November 2010
IMF Country Report No. 10/337

United Kingdom: Selected Issues Paper

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

UNITED KINGDOM

Selected Issues

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Approved by European Department

October 25, 2010

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I. ESTIMATING THE UK'S OUTPUT GAP[1]

This chapter estimates the extent of spare capacity in the UK economy using a range of methodologies. Although results vary, all standard filter and model-based approaches point to a sizeable output gap. Survey-based evidence, however, suggests more limited slack.

A. Introduction

1. **The financial crisis has made it more challenging to estimate the size of the output gap**.[2] Even when there is no major structural break in the economy, estimation of the output gap involves some margin of error due to measurement issues and difficulty in identifying temporary demand factors. However, the uncertainty today is particularly large because the lasting effect of the financial crisis on each component of potential output—labor, capital, and the total factor productivity (TFP) residual—is very difficult to quantify.

2. **With this heightened uncertainty, reviewing a range of output gap estimates based on different approaches can help inform macroeconomic policy**. Estimates based on different approaches might point to a similar view of the gap, at least qualitatively. In this case, macroeconomic policies could more confidently be based on this view. If instead different approaches point to divergent assessments, a risk management approach could be given greater emphasis, with attention paid not just to the central forecast, but also to the error band around it.

3. **This annex examines three estimates of the UK's output gap based on the following approaches**:

- a univariate Hodrick-Prescott (HP) filter;
- a multivariate filter based on an unobserved component model; and
- a production function approach.

Each of these approaches is prone to certain biases at times of large structural changes because they all rely on historical patterns of observable variables. The nature of such biases is discussed below.

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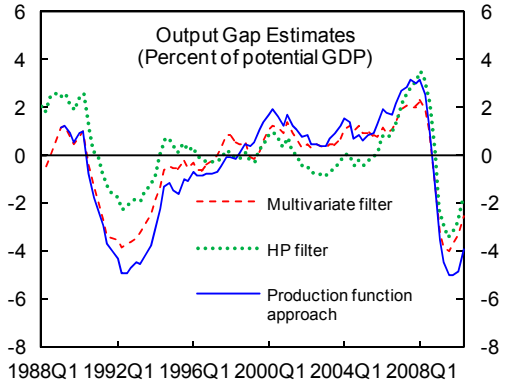
[1] Prepared by Hajime Takizawa and André Meier (EUR).

[2] In this chapter, the output gap is defined as the extent to which actual output *exceeds* potential output. If actual output is below the potential, the gap is negative; and the more spare capacity there is in the economy, the *smaller* is the numerical value of the output gap. However, because this chapter mainly discusses negative output gaps, it is convenient to refer to situations of more spare capacity as *larger* output gaps (in absolute terms).

4. **Output gap estimates vary across the three approaches, but each methodology suggests significant spare capacity**. Specifically, the estimated output gaps range from minus 1.8 percent to minus 3.9 percent as of the second quarter of 2010 (see text chart).



Sources: IMF staff estimates.

5. **As a check on these estimates, the chapter also examines survey-based information on spare capacity**. Although survey responses cannot be mapped straight-forwardly into output gap estimates, the relevant time series are significantly correlated. As such, firms' own assessment of spare capacity would have provided useful guidance to policymakers in the past. Results from the most recent business surveys, in turn, point to continued slack, albeit to a more limited extent than standard output gap estimation suggests.

B. HP Filter Approach

6. **The HP filter has been widely used to derive approximations for potential output**. This approach assumes that, because of self-equilibrating forces, actual output fluctuates around potential output over time. In particular, the filter fits a trend output line that minimizes a weighted average of (i) the difference between actual and trend output and (ii) the rate of change in trend output itself. More specifically, potential output, $\overline{Y}_t$, is determined by minimizing the following object (Y_t is actual output):

$$\sum_t \left\{ \left(Y_t - \overline{Y}_t\right)^2 + \lambda \left(\Delta\Delta \overline{Y}_t\right)^2 \right\}$$

where λ denotes a smoothing parameter.

7. **The method is subject to several shortcomings**. Lacking a close link to economic theory, the HP filter abstracts from any potentially relevant economic information other than the output series itself. As a purely statistical tool, which smoothes actual GDP to estimate potential, it may also be slow in "discovering" structural breaks. This entails the risk that the HP filter could *overestimate* potential GDP if the sample period ends with a sudden and large loss of output, as occurred during the recent financial crisis. More generally, estimates are prone to revision as new GDP data become available, with revisions for the most recent quarters tending to be particularly large (the "end-point problem"). These problems can be

mitigated by including forecasts in the sample under study, though this potentially makes results sensitive to the forecast assumptions.[3]

8. **The HP filter-based estimate points to a negative output gap of close to 2 percent**. To avoid the end-point problem mentioned above, the sample, which starts at Q1-1970, includes staff projections up to the fourth quarter of 2015.[4] The estimated gap, measured in percent of *potential* GDP, bottomed at minus 3.4 percent in Q3-2009 and stood at minus 1.8 percent as of Q2-2010. This is still considerable, but smaller (in absolute terms) than the output gap estimates obtained from the approaches discussed in the following two sections.

C. Multivariate Filter Model[5]

9. **A multivariate filter is a reduced-form approach based on an operational definition of potential output**. It estimates the output gap based on estimated relationships between the *unobservable* output gap and other relevant macroeconomic variables, including *unobservable* equilibrium values of these variables. In particular, the model builds on an operational definition of potential output as the path of output that may be sustained without causing inflation to change. This definition is combined with other identifying constraints (based on relationships between the output gap and other economic variables) to form a small macroeconomic model. The model is in a reduced form in the sense that underlying structural (i.e., behavioral) relationships themselves are not identified. The model is estimated using a Kalman filter.

10. **Output gap dynamics in the model are assumed to be influenced by monetary policy**. One of the key channels through which monetary policy exerts its influence on inflation is via aggregate demand and hence the output gap. It is therefore natural to link the output gap to the deviation of actual inflation from the long-term inflation target:

$$y_t = \rho_1 y_{t-1} - \rho_2(\pi 4_{t-1} - \pi 4_{t-1}^{LTE}) + \varepsilon_t^y$$

where $\pi 4$ denotes core inflation, $\pi 4_t^{LTE}$ is the perceived long-term inflation target, and y_t is the output gap, defined as follows:

$$y_t = 100 * LOG\left(Y_t / \overline{Y}_t\right)$$

[3] HP filter-based estimates are also sensitive to the value of the smoothing parameter, λ. It is standard practice in the literature to set λ equal to 1,600 for quarterly data. The estimation in this chapter follows this practice.

[4] Varying the forecasts within a reasonable range does not materially change the results. For example, using the OBR's growth projections as reported in the June 2010 budget yields the same Q2-2010 output gap as the estimation based on staff projections.

[5] The model is based on J. Benes et al. (2009), "The Global Financial Crisis and its Implications for Potential Output," IMF, mimeo.

The term ε_t captures other factors driving the output gap, such as demand shocks. The output gap equation above is a reduced-form representation that could be derived from a range of different micro foundations, notably a combination of a standard *IS* curve and a *Taylor* rule.

11. **The model also includes three empirical relationships that are key to identifying the output gap**. The first key relationship is represented by an inflation equation (or *Phillips Curve*). A higher output gap leads to an increase in the inflation rate, as summarized by the following equation:

$$\pi 4_t = \pi 4_{t-1} + \beta y_t + \Omega(y_t - y_{t-1}) + \varepsilon_t^{\pi 4}$$

Note that in addition to the level of the output gap, the equation also includes the *change* in the output gap as a determinant of current inflation. The idea is to allow for certain rigidities in the adjustment process. Specifically, the term $(\boldsymbol{y_t - y_{t-1}})$ is positive when the economy is coming out of a recession; at this point, the mere closing of the output gap might create some inflationary pressure if the available supply capacity cannot be brought on stream instantaneously, for example, due to labor market frictions. The second key relationship is between the output gap and unemployment (*Okun's Law*):

$$\mathbf{u_t = \phi_1 u_{t-1} + \phi_2 y_t + \varepsilon_t^u}$$

where u_t denotes the unemployment gap, defined as the difference between the NAIRU ($\overline{U}_t$) and the actual unemployment rate (U_t):

$$u_t = \overline{U}_t - U_t$$

The third key relationship is between the capacity utilization gap and the output gap, defined in a similar way as Okun's law:

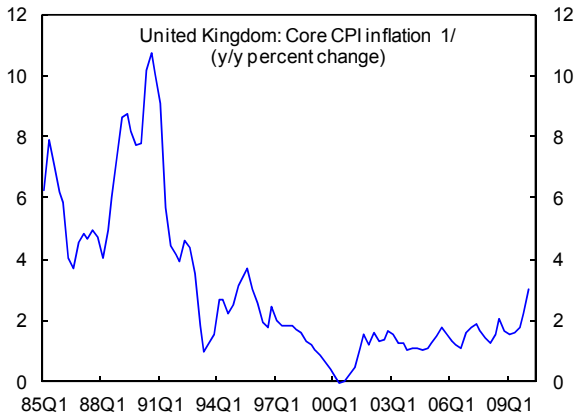
$$c_t = \kappa_1 c_{t-1} + \kappa_2 y_t + \varepsilon_t^c$$

where c_t denotes the capacity utilization gap, defined as the difference between the actual manufacturing capacity utilization rate (C_t) and its equilibrium level ($\overline{C}_t$):

$$c_t = C_t - \overline{C}_t$$

12. **These four equations are combined with laws of motion for equilibrium variables and estimated using a Kalman filter**. To close the model, it is necessary to define laws of motion for the remaining equilibrium variables, i.e., the NAIRU, potential output, the equilibrium capacity utilization rate, and the perceived long-term inflation target. Appendix I discusses the relevant assumptions. Data sources are reported in Appendix II.

13. **The estimated model points to a negative output gap that is larger than the HP filter-based estimate**. The model is estimated for a sample period from Q2-1988 through Q2-2010.[6] The gap is estimated to have bottomed at minus 4 percent in Q3-2009 and to have equaled minus 2.6 percent as of Q2-2010. A key driver of these results is the recent behavior of inflation. Unlike during the previous recession in the early 1990s, when inflation decelerated sharply, UK inflation has remained somewhat more elevated during the recent downturn (text chart). To the extent that this reflects one-off price level shocks such as the increase in the VAT rate in January 2010, current inflation rates overstate the strength of underlying price pressures. Correspondingly, the estimated output gap is likely to be underestimated (in absolute terms). However, adjusting for the estimated effect of the VAT change had no more than a negligible impact on the size of the estimated gaps.



Souces: Haver, OECD, and IMF staff calculation.

1/ CPI excluding food and energy.

D. Growth Accounting Approach

14. The **growth accounting approach** estimates potential output (and thus the output gap) using an assumed aggregate production function and estimates for potential employment, potential capital, and total factor productivity (TFP).

15. **The first step of this approach in its simplest form is to derive TFP**. TFP is calculated as a residual determinant of output that is not explained by labor and capital. In particular, the following two-factor Cobb-Douglas production function is fitted to measures of the capital stock and the labor input:

$$\ln(Y) = \alpha \cdot \ln(P \cdot PR \cdot (1-u) \cdot H) + (1-\alpha) \cdot \ln(K) + \varepsilon$$

where Y is output, P is the working age population, PR is the labor participation rate, u is the unemployment rate, H is the number of hours worked per worker, K is the capital stock, and α is the average labor share for the sample period. TFP, denoted by ε, is derived as the residual of this equation.

16. **However, the estimated TFP series is polluted by changes in the intensity of capital utilization**. It is well known that fluctuations in TFP, as measured by the method above, account for a considerable part of output fluctuation over the business cycle. The

[6] Data availability limits the sample length.

upper panel of Figure 1 confirms this result for the sample under study. Such a finding is not surprising because the estimation relies on the total capital stock, not the flow of services actually provided by the stock at any point in time. In reality, however, capacity utilization varies considerably over the business cycle (Figure 1, lower panel). Any changes in the flow of capital services due to changes in demand conditions are thus captured by the TFP residual.

17. **The second step, therefore, involves deriving trend TFP by smoothing the TFP time series**. While measured TFP tends to be volatile, in part reflecting fluctuations in the capacity utilization rate, it usually shows a clear trend behavior that can be readily extracted using a simple HP filter or a regression of measured TFP on a time trend. This estimated TFP trend smoothes away cyclical fluctuations in capacity utilization and can therefore be plugged into the production function to estimate a series for potential output (see below).

18. **However, deriving trend TFP by simply smoothing residuals could be problematic under current circumstances because the UK's productivity could have been adversely affected by the crisis**. Estimated TFP for recent periods reflects *both* the effect of a sharp cyclical downturn *and* any permanent loss of productivity. It is therefore difficult to tell how much of the recent decline in TFP represents lasting damage from the financial crisis. Simply smoothing the estimated TFP by an HP filter could be misleading, for reasons already discussed in Section B above. To separate the permanent loss from purely cyclical factors, it is better to control directly for the effect of varying capacity utilization.

19. **This chapter thus modifies the original production function equation to purge the influence of changes in the capacity utilization rate from TFP**. In particular, the following equation is fitted to the data to derive capacity utilization rate-adjusted TFP (adjusted TFP):

$$\ln(Y) = \alpha \cdot \ln(P \cdot PR \cdot (1-u) \cdot H) + (1-\alpha) \cdot \ln(cu \cdot K) + \tilde{\varepsilon}$$

where cu is the capacity utilization rate and $\tilde{\varepsilon}$ is adjusted TFP.

20. **Adjusted TFP looks more stable than TFP but still shows a marked decline after peaking in the third quarter of 2007**. The text chart shows TFP and adjusted TFP derived from fitting the two equations above. Since fluctuations of both labor inputs and capacity utilization rates have been controlled for in the adjusted TFP series, the decline likely reflects factors whose effects are lasting even when adjusted TFP resumes its trend

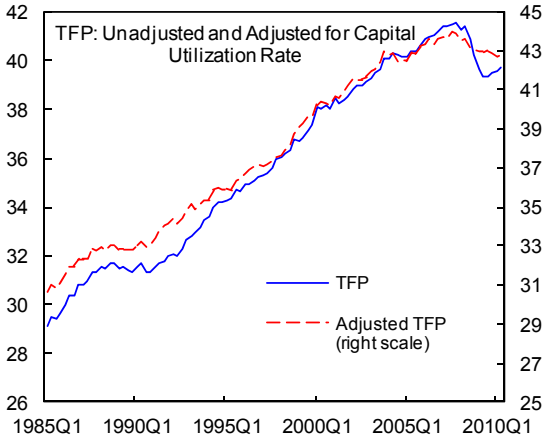
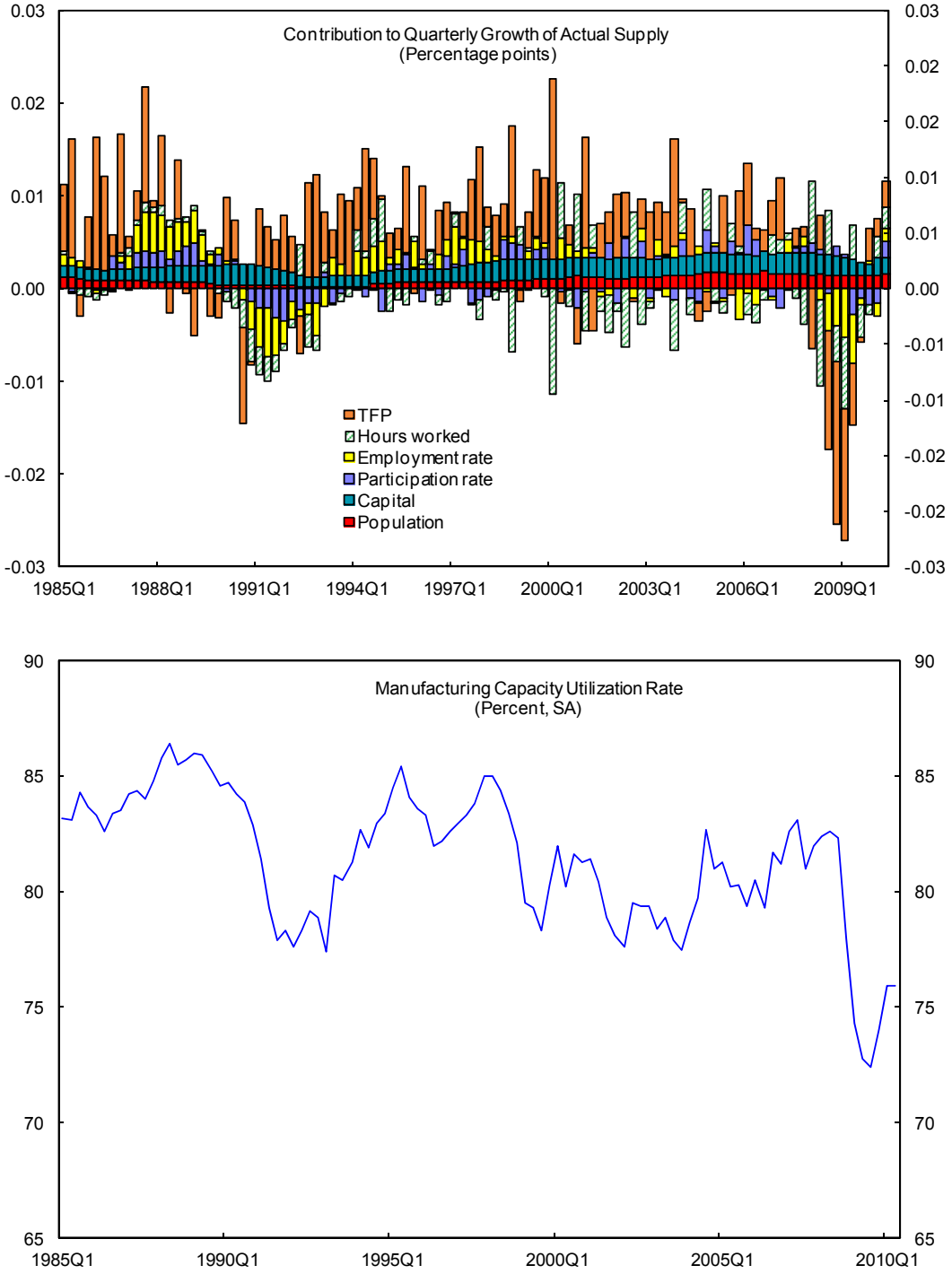


Figure 1. United Kingdom: Growth Accounting and Capacity Utilization, 1985-2010



Sources: Haver; and IMF staff calculation.

growth. These factors could include, among others, a higher cost of capital due to elevated risk premia, and a permanent shift of demand away from sectors that enjoyed high productivity growth, such as financial services.

21. **The final step of estimating potential output and the output gap involves taking cyclical factors out of adjusted TFP and factor inputs**. For the equilibrium *unemployment rate* and *capacity utilization rate*, estimates from the reduced-form unobserved component model in the previous section are used, as this approach is less prone to the "end-point problem" than simpler filtering methods. Equilibrium values of the other variables are derived through filtering techniques, with a few modifications (Figure 2):

- Before showing a characteristic decline during the recent recession, the *labor participation rate* had risen by 0.02 percentage point per quarter on average from Q4-1994 through Q1-2009. Accordingly, the equilibrium labor participation rate is derived by smoothing the raw series by an HP filter through Q1-2009 and assuming a 0.02 percentage point increase each quarter afterwards.

- *Hours worked per employee* have steadily declined over the past two decades. A simple HP-filtered series is used to determine equilibrium hours.

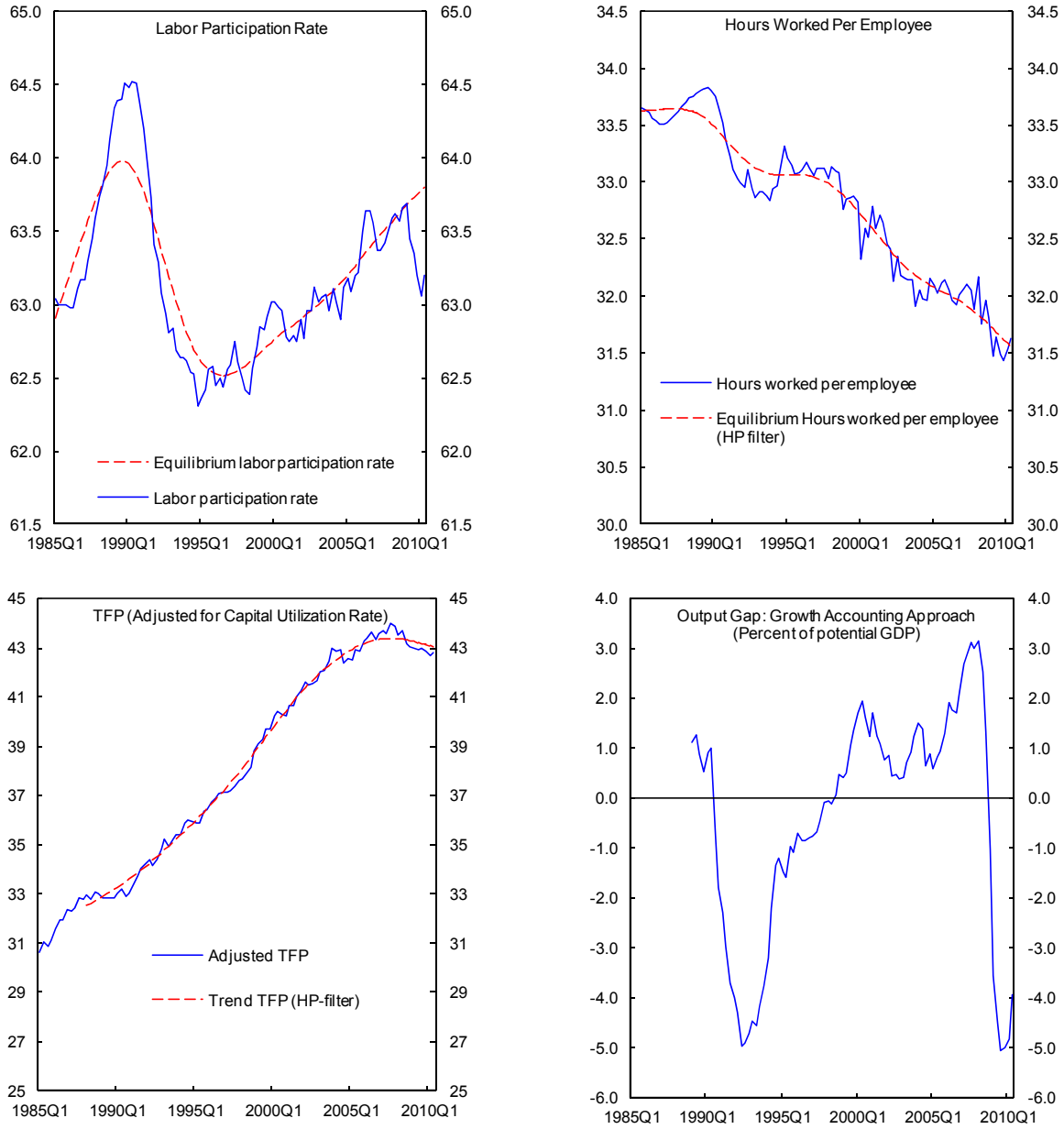
- By construction, *adjusted TFP* should not be affected by cyclical factors. A smoothed adjusted TFP series should be a good representation of trend TFP for potential output, and an HP-filtered series is used in this section.

22. **The resulting negative output gap estimate is larger than estimates based on the other approaches discussed above**. The gap is estimated to have bottomed at minus 5 percent in Q3-Q4 2009. Since then, it has recovered to minus 3.9 percent in Q2-2010. Moreover, this estimate is still smaller in absolute terms than the OECD's latest UK output gap estimate of minus 6.3 percent in Q2-2010, which uses a similar approach based on a production function but does not adjust for the capacity utilization rate.[7]

23. **Still, some caution is needed when interpreting results based on adjusted TFP**. For example, labor hoarding, which is suspected as one reason for the surprisingly modest increase in the unemployment rate despite the sharp economic downturn, would cause adjusted TFP to be underestimated. Correspondingly, potential output and the size of the (negative) output gap would also be underestimated. Another source of bias is the manufacturing sector capacity utilization rate. If the capacity utilization rate of the non-manufacturing sector is less volatile than that of the manufacturing sector—for example, the retail sector might find it more difficult to adjust store hours when demand declines—

[7] The OECD estimates the NAIRU by applying a Kalman filter to a Phillips curve that relates inflation to an unobserved unemployment gap.

Figure 2. United Kingdom: Equilibrium Aggregate Inputs and Output Gap, 1985-2010



Sources:Haver; and IMF staff calculation.

adjusted TFP would be overestimated. HP-filtered series would thus overestimate trend TFP, possibly resulting in overestimation of the size of the output gap.

E. Survey-based Measures of Spare Capacity

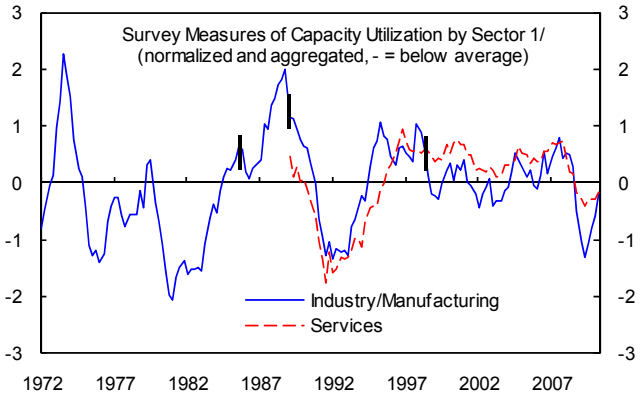
24. **Additional evidence on the output gap comes from survey-based measures of spare capacity**. Each of the methodologies discussed so far relies on a specific economic or statistical model of potential output and hence spare capacity. The results from these approaches can be usefully compared to another more direct source of evidence on spare capacity, namely from company surveys. For the UK, there exist a number of such surveys, conducted by the Bank of England's regional agents, the British Chambers of Commerce, the Confederation of British Industry, and Eurostat, respectively. Despite some variation in scope and design, these surveys all contain specific questions on whether or not companies have free capacity to expand production of their goods or services. In addition, some surveys include questions on whether or not companies are facing difficulty recruiting staff.[8]

25. **To facilitate a quantitative interpretation, we normalize the time series data for each relevant survey response**. In a first step, the time series are transformed so as to have a zero mean and unit standard deviation over the period in which the respective survey has been available. However, these periods are sometimes relatively short. As a result, the survey data may not cover a full economic cycle, in which case the within-sample mean and standard deviation provide a distorted picture of their likely long-run values. To give a concrete example, the mean capacity utilization rate over the period 1998Q1–2006Q4 is likely to overstate the long-run mean, given that the period did not include a single UK recession. For this reason, we conduct a second transformation, by recalibrating the normalized responses so as to ensure a zero mean over a full cycle (defined as a period over which historical OECD output gap data average to zero) and a unit standard deviation over the longest available period up to the eve of the recent financial crisis, i.e., 1971Q4–2006Q4. The recalibrated responses are subsequently averaged first within, and then across, survey provider categories.

