</b>
	FDI	59	56	50	50	332	145	636	855	2,184	14.7
	Portfolio	96	32	0	25	0	414	383	206	1,157	7.8
	Private loans	27	-77	-18	-73	-95	39	-12	30	-179	-1.2
<b>Senegal</b>	<b>Total</b>	<b>198</b>	<b>91</b>	<b>220</b>	<b>227</b>	<b>290</b>	<b>200</b>	<b>401</b>	<b>344</b>	<b>1,971</b>	<b>17.7</b>
	FDI	63	63	63	63	63	63	63	63	505	4.5
	Portfolio	0	1	2	3	4	5	6	7	28	0.3
	Private loans	135	27	155	161	223	132	332	274	1,438	12.9
<b>Tanzania</b>	<b>Total</b>	<b>463</b>	<b>420</b>	<b>355</b>	<b>297</b>	<b>183</b>	<b>624</b>	<b>938</b>	<b>1,108</b>	<b>4,389</b>	<b>27.1</b>
	FDI	463	374	448	498	472	541	653	700	4,149	25.6
	Portfolio	0	0	0	0	0	0	160	703	863	5.3
	Private loans	0	46	-93	-201	-289	84	126	-296	-623	-3.8
<b>Uganda</b>	<b>Total</b>	<b>472</b>	<b>431</b>	<b>529</b>	<b>578</b>	<b>564</b>	<b>585</b>	<b>736</b>	<b>1,179</b>	<b>5,075</b>	<b>45.2</b>
	FDI	155	162	188	217	293	353	399	484	2,251	20.0
	Portfolio	303	255	320	324	217	159	251	507	2,337	20.8
	Private loans	14	14	21	37	53	73	87	188	486	4.3
<b>Zambia</b>	<b>Total</b>	<b>121</b>	<b>80</b>	<b>303</b>	<b>349</b>	<b>364</b>	<b>502</b>	<b>559</b>	<b>1,719</b>	<b>3,997</b>	<b>35.8</b>
	FDI	122	72	303	347	364	380	467	811	2,866	25.7
	Portfolio	-1	8	0	2	0	122	92	908	1,132	10.1
	Private loans	0	0	0	0	0	0	0	0	0	0.0
<b>Total</b>	<b>1,436</b>	<b>1,034</b>	<b>1,438</b>	<b>1,454</b>	<b>1,638</b>	<b>2,510</b>	<b>3,642</b>	<b>5,442</b>	<b>18,595</b>	<b>28.8</b>	

Source: IMF African Department database.

<sup>1</sup> In percent of 2007 nominal GDP.

<sup>18</sup> Ghana is most comparable to more recent recipients of private capital flows like Kenya, Senegal, Tanzania, Uganda, and Zambia. South Africa and Nigeria are much larger economies with longer histories of private capital flows.

## B. Objectives in pursuing capital account liberalization

5. **Capital account liberalization was intended both to increase the supply of capital and to stimulate the development of financial markets, as part of Ghana’s overarching development strategy.** A review and eventual relaxation of capital controls was an explicit priority of the first financial sector strategic plan (FINSSP I) developed in 2003. The resulting diversification of funding sources was intended to strengthen the financial system. In particular, minimum maturities for non-resident purchases of government were intended to extend the yield curve.

6. **The continuing limitations on capital account liberalization reflect persistent wariness about vulnerability, particularly a possible “boom and bust” pattern of capital inflows.** The limits on maturities and resale in the government debt and money markets aim to limit inflows of short-term “hot” money and mitigate any sudden outflow. Continuing controls on flows into money markets also reflect caution.

## C. Sequencing of partial capital account liberalization

**Out of concerns over vulnerability, the Ghanaian authorities have implemented a gradual, partial liberalization of the capital account with careful sequencing, in the context of a reform program.** Portfolio and direct investments in Ghanaian companies were allowed within strict limits from the mid-1990s on. Non-residents were allowed to buy corporate shares and bonds in the Ghana Stock Exchange (GSE) with restrictions—no more than 10 percent of any one share and an aggregate non-resident holding in any one company of no more than 74 percent. Non-residents were not allowed to purchase government securities at all, however. While there is no indication that large portfolio inflows followed this liberalization in the 1990s, foreign direct investment grew briskly in the second half of that decade before leveling out early this decade. Both portfolio and direct investment inflows picked up again in 2004, even without further liberalization (Figure 2 and Table 1).<sup>19</sup> Beginning in 2003, the Ghanaian authorities began preparing further liberalization as part of their strategy for accelerated growth, financial sector development and regional integration.