26. **The resulting data point to a limited, and diminishing, margin of spare capacity**. In line with economic intuition and the findings of previous sections, the recession of 2008–09 initially led companies to report resource slack, especially in the manufacturing sector. However, the extent of spare capacity at the cyclical trough in early 2009 appears more limited than might have been expected. Moreover, capacity utilization appears to have steadily increased since, leaving only a moderate margin of spare capacity as of 2010Q2.

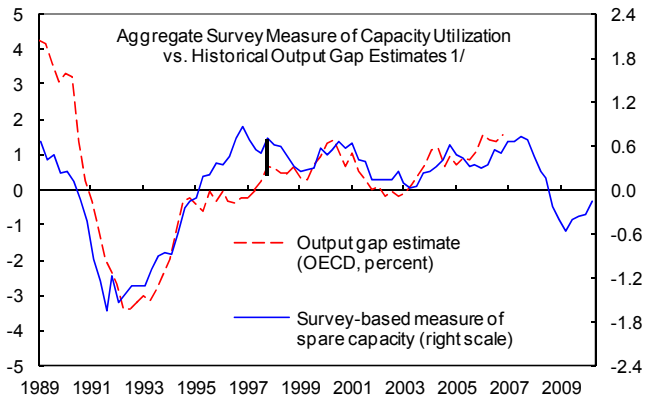
[8] See Figure 11 in *United Kingdom--Staff Report for the 2010 Article IV Consultation* for an overview of a few key surveys.

27. **To be sure, some caution is warranted in interpreting this finding, given the nature of the underlying data**. First, the relevant surveys capture significant parts of the UK economy, but not all of it—the construction sector is a notable exception. Second, as with all surveys there is some uncertainty over how exactly participants understand a particular question. In the case of questions about spare capacity, for instance, it is unclear how companies take into account temporarily idle resources, such as a mothballed assembly line or staff on part-time work. Third, the relationship between survey responses and average spare capacity across firms could be nonlinear, as surveys typically reveal the share of companies reporting spare capacity, but not the extent of such capacity. Lastly, capacity-related survey questions capture only the scope for expanding production for a given set of production factors. Yet, idle resources are likely to exist outside of firms as well, for instance in the form of unused real estate. Similarly, questions about recruitment difficulties may only give a rough sense of spare capacity in the labor market.



Sources: Haver; and IMF staff calculations.
1/ Based on a range of survey indicators (provided by Bank of England, British Chambers of Commerce, Confederation of British Industry, and Eurostat, respectively) for capacity constraints and recruitment difficulties; normalized to average zero over the cycle, with unit standard deviation. Vertical bars in chart mark structural breaks in series due to inclusion of new indicators.

28. **Despite these caveats, survey-based measures of spare capacity should not be discarded lightly, insofar as they exhibit a relatively close relationship with historical output gap data** (as reported in the OECD's Economic Outlook No. 87). Over the period 1989–2006, for example, our aggregate measure of survey-based spare capacity co-moves closely with ex-post data on the output gap: the contemporaneous correlation is 0.75; it rises to 0.80 at the first lag, 0.82 at the second, and 0.83 at the third lag, before declining again. This suggests that survey-based measures have some predictive power for the output gap. Such a finding should not be too surprising, given that some of the survey questions have a forward-looking component, notably by asking about capacity relative to production plans over the



Sources: Haver; OECD; and IMF staff calculations.
1/ Survey measures for industry/manufacturing and services as shown in previous chart; aggregated using sector weights in total value added. Vertical bar marks structural break in survey data series due to inclusion of new indicators.

following months. In addition, it is conceivable that over the course of the cycle, spare capacity first emerges and diminishes within firms, and only then in the economy as a whole, for instance because of lags in hiring and firing.

29. **If the historical relationship apparent from the above text chart is assumed to have persisted in recent years, the latest survey data suggest a rather small output gap, perhaps no greater than 1 percent of GDP in absolute terms by mid-2010**. This implication is undoubtedly surprising, given the sharp earlier fall in GDP along with a considerable drop in average labor productivity, which could naturally be interpreted as a sign of widespread labor hoarding (and hence spare capacity within firms). Taken at face value, the survey data thus send a cautionary message that the crisis may have caused greater-than-expected damage to the economy's supply, perhaps reinforced by the sharp curtailment of capital expenditure as firms strove to shore up cash flow.

F. Conclusion

30. **The empirical approaches considered in this chapter consistently point to a negative output gap, although they differ on the extent of economic slack**. The three standard methodologies at the center of our analysis unequivocally suggest that there continues to be significant slack in the UK economy. Specially, the output gap in Q2-2010 is estimated to have been within a range from minus 1.8 to minus 3.9 percent. The relative width of this range reflects the large uncertainty about the lasting effect of the financial crisis on potential output. Survey-based measures, in turn, also suggest continued economic slack, albeit to a more limited extent than the standard methodologies imply. Taken together, the available evidence supports the dominant view that economic activity currently falls short of potential. At the same time, the significant uncertainty around output gap estimates puts a premium on nimble monetary policy along with adequate contingency planning for scenarios in which inflation and growth outturns depart from baseline projections.

Appendix I. Details of the Multivariate Filter Model

As discussed in the text, laws of motion for unobservable equilibrium variables are needed to estimate the multivariate filter model using a Kalman filter. NAIRU, potential output, the equilibrium capacity utilization rate, and the perceived long-term inflation target are modeled as follows:

NAIRU

NAIRU is assumed to be subject to both transitory level shocks, $\varepsilon_t^{\overline{U}}$, and persistent shocks, $G_t^{\overline{U}}$, as modeled below:

$$\overline{U}_t = \overline{U}_{t-1} + G_t^{\overline{U}} - \omega \cdot y_t - \frac{\lambda}{100}\left(\overline{U}_{t-1} - U^{ss}\right) + \varepsilon_t^{\overline{U}}$$

where U^{ss} denotes the steady-state NAIRU. $G_t^{\overline{U}}$, in turn, follows an autoregressive process:

$$G_t^{\overline{U}} = (1-\alpha) \cdot G_{t-1}^{\overline{U}} + \varepsilon_t^{G^{\overline{U}}}$$

Potential output

Potential output depends on the trend growth rate of potential, $G_t^{\overline{Y}}$, and changes in NAIRU:

$$\overline{Y}_t = \overline{Y}_{t-1} - \theta\left(\overline{U}_t - \overline{U}_{t-1}\right) - \frac{(1-\theta)\left(\overline{U}_{t-1} - \overline{U}_{t-20}\right)}{19} + G_t^{\overline{Y}}$$

The second term represents the immediate impact of a change in NAIRU on potential output, while the third term captures a lagged effect that persists for another 19 quarters. Thus, the impact of a permanent one-percentage-point increase in NAIRU is an immediate decline in potential output by θ percent, followed by a cumulative additional decline in potential output by $(1-\theta)$ percent over the following 19 quarters. The total effect on potential output five years later is one percent.

One interpretation of this specification is to envisage a gradual change in the capital stock in response to a change in NAIRU within a simple Cobb-Douglas aggregate production function. Since the production technology remains the same, there should be no change in the equilibrium capital-labor ratio and labor productivity. An adjustment to the new equilibrium would, however, proceed gradually as capital adjusts to the change in NAIRU. Therefore, parameter theta can be interpreted as the elasticity of output with respect to labor, which will be equal to the labor share. The underlying trend growth, $G_t^{\overline{Y}}$, exhibits the following dynamics:

$$G_t^{\overline{Y}} = \tau \cdot G_{ss}^{\overline{Y}} + (1-\tau) G_{t-1}^{\overline{Y}} + \varepsilon_t^{G^{\overline{Y}}}$$

Equilibrium capacity utilization

Equilibrium capacity utilization, $\overline{C}_t$, is assumed to be subject to both transitory level shocks, $\varepsilon_t^{\overline{C}}$, and persistent shocks, $G_t^{\overline{C}}$, as follows:

$$\overline{C}_t = \overline{C}_{t-1} + G_t^{\overline{C}} - + \varepsilon_t^{\overline{C}}$$

where

$$G_t^{\overline{C}} = (1-\delta) G_{t-1}^{\overline{C}} + \varepsilon_t^{G^{\overline{C}}}$$

Perceived long-term inflation target[1]

$$\pi 4_t^{LTE} = \pi 4_{t-1}^{LTE} + \varepsilon_t^{\pi 4^{LTE}}$$

Appendix II. Data Sources

Data sources for the variables used in the multivariate filter model are as follows:

- **Real GDP, CPI, unemployment rate, labor participation rate, and labor force**: Office for National Statistics.
- **Core CPI**: For 1996 and subsequent years, CPI excluding food and energy from Office for National Statistics, seasonally adjusted by IMF staff. Prior to 1996, OECD estimates.
- **Capacity utilization rate**: Harmonized capacity utilization for manufacturing from the European Commission.
- **Perceived long-term inflation target**: Semiannual data on long-term inflation expectations by Consensus Forecast, spliced for a quarterly frequency by IMF staff.

Data sources for the growth accounting approach are as follows:

[1] This simple random-walk assumption is chosen for analytical convenience. However, it is relatively straightforward to consider the special case of credible inflation targeting, in which long-term inflation expectations are well-anchored around the central bank's inflation target. This case can be modeled by replacing the lagged term on the right hand side with the central bank's explicit inflation target. In the present case, results were found to be little changed when we imposed a stable inflation target of 2 percent. Specifically, the estimated output gap in Q2-2010 would be 2.2 percent instead of 2.6 percent as reported in the text.

- **Capital stock**: Annual data on production capital stock, defined as gross capital stock minus dwelling excluding land, spliced for a quarterly frequency by IMF staff.

- **Real GDP, labor force, number of unemployed and employed, population, and number of hours worked**: Office for National Statistics.

- **Capacity utilization rate**: Harmonized capacity utilization for manufacturing from the European Commission.

II. Inflation Dynamics during Episodes of Persistent Large Output Gaps[1]

This note documents the behavior of inflation during historical episodes of persistent large output gaps in advanced economies. Generally, such episodes brought about significant disinflation, although inflation tended to bottom out at low positive rates. Recent developments in advanced economies are consistent with the disinflationary effect of PLOGs.

1. Most advanced economies are projected to recover only slowly from the global financial crisis, with output remaining below potential for several years to come. This outlook has prompted concerns that inflation might undershoot official targets for an extended period. The assumed link between spare capacity and disinflation is familiar from traditional Phillips curve arguments, but has support in New Keynesian models as well.

2. However, not everyone agrees that excessively low inflation, or even deflation, is in store. Many official forecasts show inflation converging back to target rates well before output returns to potential; and some observers even view risks tilted to the upside, predicting an inflationary sequel to the financial crisis. What's more, the apparent disagreement relates not only, or even primarily, to the current cyclical outlook—most observers agree that there is sizeable slack—but to *the moderating impact such slack will have on inflation*, relative to other factors.

3. The standard way of analyzing this issue is to estimate the slope of the Phillips curve, often in a single-equation approach using instrumental-variable methods. Yet, these efforts are fraught with many difficulties, notably the scarcity of time series data for inflation expectations, weak instrument problems, and the complications arising from nonlinearities, nontrivial lag structures, drift in mean inflation, and nuisance factors (like exchange rate or oil price shocks).

A. Tracing Inflation Dynamics During PLOG Episodes

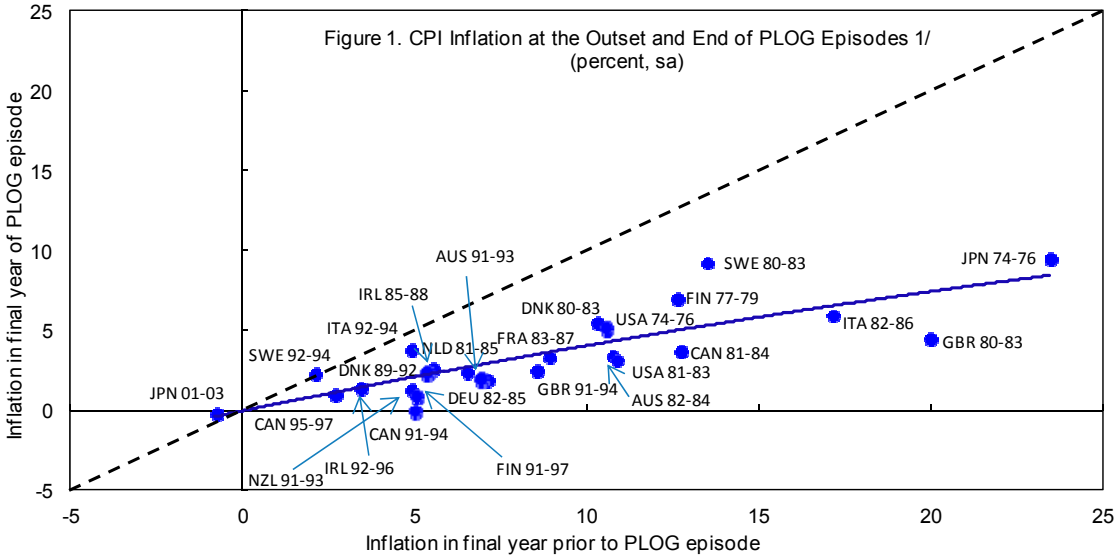
4. In a recent IMF Working Paper, we sidestep such estimation issues by focusing on a simpler event study approach. Specifically, we trace inflation dynamics during historical episodes in advanced economies where output remained significantly (at least 1.5 percent) below potential for more than eight consecutive quarters. In so doing, we limit attention to a segment of the Phillips curve that seems particularly relevant today, i.e., situations of protracted economic slack. It is clear that stylized facts documented for the past can only be a rough guide to the present, but as our sample includes a total of 25 episodes in 14 countries from the last 40 years, it provides a broad perspective on inflation outcomes during episodes of persistent large output gaps (PLOGs).

[1] Prepared by André Meier (EUR).

B. Main Results

5. A few key findings stand out:

- There is a clear and pervasive pattern of disinflation during historical PLOG episodes. Moreover, in the two atypical cases where inflation failed to decline, the observed increase was negligible and occurred from exceptionally low initial rates of inflation.



1/ Episodes of persistent large output gaps as listed in Table 2 of IMF Working Paper 2010/189.

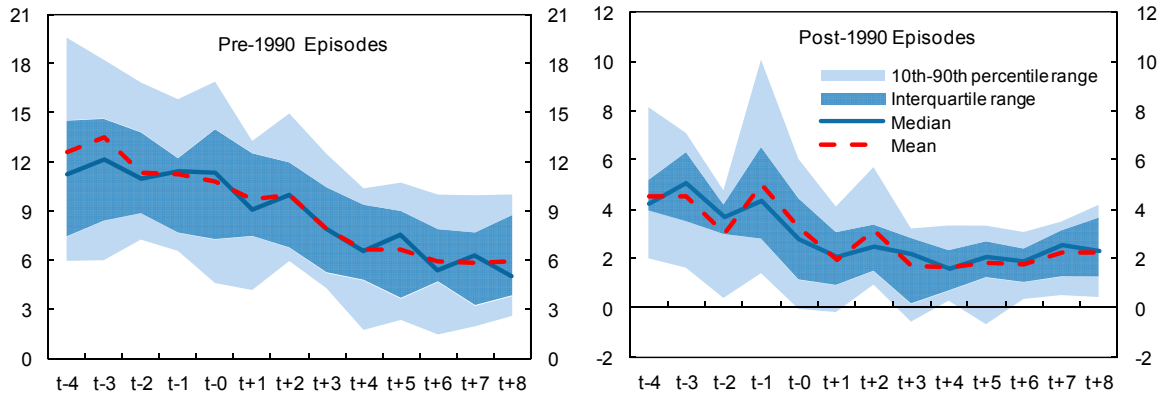
- The disinflationary dynamics appear to be supported by weak labor markets, with high and/or rising unemployment, and falling nominal wage growth and real unit labor cost. This pattern points to the expected link between spare capacity and diminished cost pressures facing firms. In several cases, falling oil prices further helped the decline in inflation. Nominal exchange rates, in turn, show no uniform trend during PLOG episodes, but appreciating currencies are systematically associated with faster disinflation in the cross section.

- Overall, the relationship between initial and final inflation rates seems roughly proportional, suggesting that countries with high initial rates of inflation experience greater disinflation in absolute, but not relative terms. This result remains intact if we control for the different length of individual episodes, by considering annualized changes in inflation rates.

- That said, the dynamics differ somewhat across time periods. In pre-1990 episodes (marked by relatively high initial inflation), disinflation tended to proceed rather steadily throughout the episode. The more recent (low-inflation) episodes, by contrast, featured most of the disinflation early on, followed by a timelier bottoming-out. Indeed, inflation generally stopped falling, and instead stabilized or even

increased, once it had reached a low positive rate. Although some of this pattern could be a statistical artifact related to temporary inflation shocks, the strong clustering of such observations in post-1990 episodes points to more fundamental reasons.

Figure 2. Quarterly CPI Inflation during PLOG Episodes by Time Period 1/
(percent, saar)



1/ X-axis denotes quarters, with t-0 the first quarter of each episode.

C. Why Might Disinflation Peter Out at Low Positive Rates of Inflation?

Two explanations, in particular, come to mind.

6. First, the literature has emphasized the enhanced credibility of central banks in preserving price stability in recent years. Such credibility would be apparent not only in low average rates of inflation, but also in a strong anchoring of inflation expectations. If price-setters trust the central bank's commitment, they have less reason to respond to short-term variation in marginal cost, and a weaker relationship between output gaps and inflation may ensue. This argument accords with the notion of a "flattening Phillips curve," which some authors have documented.[2]

7. Second, already-low inflation might inhibit further disinflation because of downward nominal rigidities, which appear to be common in wage-setting; see Akerlof et al. (1996) and Benigno and Ricci (2010). This explanation would also account for the scarcity of outright deflation in our sample. Given the resistance to nominal cuts, it may take truly exceptional circumstances (perhaps epitomized by Japan's experience during the last two decades) to create negative wage and price dynamics.

[2] See, for instance, Kleibergen and Mavroeidis (2008). By contrast, Nason and Smith (2008) find no evidence for a parameter change. Our own study also shows similar overall disinflation *in relative terms* during pre-1990 and post-1990 PLOG episodes.

Implications for the current inflation outlook…

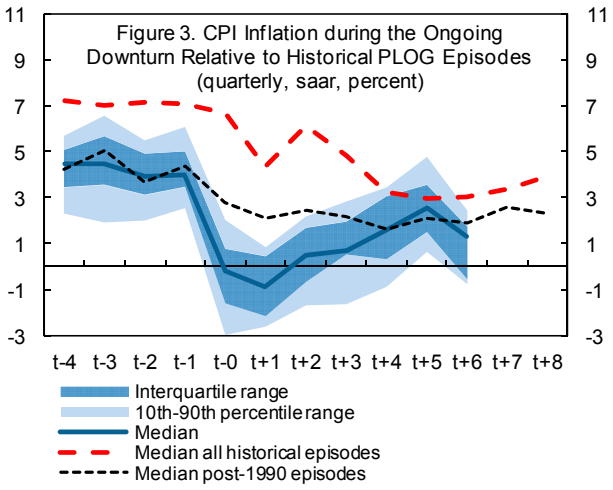
8. Taken together, the historical evidence points to a clear disinflationary effect from persistent large output gaps, at least until inflation has declined to very low positive rates. For countries currently facing protracted economic slack, this would suggest limited upside inflation risk. Yet, such an inference must obviously be taken with a bit of caution, mainly for two reasons:

- Historical experience, especially from the 1970s, shows that real-time assessments of spare capacity may be subject to large ex-post revisions. Similarly, economists might be overestimating the extent of slack in advanced economies today. Countering this concern is the profession's awareness of the lessons from the 1970s. Indeed, most economists already factor in that the global financial crisis has not only depressed demand, but also curtailed supply capacity.

- Time-invariant relationships are scarce in macroeconomics, and even patterns reliably documented for the past might not persist under today's particular circumstances. One often-cited argument relates to the exceptionally aggressive policy response to the recent crisis. Indeed, with policy rates (essentially) at zero, several central banks have resorted to money-financed bond purchases. Although there is no obvious, let alone mechanical, link from these unconventional policies to high inflation, they might conceivably interact with fears about high public debt to undermine trust in the currency. Yet, policymakers are well aware of this tail risk and, in many cases, have already laid out concrete consolidation plans to ensure fiscal sustainability. As a result, fiscal policy is likely to support, rather than counteract, disinflation over the coming period. Meanwhile, inflation expectations have shown no signs of being unhinged by quantitative easing.

…and a look at recent data

9. With these aspects in mind, it is instructive to consider actual inflation trends during recent quarters. Using the same definition as for our historical sample, we identify 15 ongoing PLOG episodes in advanced economies. Relative to the historical patterns, the decline in output is unusually large this time, although labor markets have held up better in relative terms. In fact, widespread labor hoarding appears to have driven up average unit labor cost in many countries, even as nominal wage growth



has eased. Another striking feature is the rollercoaster ride of oil (and other commodity) prices, which first fell precipitously but subsequently recovered some of the lost ground. While these swings had a considerable impact on headline inflation, a general downward trend is nonetheless apparent. And once food and energy prices are stripped out from the CPI, the pace of disinflation actually looks very similar to the historical precedent: median inflation has eased by about 20 percent of the initial inflation rate *p.a.* so far—about the same rate as in earlier PLOG episodes.

D. Conclusion

10. Historical episodes of persistent large output gaps in advanced economies show a clear pattern of disinflation, supported by weak labor markets and, in many cases, falling oil prices. The most recent experience since the beginning of the financial crisis is consistent with this pattern. Indeed, inflation in many advanced countries has now declined to the very low rates at which disinflation typically petered out during past PLOG episodes, probably reflecting well-anchored inflation expectations and downward nominal rigidities. Thus, while upside inflation risks should be limited in countries facing continued economic slack, a slide into outright deflation should not be taken for granted either.

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III. LESSONS FROM LARGE FISCAL ADJUSTMENTS[1]

This chapter examines the international experience of large fiscal adjustments to identify the components of successful fiscal consolidations. The chapter is largely atheoretical in that it focuses on examining associations rather than attempting to establish causality. Nonetheless, some clear patterns emerge from the evidence: frontloaded and expenditure-based adjustments, particularly those focused on reducing transfers and public wages, are associated with longer-lasting budgetary improvements. In contrast, very large fiscal efforts do not necessarily guarantee success if these come too late. The evidence on the usefulness of fiscal rules in supporting fiscal consolidation is generally positive, though rules appear to be neither a necessary nor a sufficient condition for success.

A. Introduction

1. **The large deterioration of fiscal positions as a result of the global financial crisis will require a major and sustained fiscal adjustment in most advanced economies**. Under current growth projections, the average debt ratio in advanced economies is estimated to increase to about 110 percent of GDP by end-2014, from 75 percent of GDP at end-2007. This would require an average improvement in the structural primary balance of 8¾ percentage points of GDP during 2011–20 in order to achieve a debt ratio target of 60 percent by 2030.[2]

2. **The scale of the fiscal challenge is especially large in the case of the UK**. The fiscal deficit is expected to remain close to 10 percent of GDP in 2010. The UK will spend more on debt service relative to revenue this year than any other AAA-rated economy, except the US. And gross debt is expected to increase by about 32 percentage points of GDP between 2007 and 2010, the second largest increase among advanced economies (Table 1).

3. **This chapter draws on the international experience of large fiscal adjustments to identify the components of successful fiscal consolidations**. A successful consolidation is one that brings about a sustainable reduction in debt and is not accompanied by large output contractions or high unemployment. More than twenty advanced economies have undergone large adjustments (defined as reductions in the structural primary balance of more than 5 percentage points of GDP) since 1975 (Table 2).[3] The analysis of the composition, speed, intensity, and determinants of these adjustments may hold lessons for the UK and other advanced economies in the challenging period ahead. The role that fiscal rules played during these adjustment episodes is also assessed.

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[1] Prepared by Marta Ruiz-Arranz (EUR).

[2] IMF (2010a).

[3] The methodology to identify large fiscal adjustment episodes was developed in IMF (2010b).

Table 1. Fiscal and Debt Fundamentals in the G-7

	Gross General Government Debt (percent of GDP)			General Government Structural Deficit (percent of GDP)	Interest payments to revenue (percent)
	2007	2010	Change	2010	2010
Canada	65.1	81.7	16.6	3.5	9.6
France	63.8	84.2	20.4	5.2	5.3
Germany	64.9	75.3	10.4	3.2	6.3
Italy	103.5	118.4	14.9	3.7	10.0
Japan	187.7	225.8	38.2	7.9	9.7
UK	43.9	76.7	32.7	8.2	8.0
US	62.1	92.7	30.6	8.4	8.0

Source: IMF WEO estimates, October 2010.

Table 2. Country Experiences with Large Fiscal Adjustments

Country (end year)	Size 1/	Length (years)	Adjustment types 2/			Fiscal rules	
			Expenditure-based adjustments	Fronloaded adjustments	High-intensity adjustments	At start or during adjustment	Year of adoption
Ireland (1989)	20.0	11					
Sweden (2000)	13.3	7					1996, 2000
Finland (2000)	13.3	7					1995
Sweden (1987)	12.5	7					...
Denmark (1986)	12.3	4					...
Greece (1995)	12.1	6					...
Israel (1983)	11.1	3					...
Belgium (1998)	11.1	15					1993, 1997
Canada (1999)	10.4	14					1998
Cyprus (2007)	8.5	4					2004
United Kingdom (2000)	8.3	7					1997
Japan (1990)	8.1	12					...
Italy (1993)	7.9	8					...
Portugal (1985)	7.5	4					...
Iceland (2006)	6.3	4					2004
Netherlands (2000)	6.3	10					1994, 1997
Denmark (2005)	5.9	11					1998
Australia (1988)	5.8	4					...
New Zealand (1995)	5.8	4					1994
Austria (2001)	5.8	6					1997
Iceland (2000)	5.7	6					...
United States (2000)	5.7	8					1990
Germany (2000)	5.3	9					1997
Germany (1989)	5.3	10					1996
Switzerland (2000)	5.2	7					1999
Cyprus (1994)	5.2	3					...
Spain (2006)	5.2	11					2002

Sources: IMF, World Economic Outlook, October 2009 and IMF staff calculations.
1/ Cumulative change in cyclically-adjusted primary balance in percent of GDP. In a given consolidation episode, the cyclically-adjusted primary balance should not be reversed by more than 1 percentage point from one year to the next.
2/ An expenditure-driven adjustment is defined as one where at least two-thirds of the adjustment is made by expenditure cuts. A frontloaded adjustment is one where at least 40 percent of the adjustment is made in the first two years. A high-intensity adjustment is one where the average annual consolidation is at least 1.5 percent of GDP.

4. **Although the chapter is largely atheoretical, some clear patterns emerge from the evidence**. The emphasis is on presenting the evidence rather than testing hypotheses (although several possible explanations are suggested along the way). In other words, the chapter looks at patterns rather than seeking to establish causality. Still, some of the evidence presented in the chapter is quite striking and could be of value to policymakers. The findings of the chapter can be summarized as follows:

- Expenditure-based consolidations, particularly those focused on reducing transfers and public wages, are generally associated with longer-lasting budgetary improvements than tax increases.

- Addressing the fiscal problem in a timely fashion, by frontloading the adjustment, is also associated with more sustainable debt reductions.

- In contrast, very large fiscal efforts do not necessarily guarantee success if these come too late or if borrowing costs do not fall because the government's fiscal credibility is not maintained. The reduction in the risk premium and improvement in the interest rate-growth differential, which accompanied expenditure-based and frontloaded fiscal adjustments, were crucial to their success.

- The evidence on the usefulness of fiscal rules in supporting fiscal consolidation is positive but not conclusive.

5. **The chapter is organized in five sections**. The next three sections review the evidence regarding three key dimensions of fiscal adjustments: composition, degree of frontloading, and intensity. At the end of each section, there is a discussion about what determines the countries' choice along each dimension. The fourth section presents evidence about the effectiveness of fiscal rules in delivering sustainable debt reductions. The final section concludes and draws implications for the UK.

B. Does the Composition of the Fiscal Adjustment Matter?

6. **Expenditure-driven adjustments have proved to be more successful in achieving the following objectives (Figure 1)**:

- **Reducing debt**. The average debt ratio fell sharply in the 5–8 years following expenditure-driven consolidations and remained at a lower level, whereas debt continued to rise following tax-driven adjustments. An expenditure-driven adjustment is defined as one in which at least two-thirds of the adjustment is made by expenditure cuts. About 40 percent of the events under study fall in this category (Table 2).

- **Improving growth performance**. Adjustments based on spending cuts have been followed by higher growth (non-Keynesian features of fiscal consolidations are

discussed in Box 1). In contrast, the impact on growth following tax-driven adjustments was slightly negative.

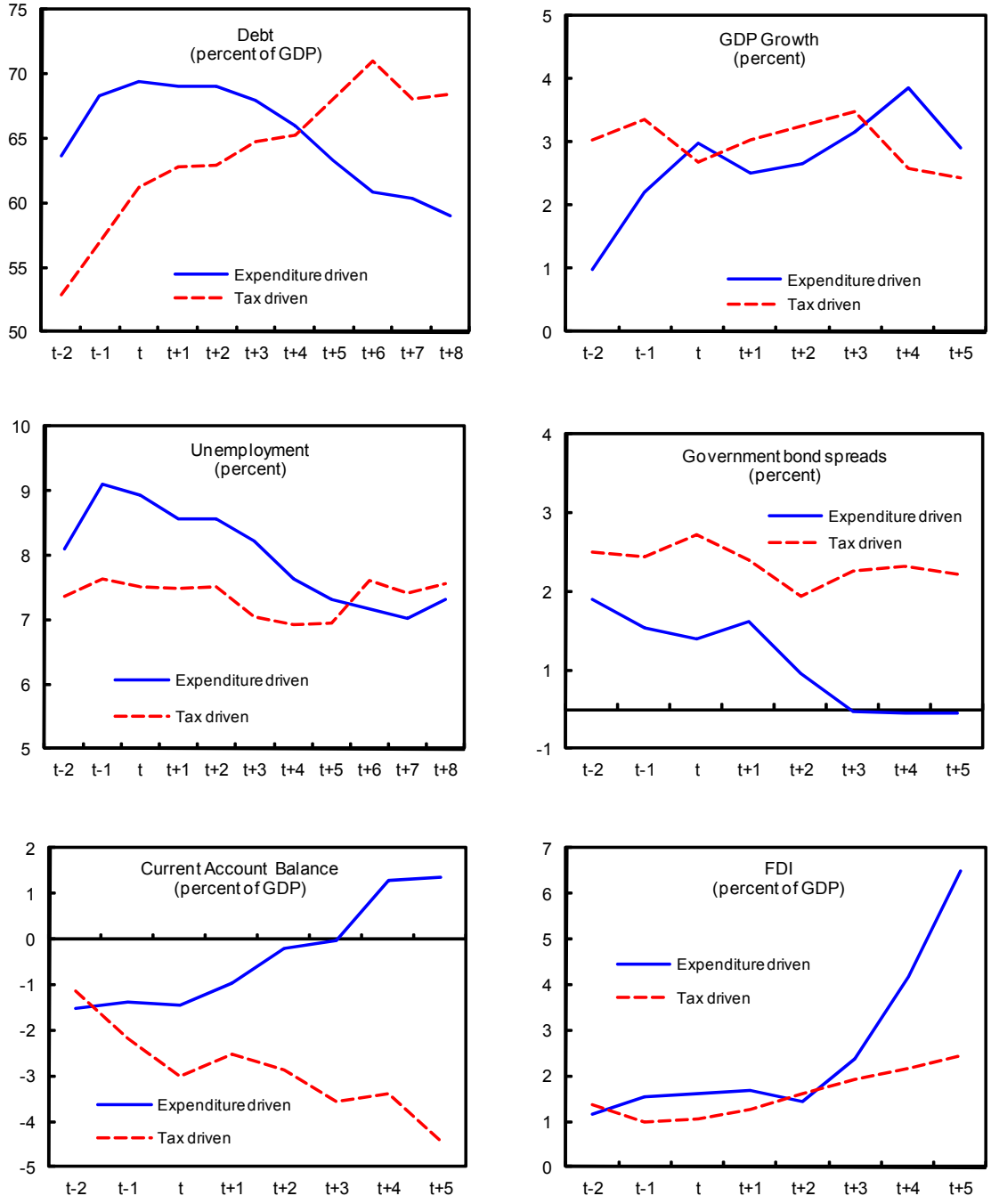
- **Reducing unemployment**. Like GDP growth, the mean unemployment rate for the group of economies that engaged in spending cuts fell considerably over the 5-8 years that followed, while it increased in countries that relied more heavily on tax increases.

- **Narrowing spreads and reducing borrowing costs**. Sovereign bond spreads fell under both types of adjustments as investors' confidence on the sustainability of public finances improved. However, they fell much faster following expenditure-driven adjustments.

- **Improving external position**. Starting from similar levels, the current account balance followed opposite trends under both types of adjustments. The large improvement following expenditure-driven adjustments could be explained by expenditure switching effects. Assuming public spending concentrates mostly on the non-tradable sector, cuts in public spending change the composition of aggregate spending in the economy in favor of the tradable sector. Another possible explanation could be reductions in unit labor costs associated with public sector wage growth moderation, which help boost competitiveness of the export sector. Indeed, unit labor costs indicators improved following expenditure-based consolidations, while they worsened following tax-based adjustments.

- **Accelerating FDI flows**. Starting two years after the beginning of the adjustment, this likely reflects the higher credibility and growth prospects of expenditure-based adjustments as well as reductions in the risk premia that crowed in private investment.

Figure 1. Composition of Fiscal Adjustments 1/



Sources: WEO and staff estimates.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

Box 1. Growth Effects of Fiscal Adjustments: The Theory

Keynesian theory

A fiscal contraction has a temporary contractionary effect through and aggregate demand channel. Such reduction will occur either directly, through the decrease in public consumption and investment, or indirectly, when households reduce their consumption as a consequence of a lower disposable income, brought about by the increase of taxes or by the decrease of public transfers. A standard multiplier effect implies that spending cuts are more recessionary than tax increases.

Expansionary fiscal contractions (non-Keynesian effects)

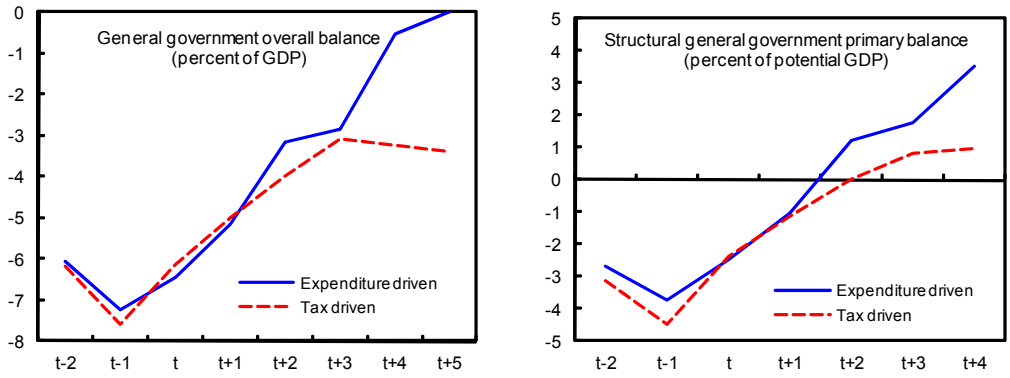
Wealth effects on consumption
A cut in government spending, if perceived as long lasting, implies a permanent reduction in the future tax burden of consumers, generating a positive wealth effect, leading to an increase in private consumption (Ricardian behavior). See Feldstein (1982), Blanchard (1990), Bertola and Drazen (1993), Alesina and Perotti (1997).

Credibility effects
By reducing their budget deficits, governments signal to markets their commitment to sound finances. If this signal is taken as credible, risk premia on interest rates will fall, crowding in private investment and raising agents' permanent income. See McDermott and Wescott (1996), Giavazzi et al. (2005).

Labor market channel
Fiscal consolidations obtained through expenditure cuts, in particular of the government wage bill, will reduce wage pressures and increase short-term investment. In this case, the possibility for fiscal consolidations to be expansionary crucially depends on the composition of the adjustment. See Alesina and Perotti (1997), Alesina et al. (2002), Ardagna (2004).

7. **The divergent performance under expenditure-based and tax-based adjustments cannot be accounted for by differences in initial conditions or the scale of the fiscal problem**. The size of the required fiscal effort was similar in both group of countries, as reflected by the overall budget deficit and the structural primary deficit in the pre-adjustment year (Figure 2). Nevertheless, five years after the start of the adjustment, the structural primary balance had improved by 3 percentage points of GDP more in countries that cut spending more aggressively.

Figure 2. Fiscal deficits and the composition of fiscal adjustments 1/



Sources: WEO and staff estimates.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

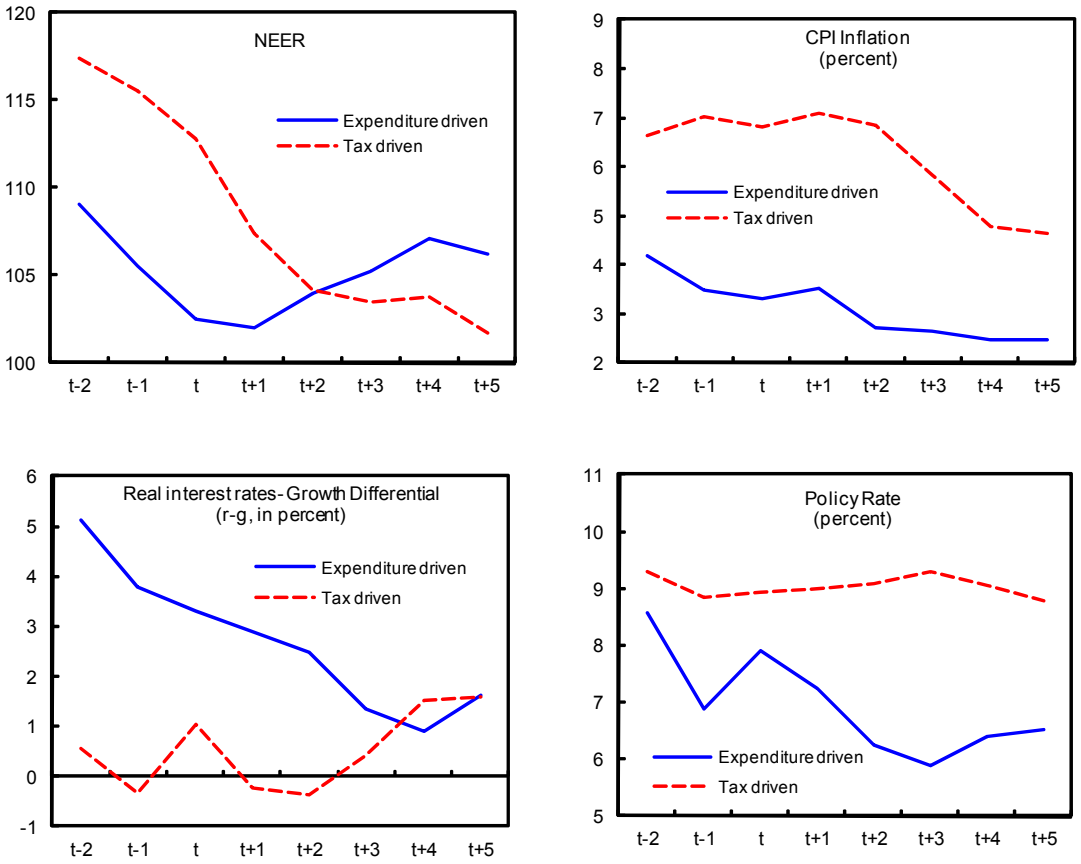
8. **There is no evidence that the better external and growth performance following expenditure-driven adjustments was the result of exchange rate weakness**. On the contrary, the NEER appreciated on average for this group of countries, whereas it depreciated sharply in countries that relied primarily on tax increases (Figure 3). However, the ULC-based REER did depreciate following expenditure-based adjustments as a result of public wage moderation, thus improving competitiveness of the export sector. To be sure, the evolution of the NEER and REER is the result of multiple factors and it is not the objective of this chapter to establish causality between these and the type of fiscal adjustment.

9. **Economies that relied primarily on spending cuts did not inflate their debt away, but grew out of their debt**. Some argue that higher inflation is a reasonable price to pay to reduce the real value of debt. But higher inflation played no role in reducing debt in expenditure-driven adjustments. Indeed, inflation was halved in the five years after the start of the expenditure-driven budgetary adjustment. This facilitated a more accommodative monetary policy that provided an offsetting boost to demand. Improved growth performance and lower risk premia following expenditure-based adjustments brought about favorable interest rate-growth differentials that significantly improved debt dynamics. In contrast, the interest rate-growth differential worsened following tax-based adjustments (Figure 3). This highlights that fiscal-monetary policy interaction during episodes of fiscal consolidation is crucial.

10. **To summarize, the composition of the fiscal adjustment matters**. Why? Credibility effects are likely a driving force. Public spending cuts, particularly in wages and entitlements that are politically sensitive, may signal that the government is fully determined to tackle the fiscal problem. Other explanatory factors could include: (i) wealth effects resulting from the perceived more permanent nature of expenditure-based adjustments, and (ii) increased competitiveness associated with public sector wage moderation and

expenditure switching from the non-tradable to the tradable sectors (see Box 1 for a review of the theory supporting non-Keynesian features of fiscal adjustments).

Figure 3. NEER, inflation, interest rates, and the composition of fiscal adjustments 1/



Sources: WEO and staff estimates.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

What determines the composition of the fiscal adjustment the countries choose?

11. **The composition of the fiscal adjustment appears to be chiefly determined by space available to implement revenue or expenditure measures**. In countries where the revenue to GDP ratio was already high, the scope for raising taxes was constrained and expenditures were cut more aggressively. There is indeed a positive relationship between the share of adjustment made by spending cuts and the initial (pre-adjustment year) level of revenues to GDP (Figure 4). Similarly, there is a positive correlation between the initial level of government expenditures to GDP and the share of the adjustment coming from spending cuts.

12. **Market discipline—threat of higher interest rates—does not appear to have influenced the composition of the fiscal adjustment**. Bond spreads at the outset of the

adjustment were in fact somewhat lower in economies that cut expenditures more aggressively. However, as discussed above, expenditure-driven adjustments were seen as more credible and spreads fell faster subsequently (by 200 basis points after 5 years).

13. **The magnitude of the pre-adjustment fiscal deficit was not a determinant of the composition of the fiscal adjustment**. The required fiscal effort in countries that relied on expenditure cuts was not larger than elsewhere. There is indeed no significant relationship between the level of the structural primary deficit in the pre-adjustment year and the share of adjustment made by expenditure cuts. However, past episodes suggest that a higher starting level of debt and a higher starting unemployment rate seem to be associated with expenditure-based adjustments. Whether this association is causal or spurious is hard to assess, but it is possible that large debts and unemployment raise public awareness of the fiscal problem, helping to overcome resistance to consolidate and to implement unpopular spending cuts.

14. **A simple regression exercise confirms these findings**. The charts in Figure 4 could prompt the objection that they mask important relationships because they only consider one dimension at a time. It could be illuminating to control for all the possible determinants of the composition of fiscal adjustments at the same time in a simple regression framework. To this end, the share of the adjustment made by expenditure cuts is regressed on the initial (pre-adjustment) size of the public sector, measured by the ratio of revenues or expenditures to GDP, along with the initial levels of debt, unemployment, spreads, and structural primary deficit. The regression results suggest that only the size of the public sector has explanatory power. More specifically, a one percentage point increase in the revenue (expenditure) to GDP ratio is associated with a 2 percentage point increase in the share of adjustment coming from spending cuts. None of the other variables in the regression are statistically significant (Table 3).

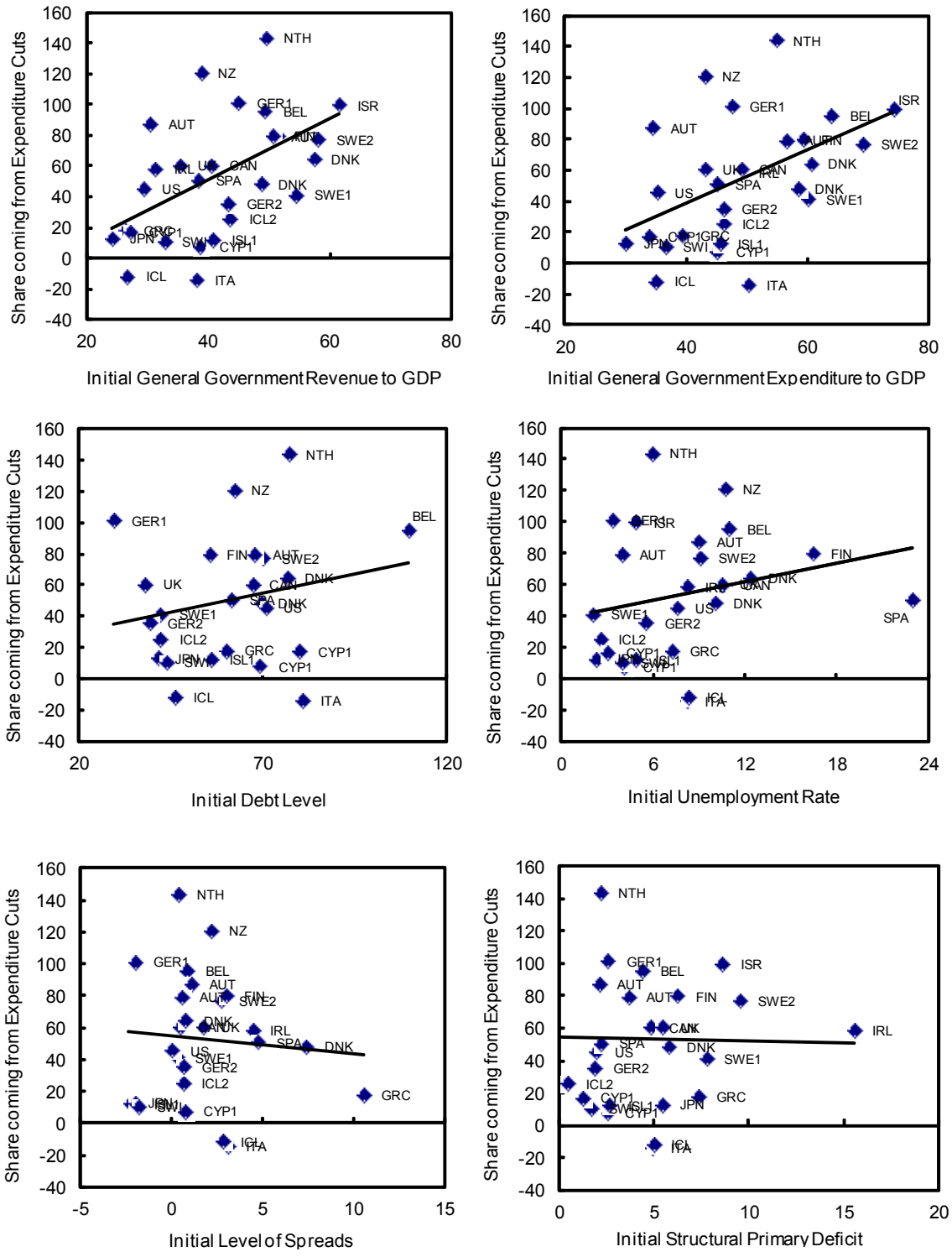
Table 3. Determinants of Expenditure-based Adjustments 1/

Dependent variable is the share of the adjustment coming from spending cuts				
	Coefficient	t-stat	Coefficient	t-stat
Revenue to GDP	1.87**	2.19		
Expenditures to GDP			2.03**	2.16
Initial debt to GDP	0.22	0.45	-0.01	-0.01
Initial CAPB to GDP	-0.03	-0.01	-1.58	-0.61
Initial level of spreads	-1.94	-0.57	-2.36	-0.7
Initial unemployment	1.75	0.9	1.66	0.85
Constant	-49.3	-1.23	-49.34	-1.2
Observations	24		24	
R-squared	0.32		0.32	

Source: IMF staff calculations.

1/ Regressions are OLS; ** denotes statistically significant at 5 percent level.

Figure 4. Determinants of the Composition of Fiscal Adjustments

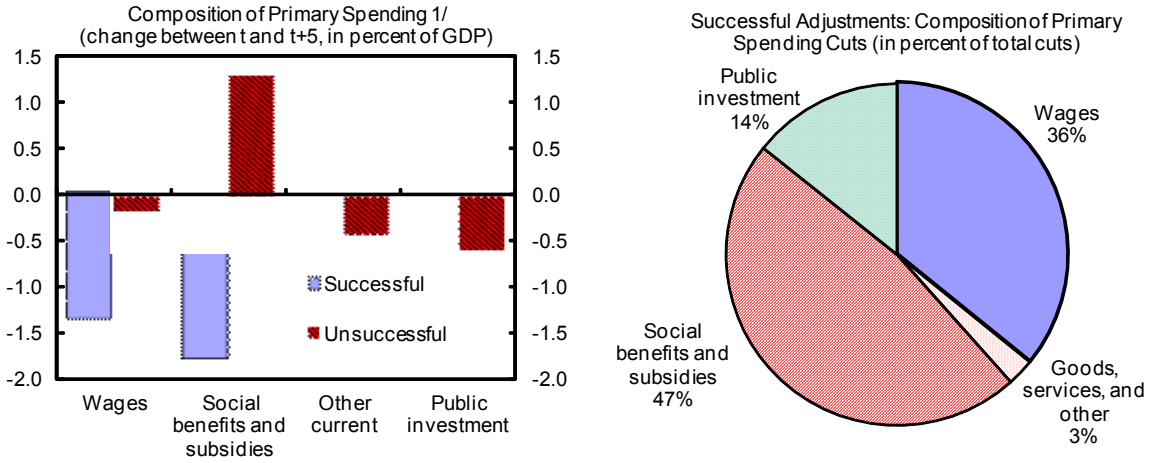


Sources: WEO and staff estimates.

Where did the axe fall in successful fiscal adjustments?

15. **Successful adjustments concentrated on cuts in transfers, welfare spending, and public wages** (Figures 5 and 6). The composition of spending cuts was strikingly different in successful and unsuccessful adjustments.[4] In successful cases, over 80 percent of the adjustment was on social benefits, subsidies, and government wages. Public investment was also affected, but cuts accounted for less than one-sixth of the total. Other current spending, including purchases of goods and services, also fell, albeit marginally. In contrast, public investment was the hardest hit spending component in unsuccessful adjustments. In these cases, wages were little changed, and social benefits and subsidies increased sharply, fully offsetting the cuts in all other categories. As a result, five years after the start of the adjustment total government expenditure to GDP had increased slightly.