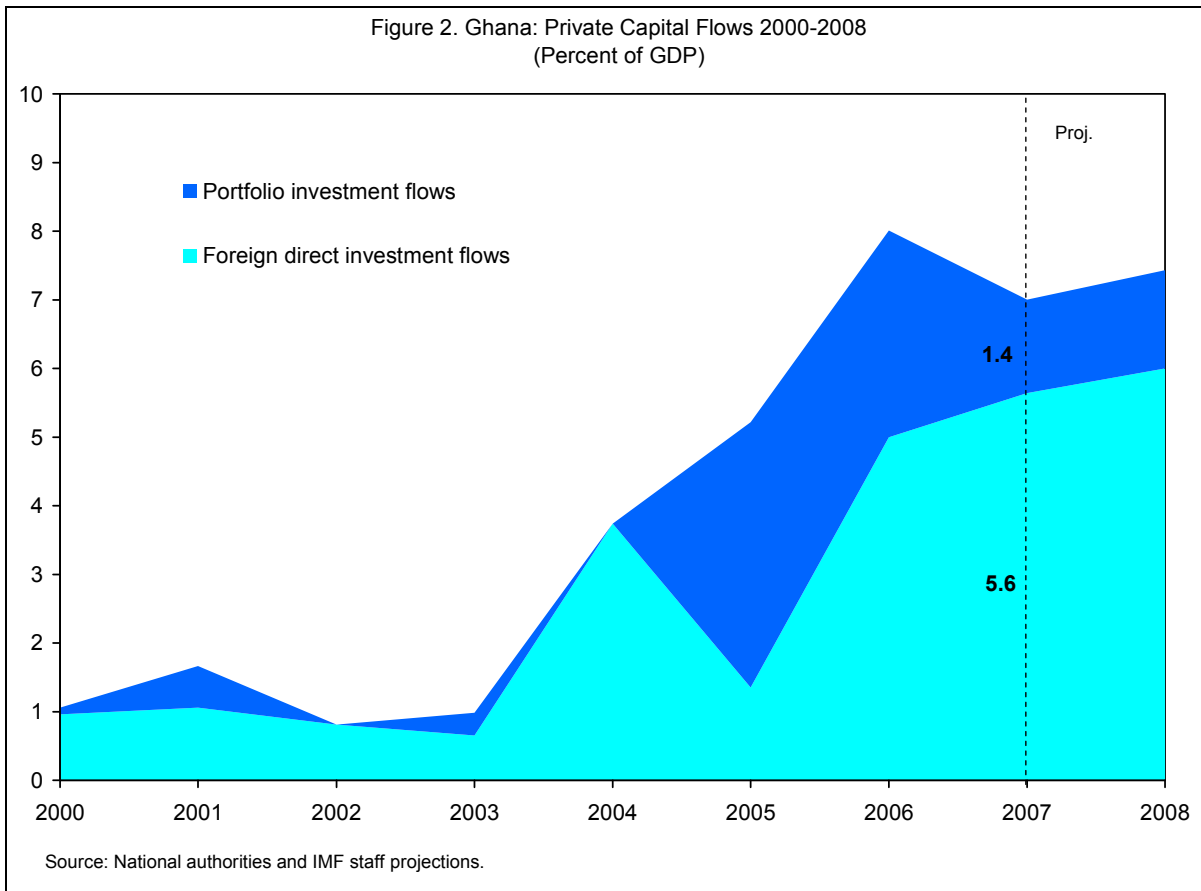
7. **In advance of the partial capital account liberalization in 2006, the authorities followed an exemplary sequencing and packaging.** First, they successfully completed a

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<sup>19</sup> The data on capital inflows, and especially portfolio inflows, has weaknesses on both levels and composition. Portfolio investment is reported as “other private capital flows,” and other reliable data is limited to non-resident purchases of government securities on the primary market. The Bank of Ghana is developing a survey tool to strengthen the data, with support from the IMF. In addition, the Foreign Private Capital Capacity Building Programme (FPC CBP) is planning a study of Ghana that includes surveys of inflows. Given the increasing importance of portfolio investment, these efforts are important.