Figure 5. Successful Fiscal Adjustments

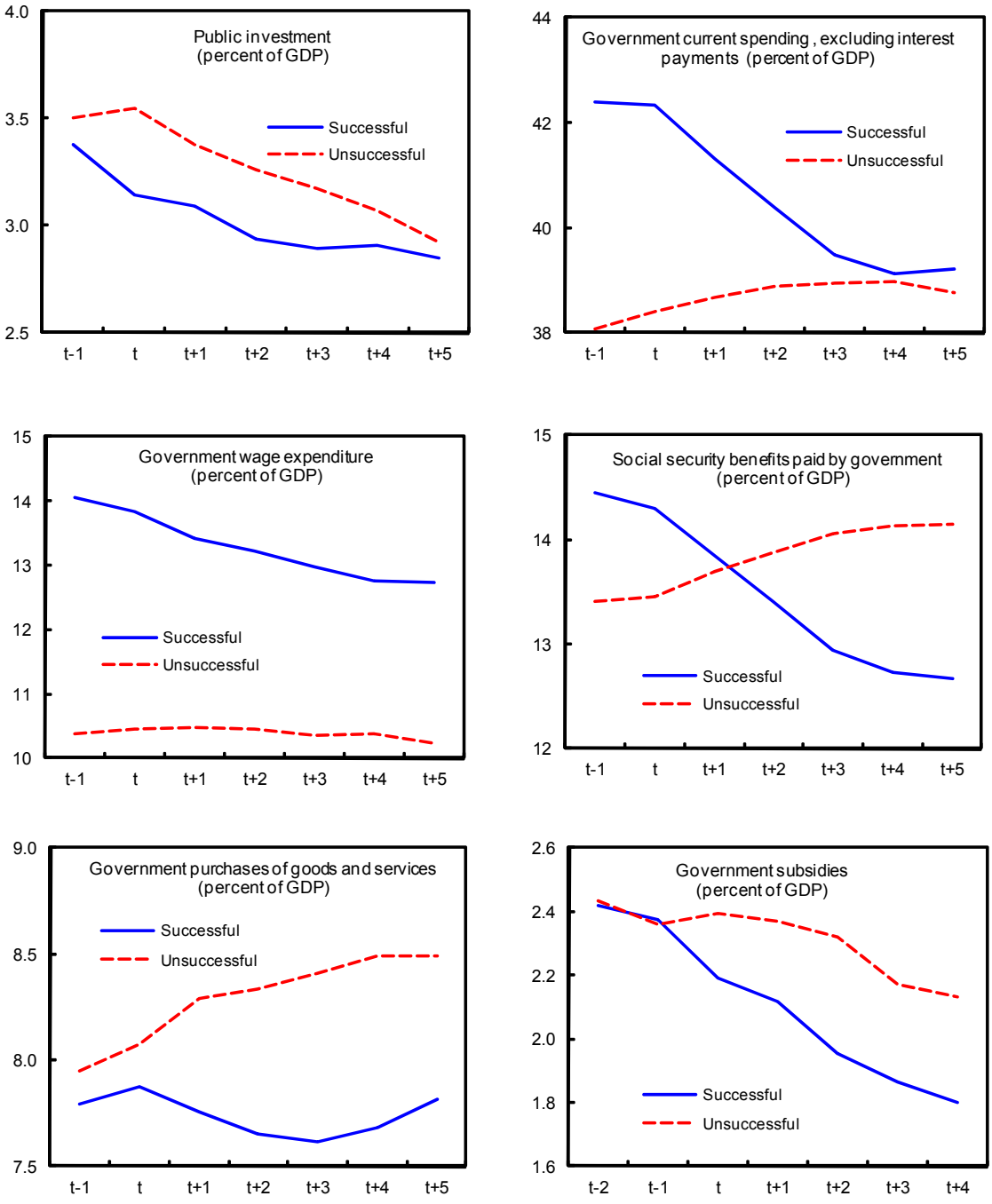


Sources: OECD and staff estimates.
1/ Time t refers to the first year of the consolidation episode.

16. **The quality of the expenditure-based adjustment matters**. Spending cuts that focus on wages and transfers may be viewed as more credible as they tackle politically sensitive components. These measures also place downward pressure on private sector wages, improving unit labor costs and external competitiveness indicators. In contrast, cuts in public investment and non-wage goods and services can have direct negative effects on investment and growth as well as unfavorable credibility effects, as they may be viewed as simply postponing the required adjustment.

[4] A successful adjustment is one where: (i) three years after the start of the adjustment, the cyclically-adjusted primary balance had improved by at least 3 percentage points of GDP, or (ii) five years after the start of the adjustment, the debt ratio had fallen by at least 5 percentage points of GDP. Alesina and Perotti (1997) use similar criteria to characterized successful fiscal adjustments. About 60 percent of the episodes under study are considered successful using this definition, including some cases defined as tax-based adjustments in section B.

Figure 6. Components of Government Spending 1/



Sources: OECD.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

C. Does It Matter Whether the Fiscal Adjustment is Frontloaded?

17. **A critical question facing policymakers in advanced economies is how frontloaded the required adjustment should be**. Is it preferable to inflict a larger pain at the beginning or would a more gradual adjustment deliver better results? Again, historical episodes can shed some light on this issue. A frontloaded adjustment is defined as one in which at least 40 percent of the required effort takes place in the first 2 years. A frontloaded adjustment is not necessarily a larger or shorter one, but more resolute and aggressive one at the beginning (Box 2). About a third of the historical events under study can be defined as such (Table 2).

18. **Frontloaded adjustments appear to deliver better results (Figure 7)**:

- They coincide with better growth outcomes, lead to faster and sustainable debt reductions, and are accompanied by a sharp reduction in bond spreads, interest rate-growth differentials, and unemployment. In contrast, more gradual (or delayed) adjustments coincide with worse growth outcomes and non-declining debt ratios.

- The better debt and growth performance does not appear to stem from differences in the size of the adjustment needed, higher inflation, or relative weakness in the currency.

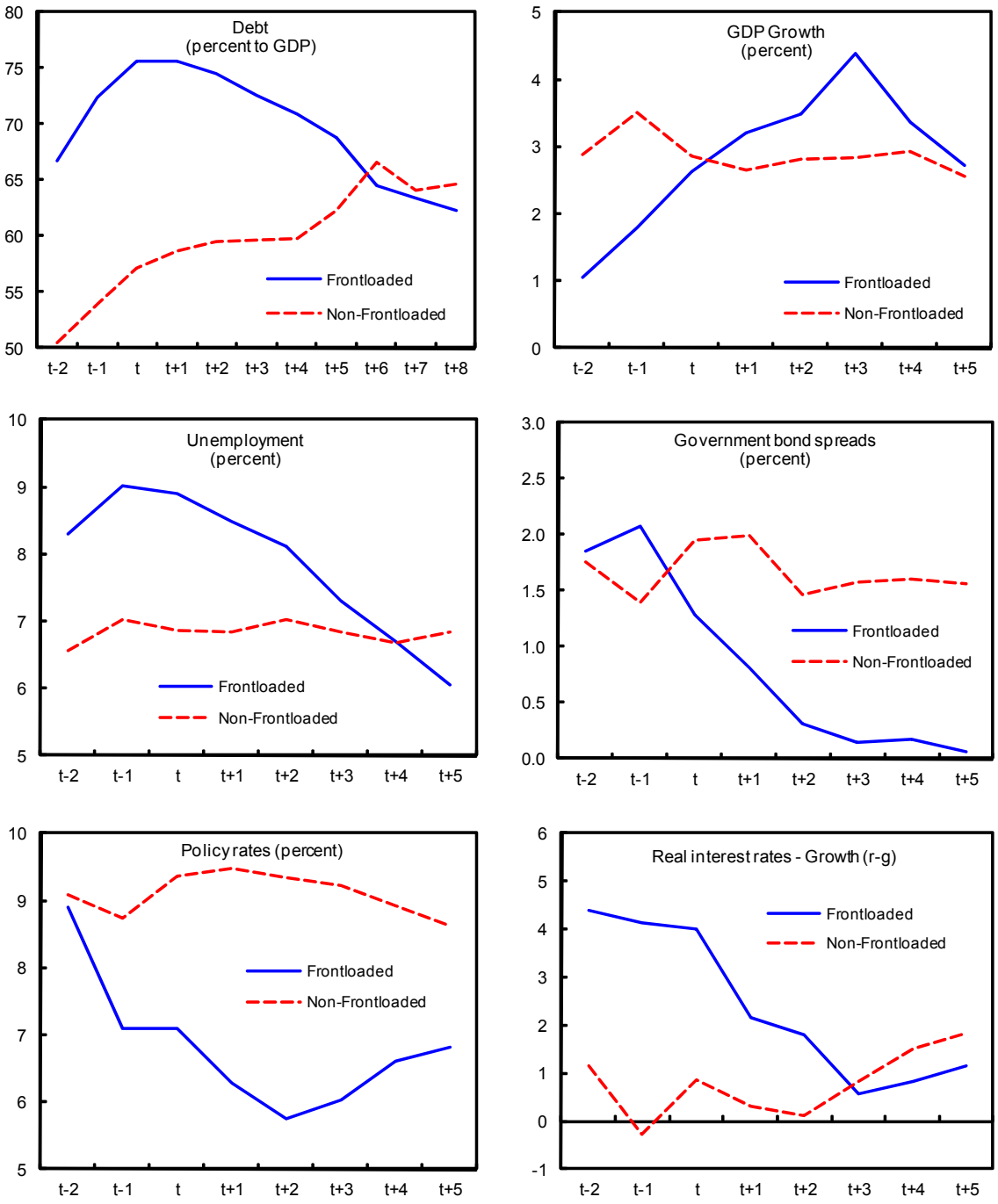
19. **This suggests that decisive fiscal action can help in delivering a successful adjustment**. Governments are well advised to implement a non-trivial first installment of adjustment measures. Why? Again, credibility matters and promises of future action will not be enough. The uncertainty about the future course of fiscal policy associated with more gradual or delayed fiscal adjustments can deteriorate market sentiment and be damaging for growth. As a result, more gradual adjustments may fail to stabilize debt ratios or reduce spreads. In contrast, frontloaded adjustments tend to coincide with better growth outcomes, perhaps because they signal a decisive, credible, and permanent reversal in the stance of fiscal policy. Furthermore, the larger reduction in the risk premium and interest rates accompanying these adjustments can provide an additional boost to demand. In turn, more favorable interest rate-growth differentials lead to faster and more sustainable debt reductions.

What determines the degree of frontloading of the fiscal adjustment the countries choose?

20. **The initial level of debt appears to be the main determinant of the speed of fiscal adjustments**. The higher the initial level of debt, the higher is the share of the adjustment in the first two years. Interestingly, other factors—including the initial deficit, level of spreads, unemployment, and public sector size—were less correlated with the choice to frontload adjustment (Figure 8). These results are also confirmed in a simple regression framework. However, this does not imply that only the debt level should be considered when designing adjustment, as past adjustments have not always been optimal

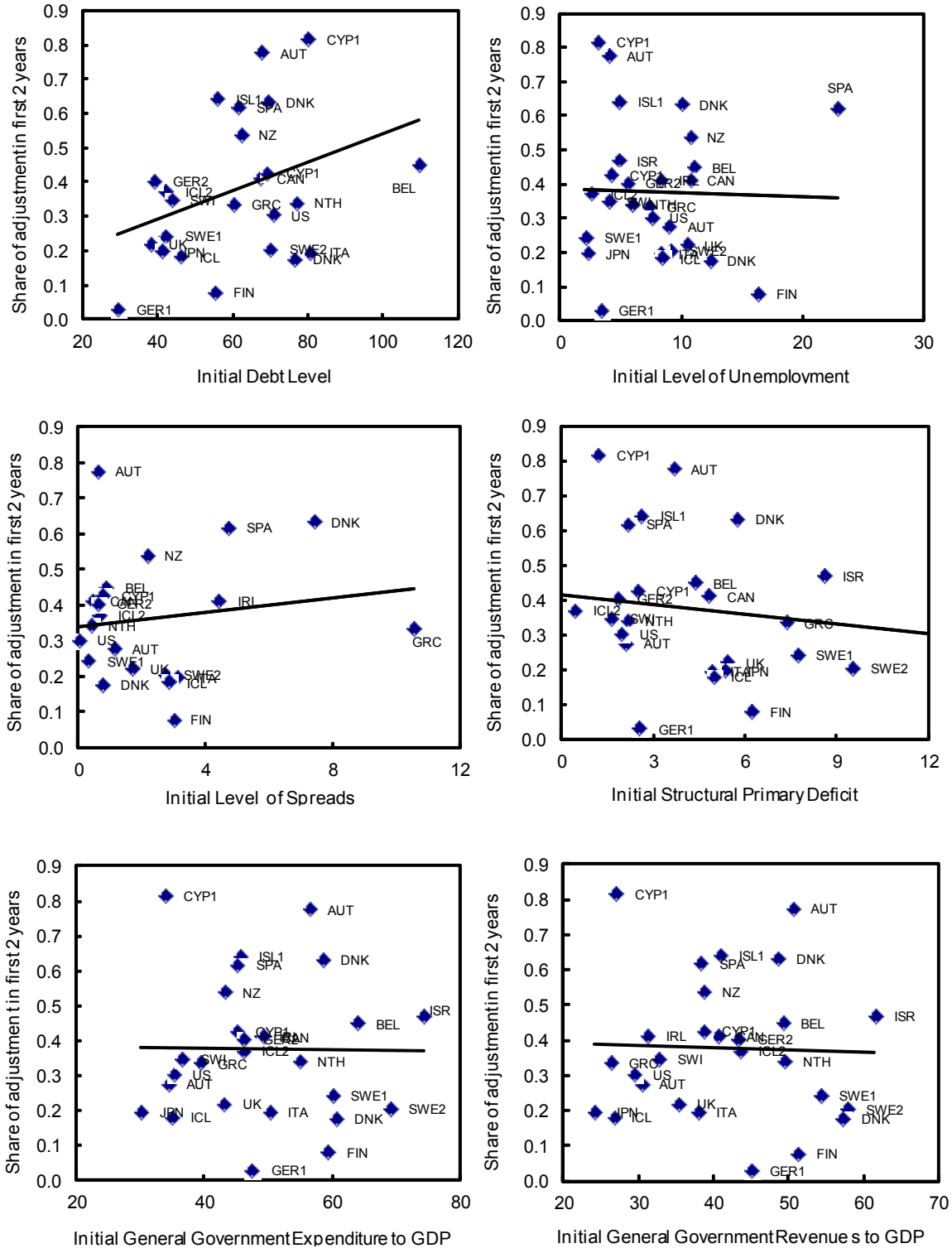
and factors other than debt can affect the likelihood of fiscal crises. In the recent UK context, frontloading may also have been affected by sovereign turmoil in parts of Europe, an event not captured in the historical analysis.

Figure 7. Degree of Frontloading of Fiscal Adjustments 1/



Sources: WEO and staff estimates.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

Figure 8. Determinants of Frontloaded Fiscal Adjustments



Sources: WEO and staff estimates.

D. Does More Pain Lead to Greater Gain?

21. **A related question that policymakers face is whether the magnitude of the adjustment effort, defined as the size of the average annual adjustment—regardless of whether this is frontloaded or not—influences the likelihood of a long-lasting debt reduction**. To address this question, the sample is split in two groups: countries that undertook average annual adjustments of at least 1½ percent of GDP per year in the cyclically-adjusted primary balance and those where the intensity (average consolidation per year) was smaller.[5]

22. **Somewhat surprisingly, an increased intensity of adjustment is not strongly associated with more rapid debt reduction**. On average, high-intensity adjustments (larger average consolidation per year) reduce debt initially, but this debt reduction is reversed after four years of the start of the adjustment. Similarly, while growth increases on average by the third year of such adjustments, it then falls, with a slightly negative net effect. Spreads also do not fall significantly. Eventually, high-intensity adjusters do not end up, on average, with lower debt levels than cases where the average annual effort was smaller (Figure 9).

23. **It is not easy to explain this evidence**. Some hypotheses that could explain the lack of success of high-intensity adjustments are discussed:

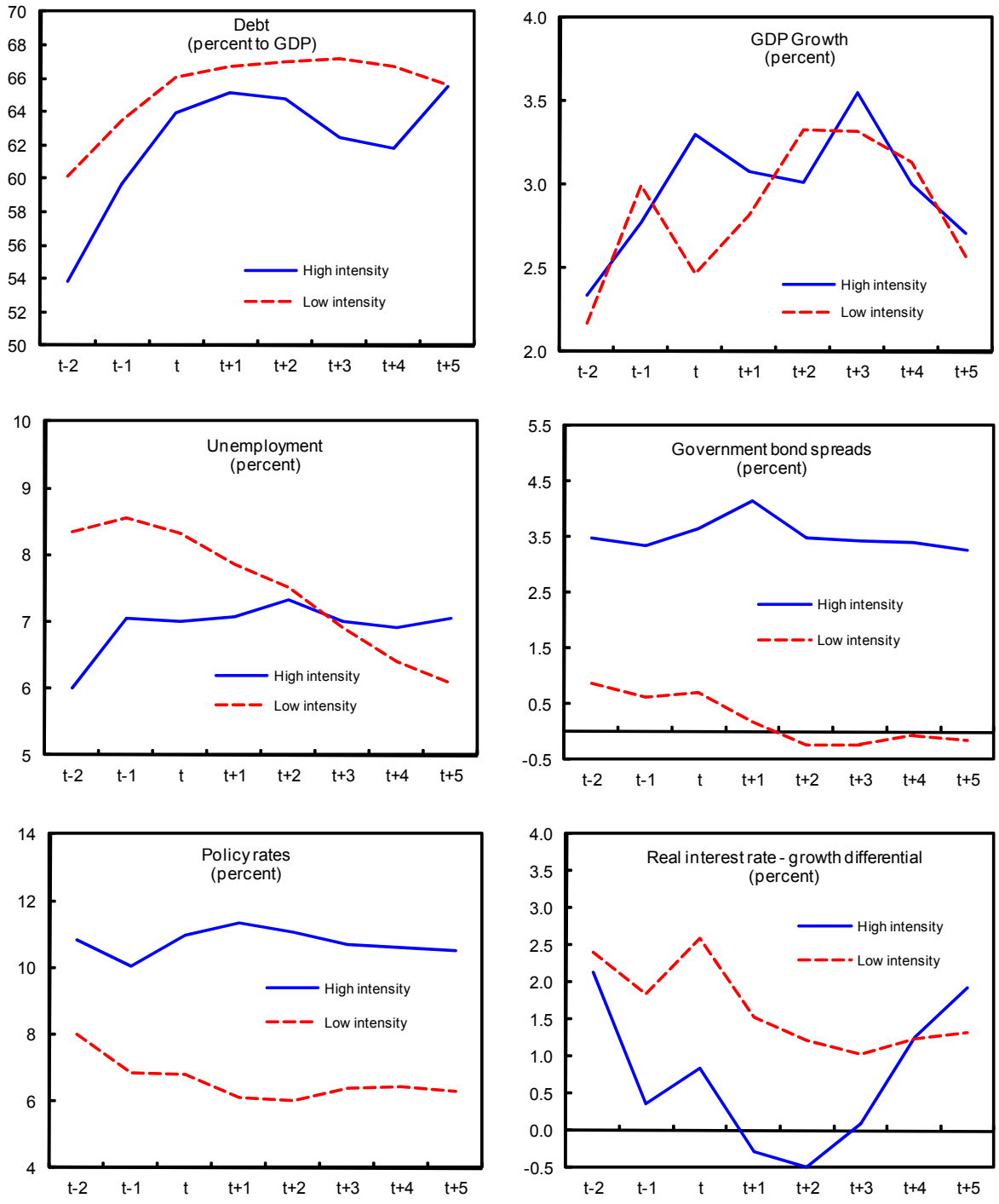
- *Worse initial conditions*. The size of the fiscal problem, measured by the structural primary deficit in the pre-adjustment period, was more than twice as large in high-intensity adjusters (6 percent of GDP vs. 2.8 percent of GDP, Figure 10).

- *Insufficient frontloading of the adjustment*. The effort made by high-intensity adjusters was smaller at the beginning than later on (Box 2). If the adjustment in the first few years was viewed as insufficient in relation to the total size of the problem, the credibility of the debt reduction strategy may have been called into question. This could explain why the consolidation was not accompanied by a reduction in the credit risk premium and why the interest rate growth differential worsened after two years of the beginning of the adjustment. Even the acceleration in the pace of consolidation that followed after wards (possibly "forced" by financial markets) did not reverse the deterioration in debt dynamics.

24. **Addressing the fiscal problem in a timely fashion may reduce the need for future fiscal tightening, in turn raising confidence**. Establishing credibility at the beginning, by frontloading the adjustment, seems to be more important than a larger adjustment if this comes too late (Box 2). This could explain the different outcomes following high-intensity adjustments, compared to the frontloaded adjustments discussed in the previous section.

[5] The mean and the median annual consolidation across episodes in the sample are about 1½ percent of GDP.

Figure 9: Intensity of Fiscal Adjustments 1/



Sources: WEO and staff estimates.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

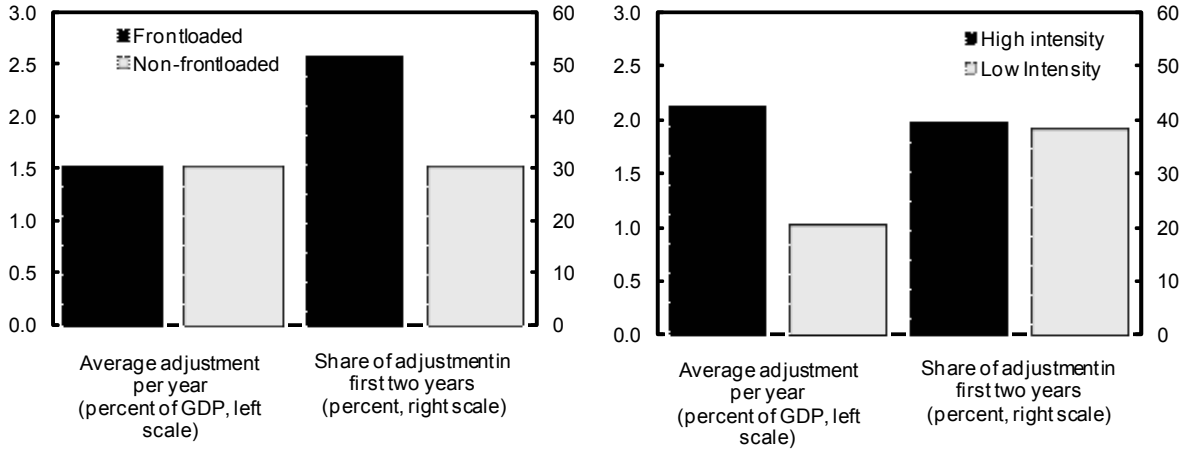
Box 2. Frontloaded vs. High-Intensity Adjustments

An adjustment is defined as *frontloaded* if more than 40 percent of the total consolidation effort takes place in the first two years. A *high-intensity* adjustment is one where the improvement in the cyclically-adjusted primary balance (CAPB) is at least 1½ percent of GDP per year.

These two aspects of the fiscal adjustment are not related.

- **Frontloaded adjustments were not larger or higher-intensity than non-frontloaded ones**. The overall size of the adjustment, measured by the total improvement in the CAPB, and the length of the consolidation episode were similar in both cases. Moreover, as the chart shows, the average consolidation effort per year (intensity) was also similar—about 1½ percent of GDP—in both frontloaded and non-frontloaded episodes. However, more than half of the total consolidation was made in the first two years in frontloaded adjustments, compared to less than one-third in the rest. The average annual consolidation in the first two years was 2 percent of GDP in frontloaded adjustments vs. 1.3 percent of GDP in the rest.

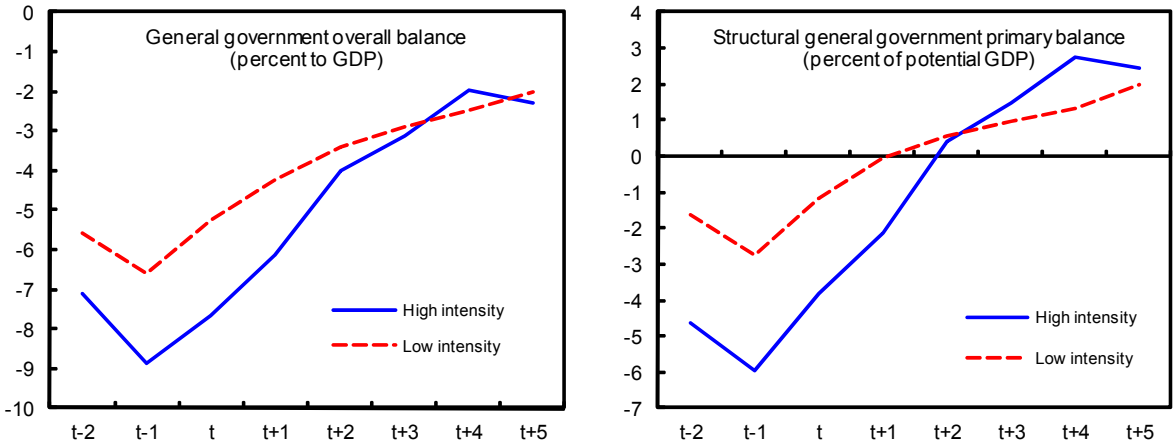
- **High-intensity adjustments were not more frontloaded than low-intensity ones**. The share of the total consolidation made in the first two years was similar in both groups (38-39 percent). The total size of the adjustment, though, was much larger in high-intensity adjustments (10 percent of GDP vs. 7 percent of GDP).



Sources: WEO and staff estimates.

How do high-intensity and frontloaded adjustments compare? Although the absolute effort in the first two years was very similar in both cases (about 2 percent of GDP per year), it was much higher in relation to the total adjustment in frontloaded cases. This, along with differences in the size of the required effort, could explain why growth, debt, and interest rate performances differed significantly under both adjustments. It is the effort made at the beginning relative to the total required adjustment what seems to matter most.

Figure 10. Fiscal Deficits and the Intensity of Fiscal Adjustments 1/



Sources: WEOand staff estimates.
1/ Time t refers to the first year of the consolidation episode. Lines in the charts refer to means across groups.