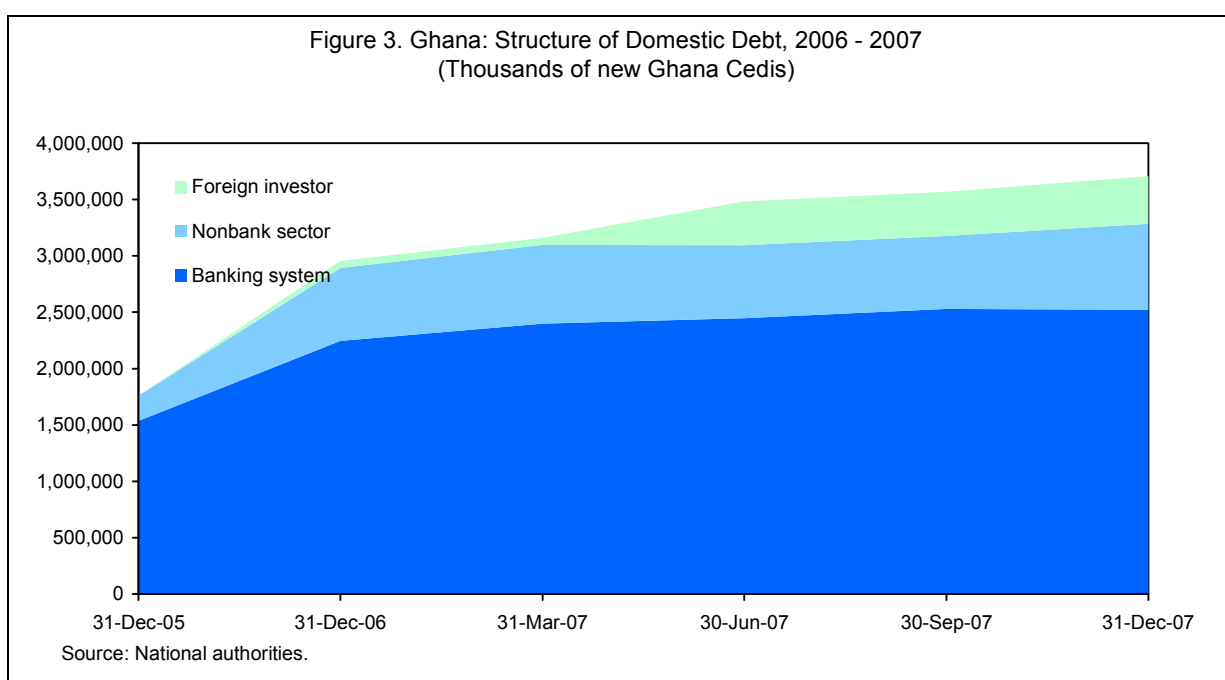
macroeconomic stabilization program with fiscal consolidation; second, they enhanced creditworthiness through debt relief and debt reduction; third, they developed the institutional framework; and only then did they embark on partial liberalization. This strategy was broadly consistent with the IMF's integrated approach to capital account liberalization (Ishii and Habermeier 2002).



8. **Prior to successful macroeconomic stabilization in 2006, potentially volatile international capital flows would have raised concerns for a heavily indebted economy vulnerable to shocks and prone to bouts of instability.** Supported by a PRGF arrangement, the stabilization program succeeded in bringing down the fiscal deficit (including grants) from nearly 10 percent of GDP in 2000 to 3 percent in 2005 and inflation from 40 percent in 2000 to near 10 percent in 2006. Total public debt also fell sharply, from 119 percent of GDP in 2003 to 42 percent in 2006, thanks largely to the HIPC and MDRI initiatives. Despite progress, concerns remained, including for the level of development of financial markets and institutions.