What determines the intensity of the fiscal adjustment the countries choose?

25. **There are three main factors that seem to influence the intensity of consolidation (Figure 11)**. A higher fiscal effort per year was positively associated with:

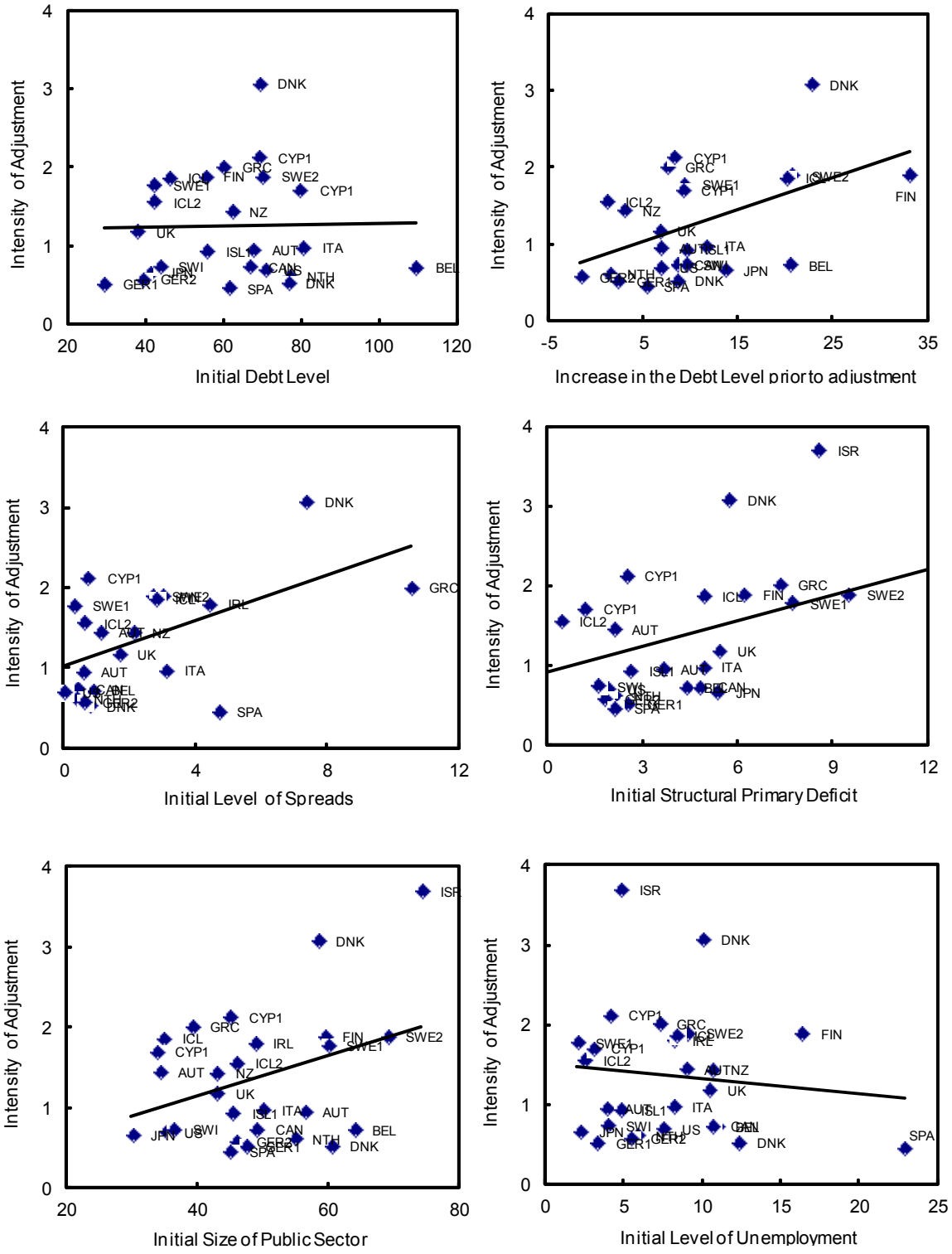
- Higher initial spreads. While this does not seem to influence the composition or whether to frontload the adjustment, market discipline seems to lead to higher-intensity adjustments.

- Higher initial deficits. The scale of the fiscal problem prompted governments to increase the annual consolidation effort.

- Larger *increases* in the debt ratio. Interestingly, the initial level of debt played no role. In fact, high intensity adjustments started from slightly lower debt levels, but had experienced a sharper increase in the two years before the adjustment started.

A regression analysis that controls for all these, and other, factors jointly confirms that the initial level of spreads, the initial deficit, and the increase in debt are the most important explanatory variables.

Figure 11. Determinants of the Intensity of Fiscal Adjustments



Sources: WEO and staff estimates.

E. Do Fiscal Rules Help?

26. **The recent crisis forced many countries to modify, abandon, or suspend their national or supranational fiscal rules**. The UK suspended its two fiscal rules (golden rule over the cycle and net debt limit of 40 percent of GDP) at the end of 2008. The government adopted a temporary "operating rule" at the 2008 Pre-Budget Report to allow sufficient flexibility in the operation of fiscal policy during the recession. This was later replaced by a Fiscal Responsibility Act in the 2009 Pre-Budget Report.

27. **How helpful is a rule-based framework in achieving a successful (long-lasting) debt reduction and improving fiscal performance?** Previous empirical evidence has been generally favorable about the role of certain fiscal rules, namely those with embedded expenditure or cyclically- adjusted balance targets. But there are many caveats accompanying these findings. The main one is that the positive association between fiscal rules and fiscal performance may reflect that governments committed to prudent fiscal management are more likely to institute a rule, rather than a reflection of the rule's effectiveness.

28. **This section draws on the international experience of large fiscal adjustments to shed some light about the usefulness of fiscal rules**. About half of the countries that have undergone large fiscal adjustments over the last 35 years had fiscal rules in place or adopted a new rule during the adjustment period (Table 2). A comparison of performance during these episodes relative to countries without rules may provide some insights on this debate.

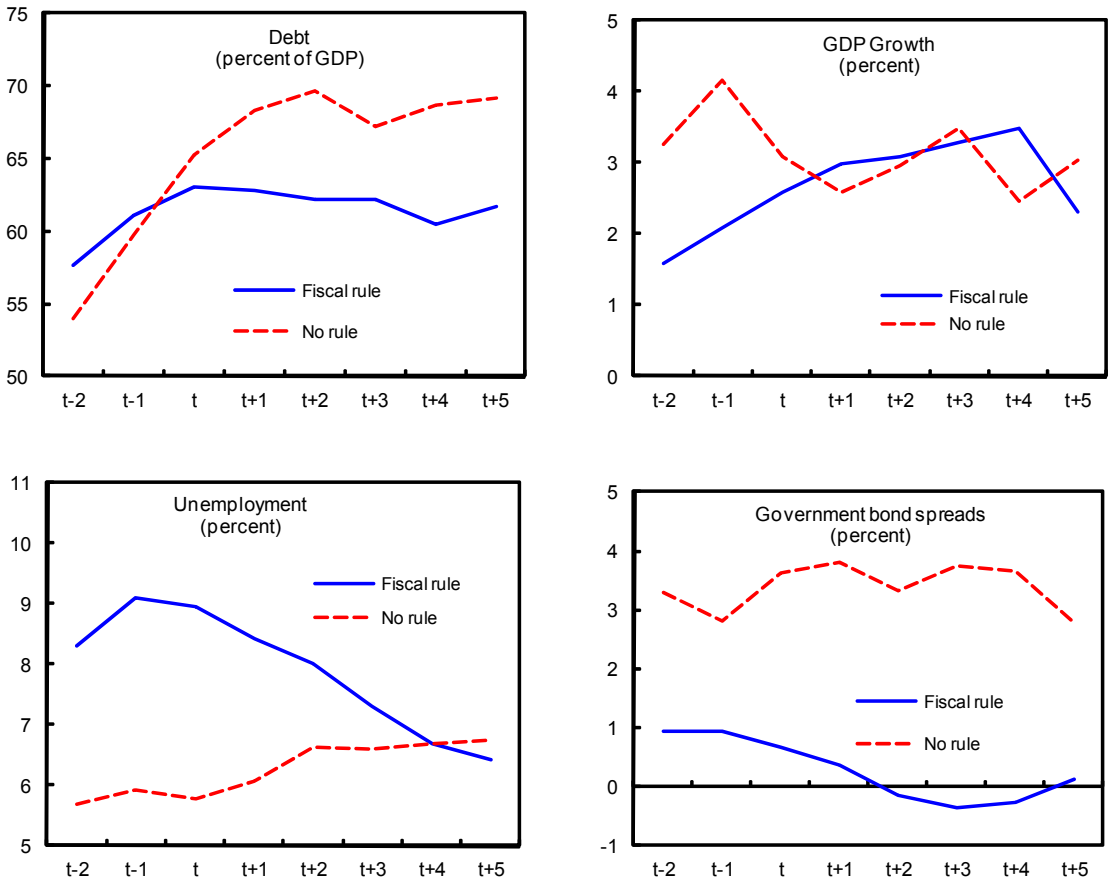
29. **The evidence on the usefulness of fiscal rules in supporting fiscal consolidation is positive but not conclusive**. Debt fell somewhat in the first five years of the adjustment period in countries with fiscal rules, while it kept increasing in those without rules. Fiscal rules were associated with a larger reduction in unemployment and, to a lesser extent, bond spreads. However, the deficit performance was significantly better after five years of consolidation in countries that did not use rules (3½ percentage point of GDP larger structural primary surplus). The overall growth performance was not better either in rule-based adjustments by the end of the same period (Figure 12, 13).

30. **Rule-based adjustments are more likely to rely on expenditure cuts, which could explain the somewhat better performance**. About two-thirds of the adjustment was made through spending cuts in countries that adopted rules, compared to two-fifths elsewhere. There is no evidence that rules make countries frontload the adjustment or increase the average fiscal effort per year.

31. **Fiscal rules are neither a necessary nor a sufficient condition for success, but well-designed rules could help improve fiscal performance in some cases**. Fiscal rules are likely to enhance fiscal policy credibility and discipline, and anchor medium-term expectations regarding fiscal sustainability. But other institutional frameworks, such as strong public financial management mechanisms, appropriate procedural rules, and

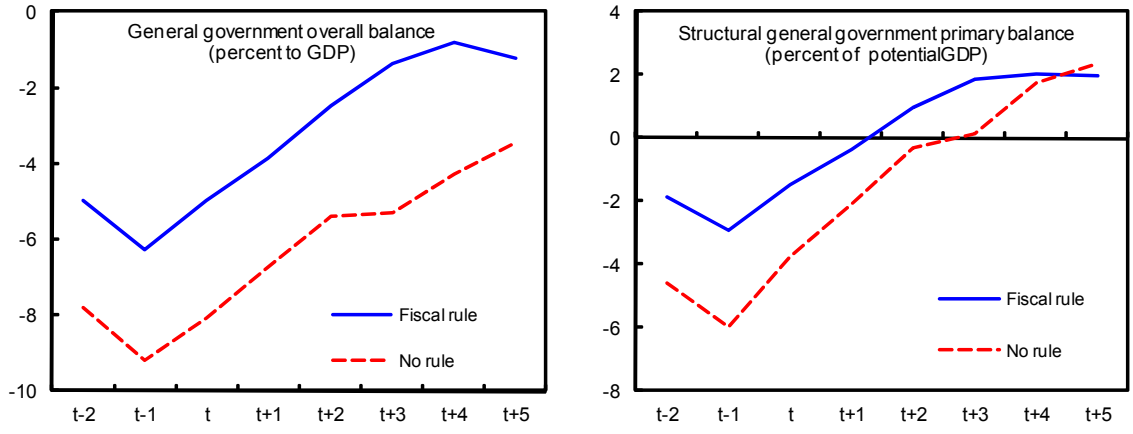
independent fiscal agencies that provide (among other outputs) unbiased fiscal forecasts could also be important in promoting fiscal discipline and may be needed to make fiscal rules effective. Such institutional differences, as well as variation in the quality of rules themselves, might help explain why rules are associated with better outcomes in some cases but not others.

Figure 12. Rule-Based Fiscal Adjustments



Sources: WEO and staff estimates.

Figure 13. Fiscal Deficits and Rule-Based Adjustments



Sources: WEO and staff estimates.

F. Conclusions and Implications for the UK

32. **Evidence in the sample studied suggests that expenditure-based and frontloaded adjustments were more successful in ensuring debt sustainability**. They were also accompanied by improved macroeconomic performance. Credibility and wealth effects seem to be a driving force, but further research is necessary to establish causal effects. In contrast, very large annual deficit reductions do not necessarily guarantee success if these come too late or if borrowing costs do not fall because the government's fiscal credibility is not maintained. Further, the presence of fiscal rules could help improve fiscal performance, but it is hard to disentangle the effect of the rule per se from the government's commitment to prudent fiscal management. Finally, the design of actual fiscal adjustment would need to depend on country-specific circumstances.

33. **The UK's consolidation plan is broadly consistent with the key qualities of successful fiscal adjustments suggested by the evidence in this chapter**. In particular:

- **The consolidation is frontloaded**. The argument for decisive action in the UK is strong. The surge of debt as a result of the crisis is amongst the largest in advanced countries and so is the size of the structural deficit. A large adjustment at some point is therefore inevitable. If past international experience is of any guide, frontloading the fiscal effort—as the UK authorities have announced—could lead to longer and faster debt reduction, as credible and frontloaded fiscal consolidation plans appear to have more positive macroeconomic effects through greater certainty and confidence about the future, while reducing total fiscal costs.

- **The consolidation is mainly expenditure-based, but not exclusively so given the magnitude of the problem**. The empirical evidence in this chapter, and in other

academic studies, has emphasized that adjustments that rely primarily on spending cuts are more likely to achieve a sustainable reduction in debt. This, however, does not preclude tax increases, as the optimal combination of specific measures depends on country-specific circumstances and the source of fiscal imbalances. In the UK, the large rise in the expenditure-to-GDP ratio over the last decade supports the emphasis on expenditure reduction. However, revenue-enhancing measures must also be part of the solution given the magnitude of the needed effort to stabilize debt. On this front, the authorities have announced several tax increases, including a hike in the VAT rate from 17½ percent to 20 percent from January 2011, a hike in the capital gains tax from 18 percent to 28 percent, and small bank levy on selected wholesale liabilities.[6] Other measures that could be considered include efforts to broaden the tax base and eliminate distortionary exemptions in the tax system. The evidence in this chapter suggests that consolidations that rely heavily on reductions in the public sector wage bill and transfers tend to be more successful. In contrast, very large cuts in investment spending are less helpful, although they are easier to attain in the near term than fiscal structural reforms. In addition, in past successful episodes, cuts in goods and services contributed little to the total adjustment. This would suggest that efficiency gains alone cannot be relied upon to deliver a large and successful consolidation.

34. **Fiscal-monetary policy interaction during the fiscal consolidation period will be crucial**. There are currently sizeable monetary offsets to the impending fiscal tightening, and the flexible exchange rate could provide additional support. Policy interest rates are close to zero and the Bank of England has completed a large quantitative easing program. These policies have helped induce a significant depreciation of sterling, and continued monetary stimulus will help limit the fallout from fiscal adjustment. The caveat is that interest rates cannot fall much further and that fiscal multipliers are likely to be larger when nominal interest rates are held constant near the zero bound. In this case, quantitative easing could be resumed in the event of heightened disinflationary pressure, and the exchange rate also remains as a key shock absorber.

[6] International evidence suggests that broad-based consumption and property taxes are less harmful to growth than income taxes (IMF, 2010c).

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IV. What Fiscal Rule Would Work Best for the UK?[1]

The government's current fiscal mandate provides an appropriate guide for the medium-term fiscal consolidation process. However, a more permanent rules-based fiscal framework may eventually be required to guide policy over the longer term, as the government has indicated. Although there is no rush to adopt more permanent fiscal rules, work could begin now to have time to chose and design rules carefully. In this context, this chapter illustrates how alternative fiscal rules would work in the UK, taking into account country-specific factors. It finds that a structural balance rule (or an augmented growth-based balance (AGB) rule) with a sufficiently high cyclical coefficient could have promoted more countercyclical policy during the pre-crisis expansion—resulting in lower debt and deficit levels—while allowing significant stimulus during the crisis. Such rules would also provide broad budget coverage and promote debt sustainability under a wide range of simulated shocks.

A. Introduction

1. **The recent crisis led the UK to suspend its two national fiscal rules—golden and sustainable investment rules—at the end of 2008**.[2] However, the credibility of the national rules as effective constraints for policy action was weakened well before the crisis. The rules failed to prevent a worsening of the fiscal balance in the years leading up to the crisis, leaving insufficient buffers as the economy entered the downturn. While in place, the golden rule was often criticized because it provided insufficient monitoring, transparency, and accountability of fiscal policy. The debt rule, in turn, did not provide any guidance when debt was below its ceiling, albeit rising fast. Essentially, both rules did not provide enough practical guidance for the conduct of fiscal policy.

2. **The Fiscal Responsibility Act that replaced the rules attempted to enshrine policy targets into law, but fell short of cementing credibility**. The Act—announced alongside the 2009 Pre-Budget Report and approved by Parliament in February 2010—made it a legal requirement for the government to: halve public sector net borrowing over four years from its 2009/10 level; reduce borrowing as a share of GDP in each year; and ensure that public sector net debt fell as a share of GDP from 2015/16. One issue with the Act's credibility is that it did not allow for any potential deterioration of the fiscal position arising from further negative shocks to the economy. Conversely, under a scenario where the recovery is faster than expected, the targets set in the Act would be too modest.

3. **The crisis thus left the UK's fiscal framework in need of reform and public finances in a weak state**. The deterioration of the fiscal position during the recession was

[1] Prepared by Carlos Caceres (FAD) and Marta Ruiz-Arranz (EUR). Based on data as of June 2010.

[2] The golden rule stated that the government should only borrow to fund investment. The sustainable investment rule stated that public sector net debt should not be higher than 40 percent of GDP. Both rules were designed to be met over the course of an economic cycle (HM Treasury, 2008).

unprecedented. The deficit reached 11 percent of GDP in 2009/10, some 8½ percentage points of GDP higher than before the crisis, and the resulting increase in debt between 2007 and 2010 is estimated at over 30 percentage points of GDP.

4. **Significant steps toward reforming the UK's fiscal framework were announced in the context of the June 2010 budget**. The government kept the objective of putting the net debt-to-GDP ratio on a downward path by 2015/16, but made the deficit objective more ambitious and cyclically sensitive by establishing a "fiscal mandate" to balance the cyclically adjusted current budget by 2015/16.[3] The government also established a new independent Office for Budget Responsibility (OBR), whose envisaged tasks include to provide the macroeconomic and fiscal forecasts for the budget and to assess fiscal sustainability and compliance with the fiscal mandate (and with any future rules or targets). The newly established OBR should support the consolidation, as international experience with independent fiscal councils has generally been favorable. Specifically, they have been associated with greater transparency and accountability of fiscal policy.[4] Nonetheless, despite the establishment of both a fiscal mandate to provide a clear guidepost for the consolidation process and an independent OBR, the longer-term fiscal framework remains uncertain.

5. **The government has indicated that it may eventually establish a more permanent fiscal framework to succeed the current mandate once the latter has been achieved**. One issue with the current mandate is that it only requires that the cyclically adjusted current budget be balanced at the end of a rolling five-year horizon. In theory, a government less committed to fiscal discipline could potentially use this rolling horizon—combined with continually backloaded fiscal plans—to perpetually avoid fiscal adjustment. Similarly, the exclusion of capital expenditure from the target potentially opens an avenue for fiscal laxity and could create incentives to aggressively label expenditure as capital rather than current where ambiguities exist. Given the current government's clear commitment to fiscal consolidation, these issues are not concerns at the moment, and the fiscal mandate is an appropriate guide for the consolidation process. However, in light of these considerations, it may be useful to begin work on considering a more permanent rule-based framework that could become effective for the post-2015/16 period. In this regard, the June budget noted that "a tighter constraint" on public finances could be set "once the public finances are closer to balance."

6. **The establishment of a more permanent rules-based fiscal framework could yield a number of benefits**. The rising use of some form of fiscal rule over the last two decades reflects the view that well-designed and properly implemented fiscal rules could

[3] Announced plans have been drawn up to meet this objective one year early, thus providing some margin.

[4] Kumar *et al* (2009), Debrun and Kumar (2007), and Debrun *et al* (2009).

support credibility and discipline and help limit distorted incentives in policymaking.[5] After an appropriate transition period from the recent crisis, more permanent rules in the UK could secure the gains of the consolidation process, support fiscal discipline, and anchor long-term expectations about fiscal sustainability. Although bringing a new fiscal rule into force too early would not be desirable,[6] there would be value in eventually adopting legislation that establishes new fiscal rules for the longer term, including a timetable for those rules to become effective. Germany provides an example in this regard.[7] In the transition period, the fiscal mandate set in the June budget will serve to guide policy and is appropriate to put the UK debt-to-GDP ratio on a declining path. The fiscal mandate also provides sufficient time to carefully study and build broad consensus for a more permanent framework before adopting it.

7. **Against this background, the objective of this chapter is to illustrate how alternative fiscal rules would work in the UK, taking into account country-specific factors**. To this end, the chapter simulates the hypothetical path of key fiscal variables predicted by various fiscal rules had they been in place in the UK since 1997. This exercise will help assess, for instance, which fiscal rule would have been most effective in containing the growth of the structural deficit in the run-up to the crisis. The rule-based simulated outcomes are then compared to the actual fiscal outturns over the same period, when the golden and the investment sustainability rules were in place. The chapter also presents a forward-looking exercise that illustrates how these fiscal rules behave in response to various stochastic shocks that fit the historical UK data. Fan charts quantifying the risks to the fiscal position and debt sustainability as a result of potential shocks are estimated for each rule and year of the forecasting horizon.

8. **The findings of the chapter could help guide the choice and design of a fiscal rule that could be implemented by 2015–16**. The results of the chapter suggest that:

- The rules under consideration—structural balance, expenditure, and augmented growth-based—would have outperformed the previous national rules by preventing a deterioration of the fiscal position prior to the crisis and yielding lower debt ratios.

[5] In 2009, there were 80 countries with national and/or supranational fiscal rules, compared to only seven countries in 1990 (Kumar *et al*, 2009). See Box 1 for country examples of fiscal rules.

[6] The required speed of adjustment may be excessive. Furthermore, the current uncertain economic environment may complicate the establishment of an appropriate target and the implementation of policies to attain it. The relevance of these considerations would depend on the specifics of the new rules.

[7] In mid-2009, the government announced a fiscal rule, which would require the federal government to maintain a structural deficit not exceeding 0.35 percent of GDP. This rule will take effect in 2016 with a transition period from 2011.

- All three rules ensure long-term debt sustainability in response to a constellation of adverse economic shocks. The probability that debt will fall below 60 percent of GDP by 2026/27 is about 50 percent under the three rules.

- While the choice of fiscal rule should reflect the authorities' preferences regarding the degree of countercyclicality, tolerance for debt, and simplicity, among other objectives, a structural balance rule may work well in the UK.

9. **The chapter is organized as follows**. The next section provides an overview of fiscal rules in the UK. Section C discusses simulation-based properties of different rules applied to the UK economy. Section D illustrates how different rules behave in response to macroeconomic shocks. The final section concludes.

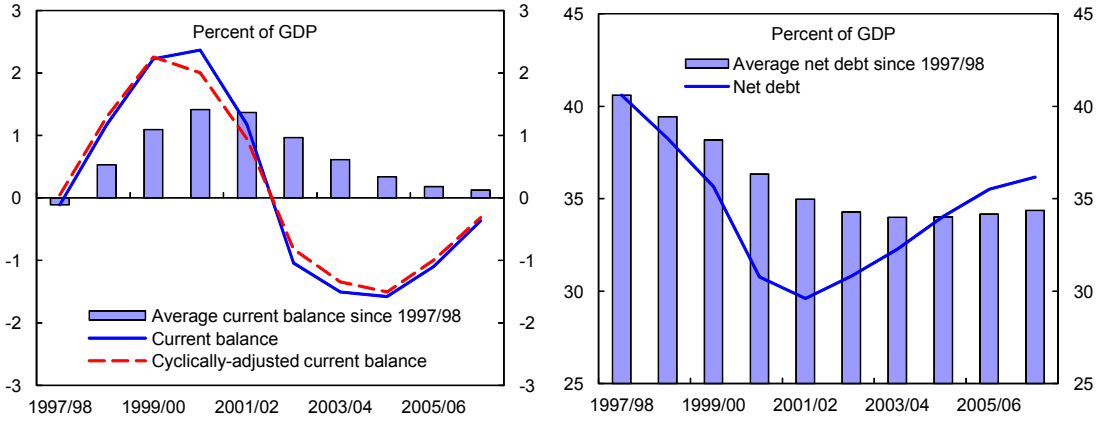
B. The Golden and Sustainable Investment Rules: Theory and Practice

In practice

10. **The government met its fiscal rules over the cycle that ran between 1997/98 and 2006/07, albeit by a small margin**. In 1998 the government adopted two fiscal rules—a golden rule and a sustainable investment rule—designed to be met over an economic cycle in order to give fiscal policy enough flexibility to smooth fluctuations in the economy while containing debt. The golden rule stated that the government should only borrow to fund investment, not current spending. More specifically, it required the current budget to be in balance or surplus on average *over the economic cycle*. The sustainable investment rule required that public sector net debt should not exceed 40 percent of GDP. The Treasury judged that the cycle started in 1997 and ended in 2007. Over this period, the current budget, which excludes capital investment, averaged 0.1 percent of GDP, meeting the golden rule by a small margin. At the same time, public net debt averaged about 35 percent of GDP, thereby meeting the sustainable investment rule (Figure 1).