9. **Capital account liberalization has been implemented in conjunction with a comprehensive institutional development strategy:**

- The authority and capacity of the Bank of Ghana has been strengthened, starting with the Bank of Ghana Act of 2002.
- Reforms in the primary government debt and stock markets have increased their depth and liquidity, in line with the government’s financial sector strategic plan (FINSSP). The secondary interbank market for government debt remains underdeveloped, however. In addition, the Ghana Stock Exchange is less liquid and broad-based than some of its peers in the region (Yartey 2006), despite some progress. Efforts are underway to build the interbank markets for money and foreign exchange, although they are less advanced than for the debt and stock markets.
- Efforts to reinforce financial sector supervision and soundness have also advanced.



10. **The strategy culminated in the enactment in late 2006 of the new Foreign Exchange Act, which allowed non-residents to purchase government securities for the first time.** However, out of concern for vulnerability, non-residents’ purchases are limited to the longer end of the market – securities with a minimum maturity of three years – with a minimum holding period of one year. Foreign purchases of equities were also completely liberalized. Certain other controls on non-residents have remained in place, including notably the prohibition on investment in money market instruments with a maturity of less than three years. Capital inflows responded rapidly to this liberalization; non-residents bought domestic government securities worth 3 percent of GDP by the end of 2007—and more than 2 percent of GDP in second quarter of 2007 alone (Figure 3). As hoped, foreign investors have strengthened the long end of the market for government debt considerably; in just one year,

the average maturity increased by more than 6 months to 2.1 years. The strategy has also influenced the composition of the types of inflows. As mentioned above, portfolio inflows have played a larger role than private debt in Ghana, especially compared to many peers in the region, with implications for vulnerability.

#### **D. Managing vulnerabilities linked to capital account liberalization**

##### **11. While beneficial in many ways, continued success in attracting capital inflows could pose significant challenges for managing vulnerability.**

- **Despite clear progress, the underdevelopment of certain parts of the financial sector may leave Ghana vulnerable.** In particular, a sudden reversal of capital flows might prove disruptive to domestic government debt markets, given their limited depth and liquidity relative to inflows. The restrictions on the resale and maturities of foreign-owned securities are intended to mitigate the risk of a reversal and have some justification in an initial stage for a small, open economy like Ghana's. However, their effectiveness remains unclear, especially without a real-world test. Experience elsewhere has shown that while capital controls may work in the short-run, foreign investors can and do find ways to circumvent capital controls over time (IMF 2008). Moreover, a rising proportion of the government securities will become eligible for resale (having been held for over a year). The introduction of new market instruments for hedging and managing risks might lessen incentives for sudden flight from domestic markets.
- **Managing large capital inflows will require better monitoring and data.** Current reporting does not permit a close monitoring of the types of inflows.
- **Despite recently liberalizing inflows to equities as well as government debt, inflows appear concentrated in the latter, which may increase vulnerability.** The shift in inflows toward government debt can be inferred from the massive non-resident purchase of government securities in 2007. Equity investments are non-debt creating (reducing vulnerability), can help transfer managerial and technological know how, and—most importantly—support the government's private sector-led growth strategy. The larger, more strategic equity stakes (i.e., with either a managerial role or control) that were liberalized in 2006 have the broadest benefits. Countries with large and liquid equity markets also tend to experience sudden reversals less often (IMF GFSR 2007). The Ghana Stock Exchange has low liquidity and depth, even compared to regional peers; one company, Ashanti Gold accounts for much of the capitalization and turnover (Yartey 2002).
- **The easier access to capital following liberalization also highlights the challenge of the sustainability of external and public debt.** While gross debt fell to 42 percent of GDP in 2006, it rose again to near 50 percent at the end of 2007. Moreover, the proportion of non-concessional debt has risen to 40 percent. If not corrected, these

trends would significantly weaken debt dynamics. Also, given the falling concessionality and rising complexity of Ghana's debt, it is important to continue to build debt management capacity, for which the authorities are receiving technical assistance, from the Fund and others. The entry of foreign investors into domestic debt markets may temporarily relax constraints on the supply of credit to the government, weakening market-imposed discipline (i.e., lessening rises in interest rates due to growing domestic debt). However, over the medium-term, they tend to be more sensitive to concerns about debt dynamics than domestic investors, placing a premium on maintaining robust sustainability.