11. **Nevertheless, the rules did not prevent a significant deterioration of the UK budgetary position in the run-up to the crisis, which eventually led to the breaching and abeyance of the rules**. The overall fiscal balance averaged -2¾ percent of GDP between 2002/03 and 2006/07, compared to a surplus of about 1 percent of GDP in the preceding years. The bulk of this deterioration was structural and primarily reflected increases in spending on public services. The risk of breaching the golden rule increased sharply in the second half of the cycle. Indeed, the average balance on the current budget since the beginning of the cycle started to decline in 2002 and got very close to the breaching threshold by 2007. Koeva (2005) concluded that meeting the golden rule with a high degree of confidence would require on average a current surplus of 0.5-2.5 percent of GDP and that fiscal policy in 2004 did not conform to a reasonable probability of meeting the golden rule. The absence of any safety margin as the economy entered the crisis forced the government to abandon the rules in 2008.

Figure 1. Meeting the Golden and Sustainable Investment Rules



Sources: Office for National Statistics; and IMF staff calculations.

In theory

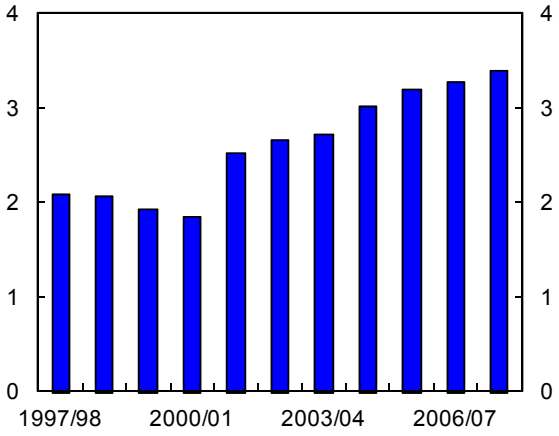
12. **The golden and sustainable investment rules can be assessed against key criteria for effective fiscal rules**. To be effective, fiscal rules should: anchor public debt sustainability; allow countercyclical policy response; ensure transparency, clarity, and ease of monitoring; and provide credibility and guidance for fiscal policy. Furthermore, rules need to include effective enforcement and accountability mechanisms. Other considerations for using fiscal rules include the ability to support intergenerational fairness.

- ***Sustainable investment rule***. Debt rules are, in theory, effective in terms of ensuring convergence to a debt target or at keeping debt below a given ceiling. Debt rules conform to intergenerational equity objectives as they avoid the creation of excessive burdens of debt repayments on future generations. However, they do not provide enough guidance when debt is below its ceiling. Furthermore, policy slippages are only reflected in debt ratios with a lag. Thus, remedial action may come too late to avoid adverse debt dynamics or market reaction. Debt could also increase abruptly as a result of one-off financing operations, such as the interventions in the financial sector during the 2008–09 global crisis. The resulting debt volatility could have undesirable implications, such as requiring unrealistically large fiscal adjustments to meet the rule. Finally, debt rules designed to be met every year provide little cyclical flexibility and are likely to require highly procyclical policy responses, since debt-to-GDP ratios typically rise sharply in recessions and fall during booms.

- ***Golden rule***. Golden rules target the overall balance net of capital spending. The rationale for such a specification is usually to promote and protect capital spending, which is often seen as more pro-growth than other types of spending, by excluding it from the rule. Such a rule can also be consistent with intergenerational equity, since public consumption that benefits the current generation is paid for by that generation. However, if such a rule promotes rapid capital spending growth (possibly including through incentives to label more types of spending as capital spending), this could

undermine fiscal sustainability. As a result, golden rules are less linked to debt sustainability than overall balance or debt rules. Indeed, after the adoption of the golden rule in 1997, capital spending in the UK increased significantly as a share of GDP (Figure 2), contributing to the deterioration in the fiscal position. Moreover, there are alternative mechanisms for protecting capital spending while still covering under a broader rule. For example, a rule covering the overall or primary balance combined with a (relatively modest) floor on capital spending could protect capital spending from being cut excessively while still restricting its excessive expansion.

Figure 2. Capital Spending
(Percent of GDP)



Source: Office for National Statistics (ONS).

- ***Over the cycle***. Rules defined over the cycle provide high budgetary flexibility to output shocks, as they provide room for the operation of automatic stabilizers and for discretionary fiscal stimulus. However, greater flexibility may come at the expense of less credibility, as these rules could lead to excessively loose fiscal policy at times during the cycle. In addition, monitoring the performance of the rule requires precise dating of the cycle, which hinges on the methodology used and the stability of national accounts data. In practice, the dating of economic cycles involves a degree of judgment, which can be controversial. And since the length and level of peaks and troughs of any cycle are unknown until the cycle is complete, the performance of the rule is only fully tested ex-post.

13. **Each fiscal rule entails a different weighting of objectives**. Figure 3 illustrates the "tradeoffs" involved in a debt rule and in a golden rule over the cycle vis-à-vis four of the criteria for effective fiscal rules discussed above, namely the ability to anchor debt sustainability, allow for countercyclical policy response, provide clear operational guidance, and ensure transparency and ease of monitoring. The shaded area within the diamond represents the overall benefit accruing from the adoption of a particular rule.[8] In the case of the golden rule over the cycle, the high degree of policy flexibility may come at the expense of transparency, ease of monitoring, and operational guidance. Conversely, a debt rule prioritizes the link to debt sustainability, but may exhibit weak countercyclical properties.

[8] See Kumar *et al* (2010) for further examples of assessing criteria for fiscal rules.

Box 1. Country Examples of Fiscal Rules

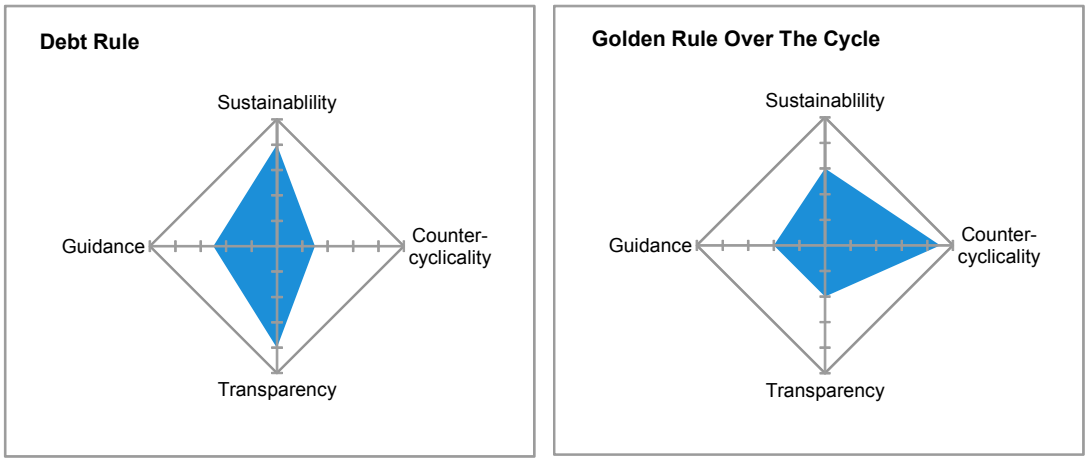
Structural balance rule in Germany
In June 2009, the German parliament amended the constitution to include a new rule for both federal and state governments. The rule requires the federal government's structural deficit not to exceed 0.35 percent of GDP. The rule becomes binding in 2016, with a transition period starting in 2011. The states will be bound by a balanced structural budget from 2020. Execution errors are cumulated in a notional account that has to be corrected once errors accumulate above 1 percent of GDP. However, the adjustment only needs to start after an economic recovery is in place to avoid a procyclical tightening. The provisions allow for an escape clause that can be invoked by parliamentary majority in the event of natural catastrophes and other emergencies outside government control.

Swiss debt-brake rule
This rule took effect in 2003 with the objective of stabilizing government debt, which had increased rapidly during the 1990s. The rule specifies a one-year ahead ex-ante ceiling on central government expenditure equal to predicted revenue, adjusted by a factor reflecting the cyclical position of the economy. Effectively, the rule aims at maintaining a structural budget balance every year. It is then possible to run deficits in a recession, but over the medium-term deficits and surpluses are expected to cancel out. Differences between budget targets and outcomes are recorded in a notional account. If the negative balance in the account exceeds 6 percent of expenditure, the authorities are required by law to take measures sufficient to reduce the balance below this level within three years. An escape clause exists, by which Parliament may allow deviations to the rule in exceptional circumstances. For details see Danninger (2002).

Augmented growth-based balance rule in Turkey
Turkey has recently considered adopting a fiscal rule that promotes countercyclical policy while circumventing the need to estimate the output gap. The draft law submitted to Parliament specifies a general government deficit target of 1 percent of GDP. In any given year, the actual deficit may deviate from the target to account for cyclical developments. In this case, the deficit may react to changes in the growth rate (relative to the long-run trend of 5 percent), rather than changes in the output gap. In addition, the rule allows gradual adjustment when the deficit is away from its medium-term target. As a result, the amount of required adjustment in any given year would almost always be feasible, making the rule more politically durable. For details see Fletcher and Benelli (2010).

Expenditure rule in Finland
A system of multi-annual expenditure ceilings was initiated in Finland in 2003 to rein in public expenditure and consolidate public debt. The ceilings are set in real terms for a four-year period at the start of a new government. Every March, ahead of the budget, the government converts real ceilings into nominal ceilings using an updated deflator of the central government price index. Local government, public enterprises, and about a quarter of the central government budget are excluded from the ceilings. The deficits are not explicitly anchored in debt and deficit limits. Compliance and monitoring is done primarily by the finance minister, and there are no formal sanctions for exceeding the ceilings. But commitment to the ceiling has been high. See Ljungman (2008) for a survey of expenditure ceilings.

Figure 3. Weighting of Criteria for Fiscal Rules



Source: IMF staff calculations. A maximum of 5 is assigned to each criteria.

C. Alternative Fiscal Rules Under the Observed Economic Cycle in the UK

14. **This section analyzes fiscal outcomes under various fiscal rules had they been in place in the UK during the decade starting in 1997**. We simulate the hypothetical path of key fiscal variables dictated by three alternative fiscal rules in response to the actual economic cycle of the UK since 1997. This enables the comparison of the behavior of the rules to one another and to actual fiscal policy in the UK when the golden and sustainable investment rules were in place.

15. **The following three rules are analyzed**. A formal representation of these rules and the choice of the parameter values are discussed in Box 2.

- ***Structural balance rule***. This rule allows for temporary deviations in the overall fiscal balance from its medium-term structural deficit target according to cyclical developments. In particular, the rule allows full operation of automatic stabilizers, calling for larger deficits (or lower surpluses) when the output gap is negative and requiring lower deficits (or higher surpluses) when the output gap is positive.[9] The target is set at a level that is consistent with a pre-determined long-term fiscal sustainability target. Given the government's objective in 1997 to bring net debt below 40 percent of GDP, the baseline simulations assume a structural balance target of -0.9 percent of GDP (see Box 3 for details). In the baseline simulations, the

[9] From the simulation exercise point of view, there is no difference between a structural balance rule and the Swiss debt brake described in Box 1. Both rules aim at maintaining a structural balance target, allowing for cyclical factors. Both rules can embed an automatic correction mechanism (debt brake) for deviations due to discretionary policy or forecast errors, as is the case in the Swiss rule and in the new German rule. Since the simulations assume no deviations from the rule, this correction mechanism is not triggered.

Box 2. Analytical Definitions of Fiscal Rules

Structural balance rule

Under a structural balance rule, the overall budget balance in any given year is equal to the medium-term overall balance target adjusted for changes in the output gap. Formally,

$$b_t = b^* + a\, y_t^G \ , \qquad a>0$$

where b_t is the overall balance (as a percent of GDP) in the current year, b^* is the medium-term overall balance target (as a percent of GDP), a is the semi-elasticity of the budget balance with respect to the output gap, and y_t^G is the output gap in the current year. In the baseline simulations, a is equal to 0.45 (as in Girouard and Andre, 2005) and b^* is equal to -0.9 percent of GDP (see Box 3). With this value for the "cyclical coefficient" (a), the rule allows automatic stabilizers to work fully, but no discretionary countercyclical policy is allowed. Sensitivity analysis is performed to show how the rule would behave using higher values for a that allow discretionary countercyclical policy.

Augmented growth-based balance (AGB) rule

This rule aims to broadly mimic a structural balance rule, but makes some adjustments to avoid relying on output gap estimates, which in some cases are uncertain and subject to revision. To do this, the rule first replaces the output gap with the difference between actual and long-term growth. To promote countercyclicality and avoid requiring an unrealistically large adjustment in any single year, the rule also includes a term that smoothes the adjustment from any deviation from the medium-term overall balance target in the previous year. In other words, this term delays the adjustment of the balance back to target. Formally,

$$b_t = b^* + a\,(g_t - g^*) + c\,(b_{t-1} - b^*) \ , \qquad a>0 \ , \qquad 0<c<1$$

where a, b_t, and b^* are defined as for the structural balance rule and c is the pace of adjustment when the overall balance in the previous year, b_{t-1}, is away from the medium-term target b^*. A smaller coefficient c implies a faster correction. In the baseline simulations, a = 0.45, b^* = -0.9, g^* = 2.3 percent (average growth from 1970-1997), and c = 0.65. Sensitivity analyses are performed using different values for the parameters a and c.

Box 2. Analytical Definitions of Fiscal Rules (continued)

Another way to see this rule's logic is to view it in first differences by subtracting b_{t-1} from both sides:

$$b_t - b_{t-1} = (1-c)(b^* - b_{t-1}) + a(g_t - g^*)$$

This shows that the rule sets a minimum change in the overall balance each year. This change is a function of (i) how far the overall balance is from its medium-term target (this promotes convergence back to the target) and (ii) how strong growth is in the current year (this promotes countercyclical policy). The rule essentially establishes a minimum amount of structural adjustment each year, with more structural adjustment required when the overall balance is further below its medium-term target. To see this, note that if g^* equals potential growth, then the percentage change in the output gap in the current year can be approximated by $(g_t - g^*)$. If the coefficient a is set just to reflect automatic stabilizers, then the structural adjustment in any given year is the following:

$$\text{Structural adjustment in current year} = b_t - b_{t-1} - a(g_t - g^*) = (1-c)(b^* - b_{t-1})$$

which shows that the required amount of structural adjustment each year is a function of how far the overall balance is from its medium-term target. In this way, the rule promotes convergence back to the medium-term target while allowing countercyclical policy and avoiding output gap estimates.

Expenditure rule

An expenditure rule dictates the growth rate of budgetary expenditure in real terms. In the simulations, the rate of growth is fixed at a predetermined level, equal to the average of real GDP growth between 1970 and 1997 (2.3 percent). Sensitivity analyses are performed using rolling averages of the rate of real output recorded in previous periods.

Box 3. Setting a Structural Balance Target

Given an initial debt ratio, d_0, and a target debt ratio, d_N^*, to be achieved in *N* periods, the constant overall balance, b^*, that reaches the target debt ratio in *N* periods is given by:

$$b_N^* = \frac{-\gamma}{(1+\gamma)((1+\gamma)^N - 1)}((1+\gamma)^N d_N^* - d_0)$$

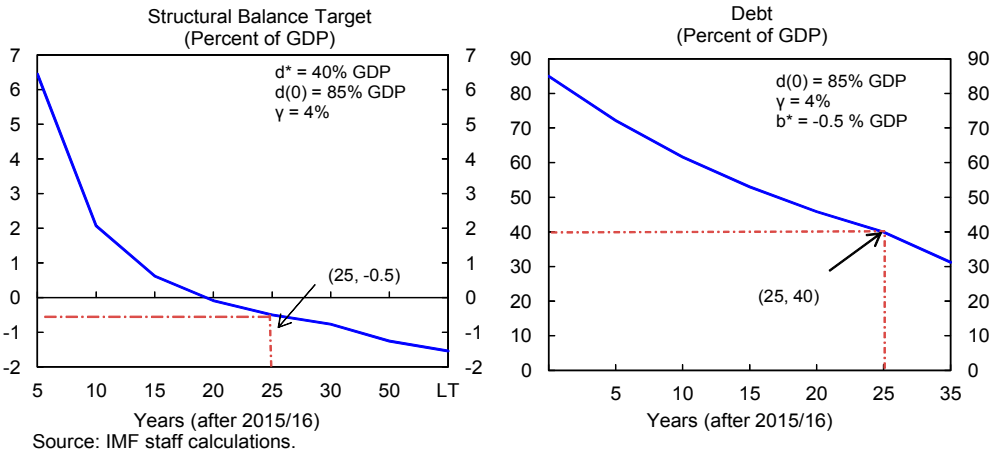
where γ is the long-run growth rate of nominal GDP.

The overall balance that will bring the debt ratio to a level d^*over the long term ($N \to \infty$) is given by b^*below. Thus, if the overall balance target is set at a constant level b^*, the actual debt ratio will *asymptotically* converge to d^* from any initial level (Escolano, 2010).

$$b^* = -\frac{\gamma}{1+\gamma} d^*$$

Balance target in the simulations using historical data (section C)
In section C, the structural balance target is set at -0.9 percent of GDP. This is the balance that would bring the debt ratio down to 40 percent of GDP over 10 years, given initial conditions in 1997. In 1997, the debt ratio was about 50 percent of GDP, trend growth was about 2.3 percent (average growth during 1970-1996), and the inflation target was 2 percent.

Medium-term balance target in the stochastic simulations (section D)
The sharp increase in debt as a result of the recession and the expected increase in age-related costs call for a more stringent balance target in the period ahead. A fiscal rule starting after 2015/16 could embed a structural balance target of -0.5 percent of GDP. As the charts below show, this is consistent with reaching a target debt ratio of 40 percent of GDP in 25 years, given an initial debt level of about 85 percent of GDP in 2015/16, an inflation target of 2 percent, and a long-term real growth rate of 2 percent.



Source: IMF staff calculations.

structural balance rule only allows for automatic stabilizers, but sensitivity analysis is performed to show how the variation of the deficit with the cycle could be increased to allow for discretionary countercyclical policy.

- ***Augmented growth-based balance (AGB) rule***. This rule sets a medium-term target for the overall balance. The balance is then permitted to be lower than the medium-term target in years when economic growth is below trend, while in years when actual growth is faster than trend growth, a higher balance is required, all other things equal. The rule also allows for gradual adjustment back to the medium-term target in the event past shocks cause the balance to deviate from its medium-term target level. In this way, the rule promotes countercyclical policy (broadly mimicking a structural balance rule), but without requiring explicit estimates of the level of the output gap.

- ***Expenditure rule***. This rule sets a ceiling for the annual growth rate of real expenditure. Revenue is not constrained by the rule and, for simulation purposes, is assumed to follow the path of actual revenue. In the simulations, the rate of real expenditure growth is linked to the long-term rate of real GDP growth. In practice, however, fiscal consolidation or debt sustainability needs may require tighter spending limits.

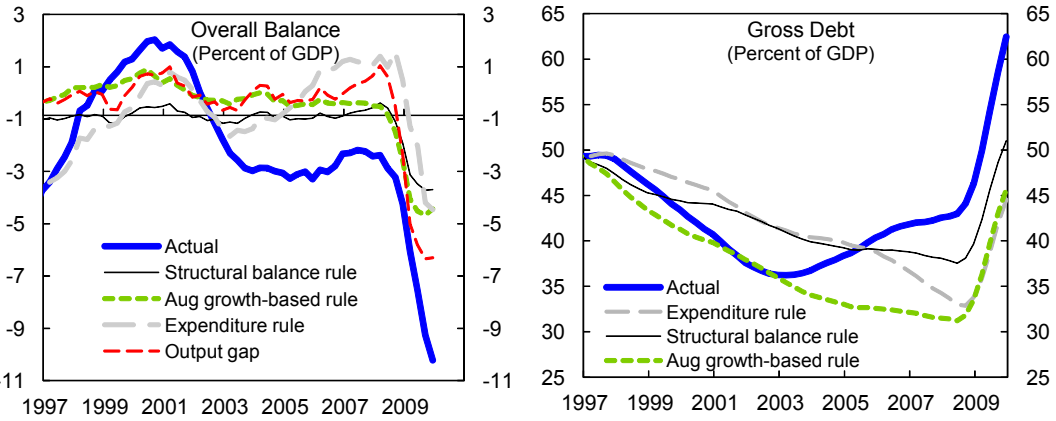
16. **During the pre-crisis period (1997–2007), the three alternative rules would have delivered better fiscal outcomes than the actual policy stance under the golden and sustainable investment rules (Figure 4)**.[10] In particular, the alternative rules would have been more effective in:

- ***Preventing a deterioration of fiscal finances in the run-up to the crisis***. Fiscal policy was quite expansionary and procyclical during 2002–07, with the deficit averaging 2.5 percent of GDP. In contrast, the average deficit implied by the rules during 2002–07 would have been in the range of 0.2-0.9 percent of GDP.

- ***Reducing debt***. After a period of consolidation, the debt-to-GDP ratio started to increase in 2002. In contrast, the debt ratio would have kept falling under the three alternative rules. In particular, the debt ratio would have been between 5 and 9 percentage points lower by the end of 2007 than that implied by the actual policy stance (Table 1).

[10] Note that in analyzing the response of the rules, these simulations take the actual output path as exogenously given.

Figure 4. Alternative Fiscal Rules Applied to the UK 1/



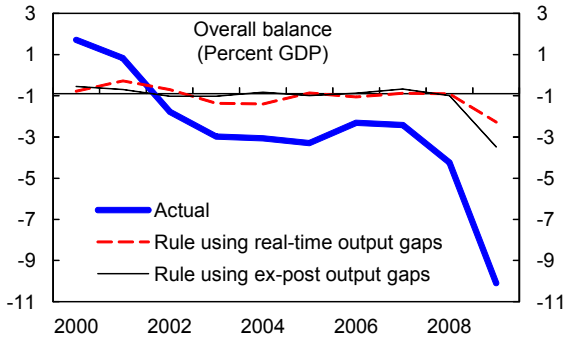
Sources: ONS; and IMF staff calculations.

1/ The simulations assume a structural debt target of -0.9 percent of GDP; trend real GDP growth of 2.3 percent; semi-elasticity of the overall balance to the output gap of 0.45; adjustment coefficient in the augmented growth-based rule of 0.65; and real discretionary expenditure growth equal to long-term real GDP growth.

17. **Simulation results suggest that the observed policy stance after 2002 was more expansionary than warranted by cyclical considerations, with expenditure growing significantly above output**. The rules' better performance stems from:

- ***Structural balance rule***: During 2002–07, the average output gap was close to zero. Therefore, the simulated path under the structural balance rule does not deviate much from the structural target of -0.9 percent of GDP. The observed policy stance, which yielded an average balance of -2.5 percent of GDP, was not the result of uncertainty about the size of the output gap or lack of accuracy in estimating the gap.[11] Indeed, if the rule is simulated using ex-ante (instead of ex-post) estimates of the output gap, the results are very similar (Figure 5). This suggests that fiscal policy was too expansionary to be consistent with a medium-term debt target of 40 percent of GDP.

Figure 5. Structural Balance Rule and Output Gaps



Sources: ONS; HM Treasury; and IMF staff calculations.

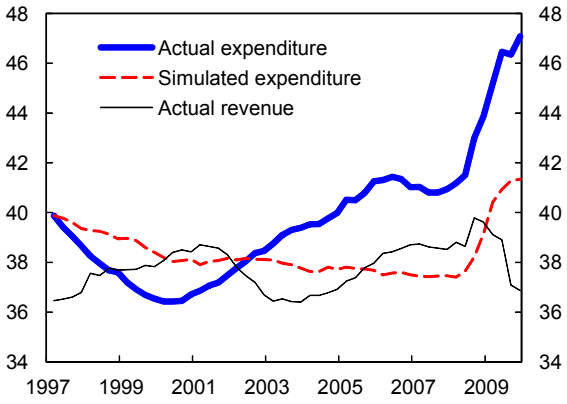
- ***Augmented growth-based rule***: During the pre-crisis period, actual real GDP grew faster than the trend growth rate used to calibrate the rule (based on average growth during 1970–97). This causes the rule to call for lower deficits than the medium-term target. As a result, the average balance implied by the rule is -0.3 percent of GDP,

[11] The average ex-post gap in 2002-2007 was -0.1 percent, compared to an ex-ante estimate of -0.4 percent.

compared to the target of -0.9 percent of GDP and the observed average balance of -2.5 percent of GDP.

- ***Expenditure rule***: The rule sets a ceiling for the real growth of expenditure equal to trend output growth. With actual expenditure growing twice as fast and real GDP growing above trend, simulated expenditure-to-GDP ratios under the rule are much smaller than actually occurred (Figure 6). This, together with the strong growth of revenue observed during this period, results in a much lower average balance (-0.2 percent of GDP) under the expenditure rule. However, it is unclear that revenue would have performed so strongly if an expenditure rule had actually been in place, since in this case temptations for fiscal easing might have been channeled into tax cuts, which are unconstrained by an expenditure rule.

Figure 6. Expenditure and Revenue under Expenditure Rule (Percent of GDP)



Sources: ONS; HM Treasury; and IMF staff calculations.

18. **The rules would have allowed less of an increase in the deficit during the recession than actually occurred (Table 1)**.[12] The smaller increase in the deficit implied by the structural balance rule suggests that much of the observed deterioration since 2007 is structural in nature. Under an AGB rule, the increase in the deficit would have been slightly larger than under a structural balance rule, but still much smaller than actually occurred.[13] While the simulated expenditure rule would have accommodated the sharp loss of revenue from the financial and property sectors, it also would have allowed less fiscal easing than actually occurred. This is because part of the actual deterioration was due to rapid real spending growth, reflecting spending plans that were set in nominal terms in the 2007 spending review and maintained during 2008–09, despite much weaker-than-expected inflation. In practice, it is possible that such higher-than-expected deficits due to lower-than-budgeted inflation would have also occurred to some degree under all of the rules, since all of the rules eventually rely on nominal spending limits in the budget to achieve the targeted stance. However, a significant part of the increase in the deficit during the recession was due

[12] Note that these simulations do not include the effect that different fiscal balance levels could have on output.

[13] The larger increase in the deficit under the AGB rule relative to the structural balance rule is mainly because, for a given revenue-to-GDP ratio, a structural balance rule effectively allows real spending to grow at the rate of estimated potential real GDP growth, which fell during the recession down to an average of about 1 percent over 2008-09. In contrast, the AGB rule effectively allows real spending to grow at the trend growth rate (2.3 percent), which is fixed in the rule and does not change during the recession.

to discretionary stimulus, and this would not generally have been allowed under the structural balance and AGB rules if, as is the case so far in the simulations, the rules are parameterized to allow only automatic stabilizers (a=0.45).

Table 1. Change in Fiscal Policy Stance 1/
(Percentage points of GDP)

	Prior to crisis		During crisis	
	Fiscal balance	Debt	Fiscal balance	Debt
Actual policy stance	-2.4	6	-7.8	20
Structural balance rule	0.5	-5	-3.3	13
Augmented growth-based (AGB) rule	-0.3	-6	-3.9	14
Expenditure rule	1.7	-9	-5.9	11

Source: ONS and IMF staff calculations.

1/ "Prior to crisis" refers to the period between Q1-2002 and Q1-2008. "During crisis" refers to the period between Q1-2008 and Q4-2009. Changes in the fiscal balance exclude the effects of financial sector interventions for both actual policy and the rules. Actual changes in valuations were used in all debt simulations.

19. **To allow for more active countercyclical policy, the cyclical coefficient (a) in the structural balance and AGB rules could be increased**. Table 2 and Figure 7 show how the simulated fiscal balance under the rules would change as the cyclical coefficient is progressively increased from 0.45 (which only allows automatic stabilizers) to 1.0. Higher cyclical coefficients allow more discretionary fiscal stimulus during recessions while requiring more discretionary fiscal tightening during booms. With higher cyclical coefficients, the structural balance and AGB rules would have allowed a similar amount of fiscal stimulus during the recession as actually occurred. However, while the *change* in the deficit would have been similar to the actual outcome, the *level* of the deficit at end-2009 would still have been lower under these rules, as they would have required smaller deficits in the run-up to the crisis than actually occurred. Promoting such a build-up of countercyclical buffers during the boom is a key way in which the rules would have outperformed actual policy.

Table 2. Change in Fiscal Balance During the Crisis 1/
(Percentage points of GDP)

Actual policy stance	-7.8
Structural balance rule	
a=0.45	-3.3
a=0.60	-4.4
a=0.75	-5.5
a=1.00	-7.3
Augmented growth-based rule	
a=0.45	-3.9
a=0.60	-5.2
a=0.75	-6.5
a=1.00	-8.7
Expenditure rule	-5.9

Sources: ONS and IMF staff calculations.

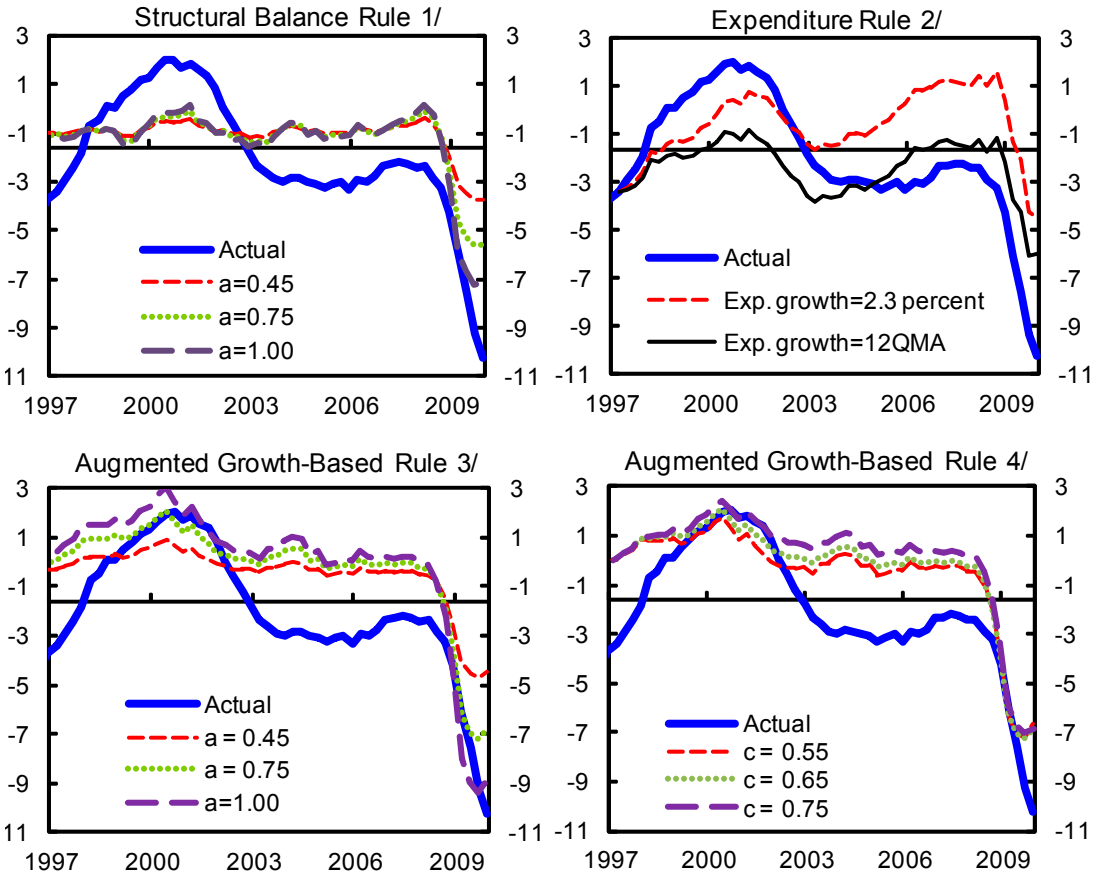
1/ "During crisis" refers to the period between Q1-2008 and Q4-2009. Changes exclude the effects of financial sector interventions for both actual policy and the rules.

20. **Figure 7 illustrates how the fiscal balance under the rules changes when subject to different assumptions on other key parameters**:

- Varying the AGB rule's adjustment coefficient (c) over reasonable values would not have significantly affected the outcomes over the last decade. However, slower speeds of adjustment (higher values for c) back to the medium-term deficit target would make the rule somewhat more countercyclical.

- Under the expenditure rule, changes to the expenditure growth rate ceiling can affect the fiscal balance path significantly. If the expenditure growth rate is set equal to the 12-quarter moving average of growth (instead of trend growth), then expenditure growth more closely follows short-run growth trends, making the rule more procyclical. However, even under this formulation, an expenditure rule would still have built a higher fiscal balance before the crisis than occurred under actual policy.

Figure 7. Sensitivity Analysis: Overall Balance
(Percent of GDP)



Sources: ONS; and IMF staff calculations.
1/ Assumes a structural balance target of -0.9 percent of GDP.
2/ Assumes long-term real GDP growth of 2.3 percent or a 12-quarters moving average.
3/ Assumes a medium-term overall balance target of -0.9 percent of GDP; trend real GDP growth of 2.3 percent; and adjustment coefficient (c) of 0.65.
4/ Assumes a medium-term overall balance target of -0.9 percent of GDP; trend real GDP growth of 2.3 percent; and a cyclical coefficient (a) of 0.75.

21. **The relative performance of the rules varies along several dimensions that are important in the choice of fiscal rules**:

- ***Countercyclicality and flexibility in response to shocks***. In both the structural balance and AGB rules, the desired degree of average countercyclicality can generally be obtained through the choice of cyclical and adjustment coefficients. Depending on a country's preference, the rule can be set to allow only automatic stabilizers or, if desired, to allow some discretionary stimulus during recessions with offsetting tightening during booms. Under the structural balance rule, the response to the cycle will be directly proportional to the output gap. Under an AGB rule, the relationship to the output gap will be slightly less exact, as the AGB rule intentionally avoids reliance on output gap estimates.[14] Nonetheless, the AGB rule will generally mimic the cyclical pattern of a similarly calibrated structural balance rule, as demonstrated in Figure 4. The countercyclicality of an expenditure rule will depend largely on whether discretionary revenue policy, which is unconstrained under an expenditure rule, is employed in a countercyclical fashion or not. An expenditure rule will generally preclude discretionary countercyclical stimulus on the spending side.

- ***Simplicity and ease of monitoring***. The need to estimate and forecast the output gap represents the main challenge for implementing the structural balance rule, especially in periods of high uncertainty. Errors in estimating the output gap could lead to undesirable changes in the fiscal policy stance. Nonetheless, these errors had only limited consequences when applying the rule to the UK in the past (Figure 5). An annual structural balance rule, unlike one over the cycle, does not require precise dating of economic cycles and its performance is easier to monitor. An AGB rule is even easier to implement since it does not rely on output gap estimates. An expenditure rule is probably the easiest to implement and monitor, as it only requires the policymaker to set expenditure growth ceilings.

- ***Comprehensive coverage and avoidance of loopholes***. The simplicity of expenditure rules comes, however, at a significant cost—they do not constrain the revenue side of the budget. This may create temptations to spend through tax expenditures and may undermine the incentive to strengthen revenue collection and tax laws. Consequently, the risk that fiscal sustainability will be undermined by revenue reductions is much higher under expenditure rules. Similarly, the risk that large increases in capital spending will increase the deficit is much greater under a rule that only limits the

[14] Relative to a structural balance rule with the same average degree of cyclicality (as calibrated by the coefficients), the AGB rule will tend to produce more "front-loaded" fiscal policy: the fiscal stance will be more expansionary in the early stages of recessions and more contractionary in the early stages of recovery. However, Fletcher and Benelli (2010) show that the differences with a structural balance rule are typically modest—in general, the AGB rule broadly mimics the cyclical path of a structural balance rule.

current balance, as occurred after the adoption of the golden rule in the UK (Figure 2). In contrast, a key benefit of structural balance and AGB rules is that they constrain all elements of discretionary policy, thereby reducing loopholes.

- ***Response to deviations from the rule***. A fourth consideration is how the rules respond to deviations from the rule due to policy or forecasting errors. Under the structural balance rule, a deviation in the overall balance would have to be corrected immediately in the following year to get the structural balance back to the targeted level. This feature should keep the structural balance rule tightly on course. In contrast, the AGB rule allows gradual correction of past deviations. The upside of the AGB's treatment is that it reduces reliance on large adjustments in any single year. The downside is that this opens the rule to gaming (e.g., a new government may intentionally miss the rule in its first year in order to increase the deficit ceiling in subsequent years). To avoid this, the convergence term in the rule could be modified, replacing last year's actual deficit with last year's *targeted* deficit under the rule (note that, in the simulations, there is no distinction between the targeted and actual deficit, since it is assumed that the rule is met every year). Under a basic expenditure rule, deviations from the rule in past years would not require lower spending growth in future years. However, as with the AGB rule, various feedback mechanisms to require at least partial "make-up" of policy errors could be envisioned.

D. Performance of Alternative Fiscal Rules in Response to Stochastic Shocks

22. **To gain further insight about fiscal rule options in the UK, this section illustrates how different fiscal rules perform in response to macroeconomic shocks**. First, the joint distribution of economic shocks (to output, the real interest rate, and the real exchange rate) is calibrated to fit the statistical properties of the UK historical data, using a VAR framework. A large number of scenarios that capture the structure of disturbances as well as the dynamic response of the economy are generated (see Box 4 for details). Second, fiscal policy is allowed to adjust to these shocks according to the fiscal rules analyzed in section C. Finally, through repeated simulations of random shocks, fan charts are derived representing the frequency distribution of budgetary aggregates for each fiscal rule and year of projection.[15] This allows a probabilistic assessment of the fiscal policy stance and debt sustainability under realistic shock configurations. Since the implementation of any fiscal rule may not be feasible in the short term, WEO projections are used for the 2010–15 period, and the risk analysis of deficit and debt dynamics starts in 2016.

23. **Fan charts summarizing risks (upside and downside) to the fiscal position and to debt dynamics when subject to shocks are estimated for the three fiscal rules**:

[15] For presentational purposes, only the overall balance and debt-ratio simulations are shown here.

- ***Structural balance rule***. Deviations of actual output from its potential level prompted endogenously by the different shocks lead to deviations of the overall balance from the medium-term target, which is set at -0.5 percent of GDP. This more stringent target, relative to the one used for the 1997-2007 period, is warranted given worse initial conditions and the projected increase in age-related liabilities (see Box 3 for details on how the target is estimated);

- ***Augmented growth-based rule***. Shocks prompting deviations of GDP growth from its long-term trend (assumed to be 2 percent, slightly lower relative to 1997-2007) trigger changes in the overall balance relative to the target; and

- ***Expenditure rule***. Real expenditure grows at a fixed rate, assumed to be 2 percent—in line with long-term output growth.

24. **A number of results flow from the fan charts (Figure 8)**:

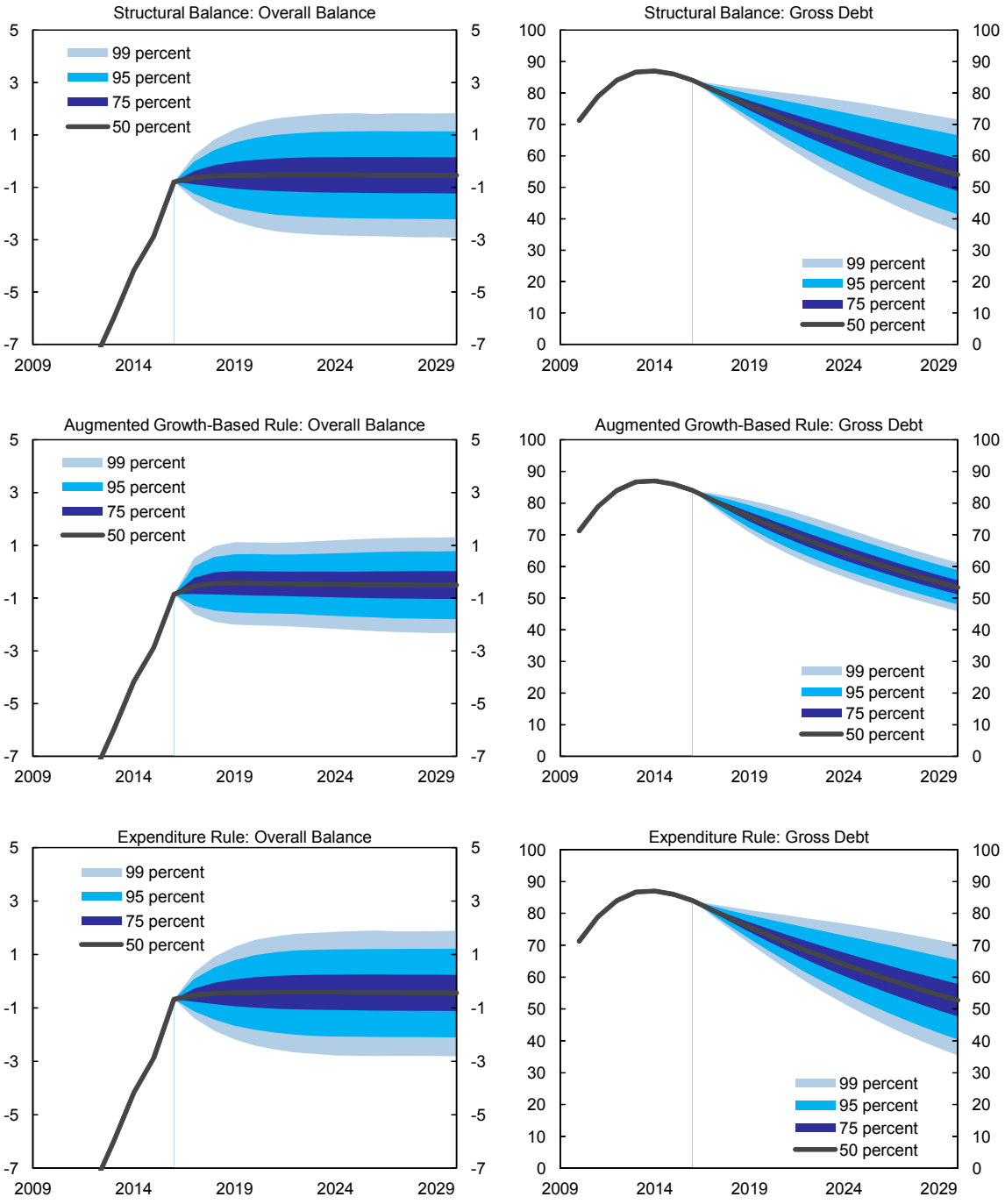
- ***The proposed rules ensure debt sustainability in response to a wide range of shocks***. The debt ratio follows a declining path over the simulation horizon under the vast majority of shock configurations. The response of all rules is strong enough to prevent debt ratios from growing above current levels (close to 90 percent of GDP).

- ***The probability that debt will fall below 60 percent of GDP by 2026 is about 50 percent under all rules.*** This takes into account all constellations of potential shocks, whose structure is based on past data, up to and including 2009.

- ***By construction, the three rules are calibrated to yield essentially the same baseline path***. Modest differences in the variation around this path reflect modest differences in the average countercyclicality of the rules as calibrated, with narrower bands coming at the cost of less countercyclicality. However, the coefficients for the structural balance and AGB rules can be adjusted to achieve the desired degree of average countercyclicality.

- ***The sustainable debt path under the expenditure rule relies on the assumption that revenue is "well behaved"; the risk with the expenditure rule is that this will not be the case in practice***. The expenditure rule simulations assume no discretionary changes in revenue policy. However, such changes are unconstrained by an expenditure rule, and the temptation to loosen revenue policies under an expenditure rule may be significant. As noted above, this failure to constrain the revenue side of the budget is a key shortcoming of expenditure rules.

Figure 8. Stochastic Simulations 1/
(Percent of GDP)



Sources: IMF staff calculations.
1/ The simulations assume a structural balance target of -0.5 percent of GDP, long-term real GDP growth of 2 percent, a cyclical coefficient (*a*) of 0.75 for the structural balance and 0.9 for the augmented growth-based rule, an adjustment coefficient (*c*) of 0.65 for the augmented growth-based rule, and a semi-elasticity of the revenue-to-GDP ratio with respect to the output gap of 0.35 for the expenditure rule.

Box 4. Stochastic Simulations of Macroeconomic Shocks

The joint distribution of shocks is calibrated to fit the statistical properties of historical data using an unrestricted VAR model. This approach is an extension to that of Celasun, et al (2006). The VAR model describes the comovements of the output gap, interest rates, and exchange rates and provides estimates of the conditional variances and covariances of the shocks. The model is estimated using quarterly data from 1980 to 2009. Formally,

$$Y_t = \gamma_0 + \sum_k \gamma_k Y_{t-k} + \xi_t$$

where $Y_t = (r_t, g_t, z_t)$ is a vector of endogenous variables, *r* is the domestic real interest rate, *g* is the output gap, *z* is the log of the real effective exchange rate, γ_k are matrices of coefficients, and $\xi \sim N(0, \Omega)$ is a vector of well-behaved error terms. The model is estimated using two lags. The variance-covariance matrix of residuals Ω characterizes the joint statistical properties of the contemporaneous shocks affecting fiscal aggregates. The VAR generates forecasts of *Y* consistent with the estimated structure of the shocks. As shocks occur each period, the VAR produces joint dynamic responses of all elements in *Y*. The model is not sensitive to the ordering of variables in the VAR.

For each simulated constellation of shocks, projections for growth, the output gap, the real interest, and the real exchange rate are generated. Similarly, projections for fiscal aggregates (overall balance, revenue, expenditure, and debt paths) dictated under each fiscal rule are constructed for each year of the forecasting horizon. Through repeated simulations (100,000 simulations) of random shocks, frequency distributions of the balance ratio and the debt ratio can be obtained for each fiscal rule and year of projection (after 2015). These are then used to draw fan charts of the fiscal aggregates, depicting confidence bands for varying degrees of uncertainty around the median projection (discussed in section D).

E. Conclusions and Policy Discussion

25. **After an appropriate transition period from the recent crisis, a well-designed fiscal rule could secure the gains of the consolidation process in the UK, support fiscal discipline, and anchor long-term expectations about fiscal sustainability**. A well-designed rule could also help moderate the business cycle by promoting countercyclical fiscal policy and could reduce the cost of borrowing by bolstering confidence in fiscal sustainability. Implementing a fiscal rule before 2015/16 might not be desirable, as a fiscal mandate to guide the consolidation process already exists, or feasible, as the required adjustment could be excessive.[16] Nonetheless, there would be value in eventually pre-

[16] The relevance of this consideration would depend in part on the specifics of the rule chosen. For example, the AGB rule allows for gradual adjustment from any starting point, which reduces or eliminates the need for a transition period.

announcing a rule-based framework to cement the policy credibility of the medium-term consolidation effort, as Germany and other countries are doing. The newly created OBR can play a central role in supporting and strengthening the operation and monitoring of the fiscal rule.

26. **The chapter finds that three alternative fiscal rules would have outperformed the national rules in place during the period 1997–2008**. The proposed rules are: (i) a structural balance rule; (ii) an AGB rule that aims to broadly mimic a structural balance rule, but without relying on output gap estimates; and (iii) an expenditure rule. The three rules would have prevented a deterioration of the fiscal balances in the years leading to the crisis and would have yielded lower debt ratios. In addition, these three rules would have provided more guidance in conducting fiscal policy, by explicitly providing a numerical objective for the relevant budgetary aggregates every year. The results suggest that the fiscal policy stance under the golden rule after 2002 was more expansionary than warranted by cyclical considerations and that the observed fast growth of expenditure was not consistent with a debt objective of 40 percent of GDP. Furthermore, the over-the-cycle feature of the golden rule added complexity, as the cycle needed to be defined and estimated, thereby reducing transparency and ease of monitoring.

27. **Stochastic simulations show that the three alternative rules deliver long-term debt sustainability under a broad constellation of adverse economic shocks**. Fan charts summarizing risks to the fiscal position and to debt dynamics show that the probability that debt will fall below 60 percent of GDP by 2026 (from about 85 percent in 2015/16) is about 50 percent under the three rules and all shock configurations.

28. **A structural balance rule with a deficit target of about 0.5 percent of GDP could work well in the UK after 2015/16**. With gross government debt expected to reach 85 percent of GDP by 20015/16 and rising age-related costs, a tight fiscal target is warranted. A structural deficit target of 0.5 percent of GDP would be consistent with a long-term debt ratio of 40 percent of GDP. The authorities' choice of the medium-term objective should aim to deliver an appropriately modest long-run debt-to-GDP ratio. With a sufficiently high cyclical coefficient (e.g., 0.6-0.9), a structural balance rule could also allow for substantial countercyclical policy while still ensuring fiscal sustainability. The recent crisis has revealed challenges in measuring potential output. However, given the characteristics of the UK economy and the Treasury's relatively good track record, estimating the output gap should not represent a major drawback in implementing the rule. The creation of an independent OBR should further strengthen economic assessments, minimizing estimation biases.[17] Nonetheless, if estimation of the output gap is viewed as

[17] If discretion in estimating the output gap is viewed as problematic, fiscal rule legislation could even specify the method by which the output gap should be calculated for purposes of determining the deficit ceiling prescribed by the structural balance rule.

problematic, an AGB rule could be an alternative, as this rule broadly mimics a structural balance rule, but without relying on explicit estimates of the output gap. In either case, the credibility of the rule can be supported by inputs from the OBR. Ultimately, however, the choice of fiscal rule should reflect the authorities' preferences regarding tolerance for debt, the degree of countercyclicality in response to shocks, and simplicity, among other objectives.

29. **Consideration could be given to the following implementation issues**:

- ***Debt brake***. A structural balance or AGB rule can embed an automatic correction mechanism or debt brake for deviations due to discretionary policy or forecast errors. Any ex-post deviation of the deficit from the target would be logged into a notional account. Once the cumulative amount in this account exceeds a pre-determined level, a correction mechanism is triggered. The Swiss and German rules include such a mechanism.

- ***Escape clause***. To provide adequate flexibility to deal with extraordinary shocks, such as natural disasters or a large financial sector recapitalization, an escape clause could be considered to exclude from the rule spending that is directly related to the emergency. To ensure that the integrity of the rule is not undermined, there should be clear guidelines so that the escape clause is not abused and it is invoked only in truly exceptional circumstances. For example, approval by a supermajority of parliament could be required to invoke such an escape clause.

- ***Enforcement***. To be effective, the rule needs to include effective enforcement and accountability mechanisms. The cost for violating the rule could range from formal sanctions to the adverse reputational impact of reneging on a public commitment. Formal enforcement could include the obligation to take corrective action. Requiring public disclosure of compliance with the rule and explanations for deviations would also bolster the reputational mechanism.

30. **However well designed the rules, there is no substitute for the government's commitment to fiscal sustainability**. It is the overall quality of the fiscal policy framework and the policymaking process, not just the presence of a rule, which determine fiscal credibility. In this context, the new government's commitment to fiscal discipline and fiscal mandate, the newly created independent fiscal agency, and the eventual establishment of a more permanent rules-based framework can reinforce each other to ensure fiscal sustainability in the UK.

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V. Recent Developments and Outlook for Major UK Banks[1]

The financial crisis severely affected the UK banking sector, prompting a forceful and wide-ranging policy response that helped increase financial stability. Over the past year, the UK banking system has recovered faster than expected: capitalization levels have increased, impairment charges have come down, and better margins led all major UK banks—including the part-nationalized ones—to return to profitability in the first half of 2010. The recent Committee of European Bank Supervisors (CEBS) stress tests confirmed the relatively good health of the largest UK banks. However, the sustainability of the sector's recovery is still uncertain, and both domestic risks (e.g., from commercial real estate exposures) and external risks (e.g., from sovereign turmoil in parts of the Eurozone) remain.

A. Policy Interventions Helped Increase Financial Sector Stability

1. **The UK authorities took a number of forceful measures during the crisis to help shore up the financial system**. Key measures include the following:

- **The UK Treasury injected a cumulative £70 billion of capital into four banks**. In November 2008, the government established UK Financial Investments Ltd (UKFI) to manage its shareholdings in banks. UKFI fully owns Bradford & Bingley and Northern Rock. In addition, it holds 41 percent of the total share capital of Lloyds Banking Group (LBG) and 83 percent of the total share capital of Royal Bank of Scotland (RBS). All four banks have undergone significant restructuring (Table 1).