- **The macroeconomic policy framework and credible policies are an important factor in managing the risks of rapid capital inflows and possible reversals** (IMF WEO 2007). As Ghana embarked in its latest liberalization, it benefited from a far better macroeconomic position following the stabilization program and debt relief. However, since mid-2006, the fiscal policy stance has become more expansionary, pushing public debt up and increasing risk factors for capital flow volatility. The fiscal and current account deficits have grown markedly. These deficits have caused the exchange rate to depreciate in real effective terms – atypically for a country experiencing an increase in inflows after liberalization. In addition, international reserves are low, at less than 3 months of import coverage. In other countries, this policy stance has often been associated with increased vulnerability to a sudden reversal of capital flows.

12. **Accordingly, the main immediate challenge for Ghana to manage vulnerability is to strengthen its macroeconomic policy framework.** Over the medium-term, strengthening the fiscal policy anchor through a fiscal responsibility law would bolster investor confidence and reduce the risks of volatile flows. In particular, the previous domestic debt anchor should be expanded to total debt and integrated into the fiscal responsibility law the Ghanaian authorities are drafting.

#### **E. Assessment of the risks and benefits of capital account liberalization to date**

13. **The Ghanaian authorities have partially liberalized the capital account as well-integrated part of their strategy to boost investment, growth and poverty reduction.** Despite continued limitations on capital account transactions, the liberalization has already succeeded in increasing capital inflows, as well as influencing their composition in some (but not all) desirable directions. Appropriate sequencing and a gradual approach in the context of a medium-term policy package have successfully laid the groundwork.

14. **So far, this approach seems to have achieved a reasonable balance between increasing capital flows and minimizing vulnerabilities.** Ghana has increased private capital flows from an average of 1 percent of GDP in 2000-03 to 6 percent in 2004-2007. As explained in Box 2 of the staff report, the composition of inflows has limited the increase in vulnerability. In particular, more volatile portfolio flows still account for only a small

proportion of the large increase in capital flows that has financed Ghana's widening current account deficit; official lending, FDI and a sovereign bond account for most of the increase. Portfolio investment does account for a large part of private inflows compared to many regional peers however, and it appears concentrated in government securities.

15. **Nevertheless, the authorities should consider further actions to reduce vulnerability to a sudden reversal of capital flows, in addition to limitations on capital account liberalization.** Capital controls, such as minimum maturity and holding periods, are reasonable responses for Ghana to the risks of sudden swings in capital flows, at least initially, but elsewhere their effectiveness has decreased over time. Most importantly, the current macroeconomic policy stance will likely increase vulnerability, and it should be strengthened for this and other reasons. Further financial sector development would also help reduce risks, particularly in the equity, secondary government debt and foreign exchange markets. In many ways, these reforms can advance together, as seen in the successful effort to use foreign investment to extend the yield curve for government debt. Once balances have been improved and financial markets have advanced further, the authorities should consider further gradual capital account liberalization by progressively removing capital controls.

16. **Capital account liberalization and the resulting inflows hold promise for contributing to Ghana's development but place an even greater premium on a consistently robustly sustainable policy mix.** To this end, policy priorities in the future could focus on the following:

- Undertake fiscal consolidation to maintain investor confidence in the government's macroeconomic policies—the key factor in avoiding reversal of capital inflows.
- Work to attract more foreign investors to the Ghana Stock Exchange. Developing its liquidity, diversity and depth should have priority. Fortunately, based on experience elsewhere, Ghana's impressive progress in improving its business environment should support these efforts over time (Yartey 2002).
- Enhance data on capital inflows, especially portfolio flows, through regular surveys.
- Continue to build debt management capacity.

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