- In January 2009, the Government announced the creation of an Asset Protection **Scheme (APS)**. The APS was set up to provide participating institutions with protection against future credit losses on defined portfolios of assets in exchange for a fee. The initial plan was to insure £260 billion of assets from LBG and £325 billion of assets from RBS. However, LBG subsequently took steps to stay out of the APS—notably a £13.5 billion rights issue and a £9.0 billion swap of existing debt into "contingent capital"—and paid a one-off fee of £2.5 billion to the government. RBS, in turn, reduced the amount of insured assets to £282 billion. On these assets, RBS remains liable for the first £60 billion of losses as well as 10 percent of all losses beyond this amount. The Asset Protection Agency (APA) stated in its July 2010 annual report that it projects an eventual net loss of £57 billion for RBS on the APS assets, just below the first-loss threshold. The APA thus expressed confidence that the government would not have to make a payment under the APS in the central scenario.

[1] Prepared by Vanessa Le Leslé, with research assistance by Morgane de Tollenaere (both MCM). This chapter aims to provide only a brief overview of themes concerning selected major UK banks and is based only on publicly available information. As such, coverage of the most recent developments is constrained by the more limited extent of banks' half-year reporting and the unavailability of detailed bank-by-bank information based, for example, on regulatory returns. A more in-depth analysis of the UK's financial system will be conducted by staff in 2011 under the auspices of the "Financial Sector Assessment Program" (FSAP).

Table 1. Key Bank Restructuring Measures[2]

Bank	Measures
Northern Rock[3]	September 2007: Liquidity support and government guarantee for deposits. February 2008: Temporary nationalization. October 2009: European Commission (EC) approves state aid package. January 2010: Bank to be split into (i) a "BankCo", with a balance sheet of approximately £20 billion, that will continue lending and other activities and (ii) an "AssetCo," which will run down the remaining assets.
Bradford & Bingley[4]	September 2008: Nationalization; branches and retail deposit book are sold to Abbey (owned by Santander). January 2010: EC approves state aid. March 2010: UKFI announces the integration of Bradford & Bingley's mortgage business with the "AssetCo" of Northern Rock; this is implemented via the establishment in October 2010 of United Kingdom Asset Resolution Ltd.
RBS[5]	December 2009: EC approves restructuring plan. Activities are separated between "core" and "non-core" divisions. The latter will be divested or run down, and the balance sheet will be reduced by approximately 20 percent compared to end-2008. Changes to geographic and specific business lines are imposed. RBS branches in England and Wales and NatWest branches in Scotland, RBS Insurance, Global Merchant Services, and the stake in RBS Sempra Commodities are to be divested. Restrictions on the payment of dividends and coupons are imposed. Prohibition on significant acquisitions until at least end-December 2012.
LBG[6]	September 2008: Merger between Lloyds TSB and HBOS announced. January 2009: LBG is formed after the acquisition of HBOS by Lloyds TSB. November 2009: EC approves a restructuring plan, which entails (i) asset reductions amounting to £181.5 billion (plus £33.2 billion for the sale of LBG's Australian retail operations); (ii) £71 billion of assets to be ring-fenced and sold through divestments of the TSB brand (600 retail banking branches), C&G branches, and Intelligence Finance; (iii) a two-year prohibition on discretionary dividend and coupon payments/calls; (iv) a prohibition on significant acquisitions until at least end-December 2012; and (v) changes in HBOS senior management and review of risks and processes across LBG.

Sources: European Commission and HM Treasury

In April 2008, the Bank of England introduced exceptional liquidity support through the **Special Liquidity Scheme** (SLS) to allow banks to swap their high-quality but illiquid mortgage-backed and other securities for UK Treasury bills for up to three

[2]A more comprehensive timeline of crisis events is provided in the Annex of the June 2009 Bank of England Financial Stability Report.

[3] http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_C14_2008

[4] http://ec.europa.eu/community_law/state_aids/comp-2009/n194-09.pdf

[5] http://ec.europa.eu/community_law/state_aids/comp-2009/n422-09.pdf

[6] http://ec.europa.eu/community_law/state_aids/comp-2009/n428-09.pdf

years. The SLS was extended in October 2008, leading to a total utilization of £185 billion by the end of the drawdown period on January 30, 2009. At end-February 2010, £165 billion remained outstanding, but banks have continued to make repayments since. The final swap transactions under the SLS will be unwound by end-January 2012.

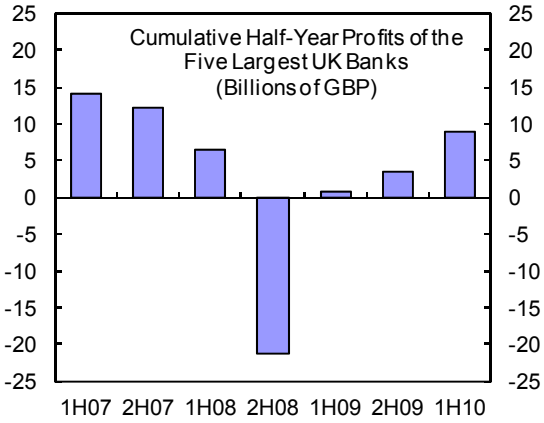
- The Bank of England also provided **temporary liquidity support** as a lender of last resort to Northern Rock in 2007 and to HBOS and RBS in 2008. Collateralized loans to the latter two banks reached a combined maximum amount of nearly £62 billion in October 2008. Both banks had repaid the cash by mid-January 2009, but the loans were only disclosed to the public in November 2009.

- Additional funding support was introduced by the Treasury through the **Credit Guarantee Scheme** (CGS).[7] Operational in October 2008, the CGS provided a government guarantee for short-and medium-term debt (one month up to three years) issued by banks. The CGS closed to new issuance at end-February 2010, but eligible institutions are still able to refinance debt already guaranteed under the scheme. The amount outstanding in late March 2010 was £125 billion.

B. UK Banking System is on a Path to Recovery

2. **The health of the UK banking system has improved considerably over the last year**:

Profitability has continued to recover in 2010, with UK banks reporting solid results for the first half of the year. The five largest banks reported a combined net profit of £9 billion in 1H10 versus only £1 billion a year ago.[8] Importantly, this included a return to profitability by both of the part-nationalized banks (LBG and RBS). Faster-than-expected cyclical recoveries in impairments and higher margins were the main drivers explaining the bottom-line improvement. Strong margin re-pricing, particularly on mortgages, was a key positive feature for LBG and



Sources: Bloomberg; and IMF staff calculations.

[7] More information is available on the website of the UK Debt Management Office.

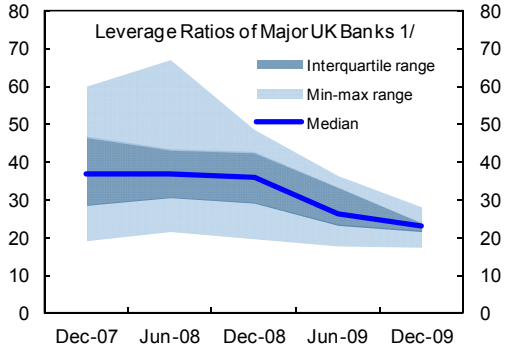
[8] The data generally refer to the five largest UK-owned banks (according to Fund staff's classification): Barclays, HSBC, LBG, RBS, and Standard Chartered. However, this sample differs slightly in the chapter depending on data availability.

RBS in the first half of the year. Investment banking revenues (primarily for Barclays) were still strong in the first quarter of 2010, but have gradually come down from their elevated 2009 levels; indicators for the third quarter point to a further moderation.

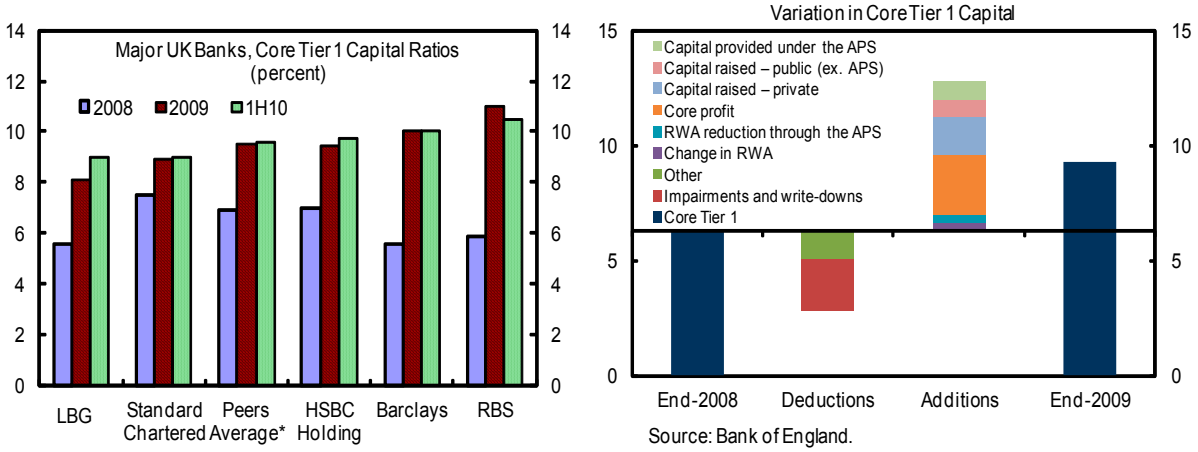
- Low interest rates and the relatively limited increase in unemployment over the last year helped maintain loan affordability and repayment capacity. Impairment charges peaked in 2009 and declined significantly in 1H10. Thus, cumulative loan loss provisions among the five major UK banks were 40 percent lower in 1H10 than a year ago.

- Following the positive outcome of the CEBS stress tests and clarification of the Basel blueprint for regulatory reform in July 2010, the major UK banks were able to return to funding markets that had been effectively closed during the spring (when the sovereign debt turmoil in some Eurozone countries reached its peak). Issuance of senior unsecured debt, covered bonds, and residential mortgage-backed securities was strong in both August and September 2010. UK banks have also increased their use of private placements to diversify away from issuance in volatile capital markets only.

- The large UK banks continued to strengthen their capital bases. Their average Core Tier 1 capital ratio increased significantly from 6.3 percent at end-2008 to 9.6 percent in 1H10. Banks have increased capital ratios through a combination of actions on the numerator and denominator, including (i) the issuance of common equity (Barclays, HSBC, LBG); (ii) debt buyback and exchanges (e.g., LBG); (iii) higher net profits and increased earnings retention through more prudent dividend and bonus policies; (iv) disposal of non-core assets (LBG and RBS); (v) a reduction in risk-weighted assets due to improving asset quality and, in the case of RBS, participation in the APS; and (vi) sale of profitable business lines (Barclays's BGI sold to BlackRock). These developments also helped bring leverage ratios down significantly.



Source: Bank of England.
1/ Adjusted assets over adjusted capital. Assets are adjusted by netting derivatives and adjusting for cash items, tax, and intangible assets. Capital excludes Tier 2 instruments, preference shares, hybrids and intangibles.



Sources: Company reports; and IMF staff calculations.

C. UK banks Stronger than Average in the CEBS Stress Tests[9]

3. **UK banks performed above average in the CEBS stress tests of European banks**. The aggregate Tier 1 capital ratio (for the four UK banks included in the CEBS tests) would decline from 12.0 percent in 2009 to 11.1 percent in the worst case scenario, versus a decline from 10.3 percent to 9.2 percent for the average bank in the CEBS exercise. Three main reasons explain the comparatively good showing of UK banks: (i) a relatively good starting position, with end-2009 Tier 1 capital substantially higher than pre-crisis levels; (ii) good profitability, generating a continued build-up in capital under the baseline; and (iii) relative to the European average, more limited exposure (in percent of total assets, both in the banking and trading book) to the EU countries most vulnerable to a sovereign risk shock.[10] That said, the UK banking sector's exposure is significantly more concentrated on Ireland, notably for RBS (Table 2).

[9] For more on the CEBS stress tests, see http://www.c-ebs.org/EuWideStressTesting.aspx

[10] Although UK banks are less exposed to the EU-4 than many European peers *in relation to total banking system assets*, UK banks' exposure is roughly similar to that of, say, French or German banks *in percent of GDP*, reflecting the UK's large banking system relative to GDP.

Table 2. Exposure of UK Banks to Selected European Sovereigns
(Millions of GBP)

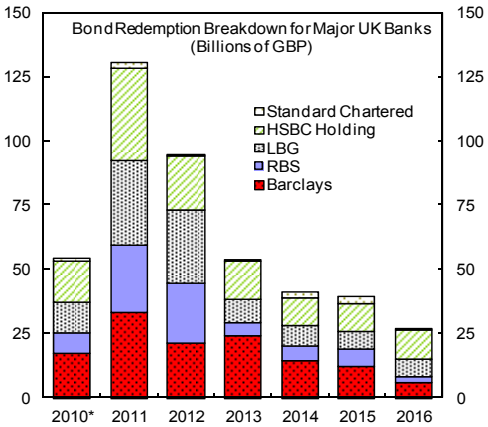
	Greece		Ireland		Portugal		Spain		Total EU-4 exposure 1/
	Banking Book	Trading Book	Banking Book	Trading Book	Banking Book	Trading Book	Banking Book	Trading Book	
Barclays	89	299	140	6	838	187	4,466	-90	5,935
HSBC	366	1,569	-	816	472	226	1	100	3,550
Lloyds BG	-	-	-	-	143	-	-	-	143
RBS	1,284	726	3,322	958	558	102	179	642	7,771

Source: CEBS.
1/ EU-4 refers to Greece, Ireland, Portugal, and Spain.

4. **The CEBS exercise generally confirmed results from the FSA's own earlier stress tests**. The FSA's 2009 stress tests, which informed the authorities' decision-making surrounding the APS, were based on the following assumptions: (i) a peak-to-trough fall in GDP of 6.9 percent, with GDP declining by 2.3 percent in 2011 alone, versus the CEBS assumption of a 0.1 percent cumulative decline over 2009–2011; (ii) unemployment peaking at 12.5 percent, versus 9.1 percent in 2010 and 8.8 percent in 2011 under the CEBS scenario; and (iii) 50 percent and 60 percent peak-to-trough declines for residential and commercial real estate (CRE) prices, respectively, versus a 20 percent decline for both under the CEBS test). Conversely, the CEBS stress tests projected a sharper rise in interest rates, implying more adverse consequences for the probability of default among corporates.

D. Nonetheless, Challenges Remain

Extending the maturity of liabilities and strengthening liquidity ratios could prove to be challenging for some UK banks. Refinancing needs in the next two years are significant, as UK banks have to replace some £750–800 billion of funding by 2013[11], including the remaining support under the SLS and CGS. In addition, UK banks remain heavily reliant on short-term funding, with 44 percent of wholesale funding maturing in less than 3 months and 60 percent within a year. And although the average loan-to-deposit ratio for the five largest banks reached 115 percent at end-June—its lowest level since 2004—there was wide dispersion around this mean. LBG, notably, maintained a ratio above 150 percent,

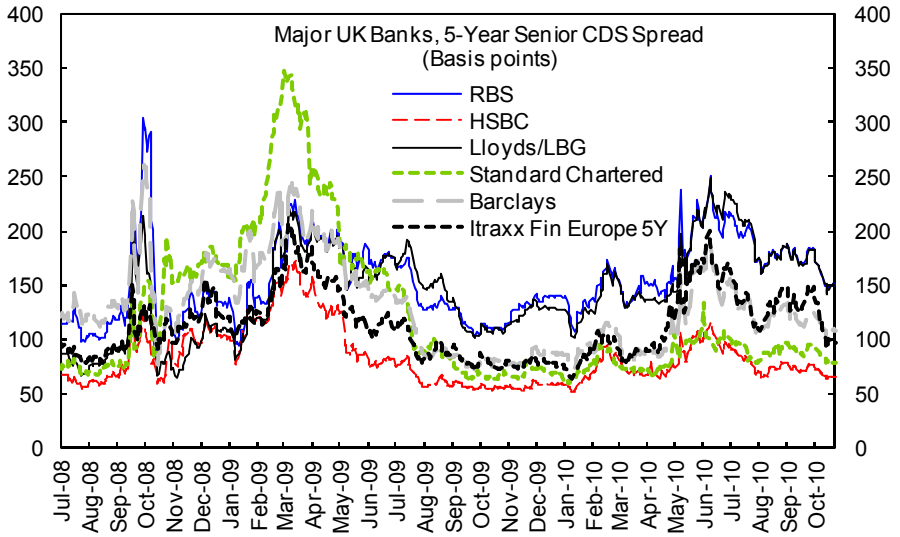


Sources: Bloomberg; and IMF staff calculations.
* Last 5 months of 2010

[11] Bank of England projections as of June 2010; funding efforts since June have likely reduced this number somewhat.

while HSBC and Standard Chartered both featured ratios below 80 percent. Looking ahead, tighter regulatory requirements are bound to prove more challenging for those banks that have previously relied to a larger extent on short-term wholesale funding sources.

5. **Access to and the price of funding varies across banks**. The tiering among major UK banks currently places LBG and RBS at the highest refinancing costs, Barclays in line with the European average, and HSBC and Standard Chartered at the lowest cost. As a general trend, competition for deposits has intensified among banks, but also from mutual funds, driving deposit costs higher.



Source: Bloomberg.

6. **Profitability may come under renewed pressure**. Continued strong profitability cannot be taken for granted. While spreads have improved on mortgages and unsecured loans, there is little room for significant further increase. In addition, these better margins cannot offset low volumes, as mortgage approvals remain very subdued and demand for unsecured credits remains low.[12] On the corporate side, loan growth is even more sluggish, to a large extent due to weak demand—in fact, many larger corporates have recently increased their reliance on market-based financing, while reducing their bank debt. Investment banking revenue, in turn, has been stabilizing at lower levels, due to reduced volumes of capital market activity and more moderate prospects for wealth management. Meanwhile, cost control was somewhat uneven in the first half of the year, with operating expenses trending down at LBG and RBS, but up at Barclays, HSBC, and Standard Chartered. More stringent liquidity requirements are also expected to weigh negatively on

[12] For more information on mortgage approvals, see British Bankers' Association: http://www.bba.org.uk/statistics/article/september-figures-for-the-main-high-street-banks2

profitability in the future, as balance sheets need to be rebalanced toward more liquid, but lower-income products.

7. **Asset quality will crucially depend on the further course of economic recovery**. Loan impairments peaked in 2009, but are still above historical averages. S&P established that loan impairments were consistently below 15 percent of revenue between 1994 and 2007, half their 2010 level.[13] Impairment charges as a percent of customer loans also remain elevated (146 basis points in 1H2010 versus an average of 77 basis points over the past 20 years). Loan performance was stronger for domestic activities, while loan quality continued to deteriorate in Ireland and Spain. One lesson from historical episodes is that impairment charges could rise as interest rates start going up.

8. **Commercial Real Estate (CRE) is on the mend, but risks remain elevated in some banks**. Property prices have recently bounced back, and according to the IPD index are currently some 15 percent above their latest through (though still around 30 percent below their 2007 peak levels). Relatively moderate unemployment, low interest rates, and lower vacancies than during the previous UK recession in the early 1990s (6-8 percent today versus 15-18 percent at the time), also point to an improving operating environment. Moreover, loan rollovers and debt-for equity swaps have allowed banks to smooth out problems over time. More importantly, margins have been improving, from very low 2007 levels (150-175 bps) to more adequate ones in 2010 (250-300 bps). However, the overall improvement masks significant dispersion in individual bank performance, with a continued high concentration of impaired assets in the legacy portfolio of HBOS.

E. Conclusion

9. **The UK banking sector is on the road of recovery after a severe crisis in 2007–09, but challenges remain**. The authorities' wide-ranging interventions in the banking system have increased financial stability, allowing banks to gradually return to better health again. Aside from a further strengthening of capital cushions to meet future regulatory requirements, a key challenge for some UK banks is to improve their funding profiles as the remaining public support schemes are gradually unwound. Meanwhile, setbacks to the economic recovery could cause a renewed spike in nonperforming loans and depress net income, thereby constraining banks' capacity to continue building up capital through earning retention. Gradually strengthening the financial system thus remains a key challenge going forward.

[13] S&P, "Major UK banks' interim results signal recovery, but a sustained improvement remains far from certain,"August 26, 2010.

VI. Recent and Pending Reforms to the UK Financial Sector's Regulatory and Supervisory Framework[1]

This chapter provides an update on recent and pending reforms to the UK financial sector's regulatory and supervisory framework. Key initiatives underway include: (i) reform of the institutional architecture for prudential oversight, including the dismantling of the Financial Services Authority (FSA) and transfer of prudential regulatory responsibilities to the Bank of England (BoE); (ii) regulatory changes alongside international initiatives spearheaded by the Basel Committee on Banking Supervision (BCBS), the Financial Stability Board (FSB), the G-20, and the European Union (EU); and (iii) independent commission review of the need for further structural reform of the UK banking sector.

A. Introduction

1. **Financial sector regulation and supervision is a key issue in the UK given the UK's status as a global financial center**. The UK's financial sector comprises both (i) British-owned financial firms, which feature relatively high concentration of financial activity in a few large groups, and (ii) hundreds of small-to-very-large UK-authorized entities (including branches and subsidiaries) controlled by foreign financial and nonfinancial firms. The sector's significant effect on domestic employment and tax revenue, as well as the potential for high fiscal costs from resolution or support arrangements, gives the UK a significant stake in the global evolution of financial sector regulation and supervision.

2. **This chapter provides a summary of recent and pending reforms to the UK's regulatory and crisis resolution arrangements**. Table 1 also describes the status of, and the UK authorities' general views on, key regulatory initiatives at the international level. Given the importance of the financial sector to the UK's economy, the authorities have played an important leadership role in advancing global regulatory reform, with innovative proposals in many areas.

B. Regulatory Developments

3. **The new government announced in June that the existing tripartite regulatory regime will be restructured**. In this context, the FSA will be unwound, and its tasks reassigned to new authorities:

- *A new Prudential Regulatory Authority (PRA) will be created;* it will operate as a subsidiary of the BoE and will carry out the prudential regulation of deposit-taking institutions, investment banks, and insurance companies.

[1] Prepared by Michael Moore (MCM).

- *A new Consumer Protection and Markets Authority (CPMA) will be set up* to regulate the conduct of authorized financial firms providing services to consumers and to protect market integrity.

- *In addition, a Financial Policy Committee (FPC) will be established at the BoE,* with an explicit new mandate for macroprudential oversight. This will entail the careful monitoring of systemic risks as well as concrete policy action to curb such risks.

A formal consultative process is underway with the intention to introduce legislation and complete the formal transition to the future structure in 2012. As an interim step, the FSA in the first quarter of 2011 will divide its activities according to the shadow functions of the future PRA and CPMA.

4. **The government also established in June 2010 the Independent Commission on Banking (ICB), chaired by Sir John Vickers, to consider further reforms to the banking system**. The ICB will make recommendations to: (i) reduce systemic risk in the banking sector by exploring the risk posed by banks of different size, scale, and function; (ii) mitigate moral hazard in the banking system; (iii) reduce both the likelihood and impact of firm failure; and (iv) promote competition in banking for the benefit of consumers and businesses. The ICB's recommendations will cover both structural measures, including the complex issue of potentially separating retail and investment banking functions, and related non-structural measures, to reform the banking system and promote stability and competition.

5. **The government will introduce a bank levy beginning in January 2011**. The levy is intended to promote less risky funding and will apply to the global balance sheets of UK banks and the UK operations of banks from other countries. The levy is expected to generate around £ 2.5 billion of general revenue annually. The proposal is in line with the design of the financial stability contribution (FSC) set out in the IMF's paper prepared for the G-20—*A Fair and Substantial Contribution by the Financial Sector*.

6. **The FSA unveiled tighter liquidity regulations in October 2009**. The regulations precede the issuance of a final standard from the Basel Committee on Banking Supervision (BCBS) and from the European Commission (EC). The FSA's rules will apply to all banks operating in the UK (including branches) until agreed international guidance is developed and/or common EU-wide rules enter into force.

7. **The UK authorities are strong proponents of the ongoing Basel III initiatives** to increase the minimum requirements and tighten the definition of capital to improve the loss absorption capacity of capital. Key aspects of the Basel III proposals include the following:[2]

[2] See BIS press release http://www.bis.org/press/p100912.htm.

- ***After a phase-in period, minimum capital ratios will increase***: (i) there will be a new requirement that common equity after deductions (see next bullet) exceeds 4.5 percent of risk-weighted assets; (ii) that Tier 1 capital (which includes common equity and other non-common equity components) exceeds 6 percent of risk-weighted assets; and (iii) that total capital (Tier 1 plus Tier 2) exceeds 8 percent of risk-weighted assets. In addition, banks will have to hold 2.5 percent of common equity as a capital conservation buffer—capital that can be drawn down in times of stress. A further 2.5 percent of capital could be required as a countercyclical buffer.

- ***The definition of capital has been cleaned up to limit inclusion of intangible assets and those elements that have debt characteristics***. Many low-quality elements have been removed from the definition of capital, and those that remain will be subject to caps.[3] The FSA was an early adopter of the concept of a "Core Tier 1 ratio," which excluded hybrid capital components.

- ***A leverage ratio (initially 3 percent Tier 1 capital to total assets)*** will be implemented in stages—beginning with a supervisory monitoring period that starts in 2011 and becoming a mandatory requirement from 2018. As early as March 2009, the FSA in its Turner Review identified the need for a leverage ratio as a backstop to discipline banks against excessive balance sheet growth.

C. Crisis Management Framework

8. **The UK modernized its legislation for bank resolution with the passage of the Banking Act of 2009 following the difficulties associated with the resolution of Northern Rock**. The Act established a new special resolution regime for failing banks and building societies, including by giving the BoE new resolution powers and the FSA new intervention powers. However, challenges remain with regard to the resolution of investment banking activities, large complex cross-border financial institutions, and the unwinding of large derivative portfolios. In this regard, a public consultation process is ongoing concerning the introduction of a special administration regime for investment firms.

9. **The authorities support requiring large financial groups to have in place well-defined recovery and resolution plans (or "living wills")**. In the case of recovery, such living wills require firms to show how the firm would, in the event of financial stress, be able to restore capital or liquidity positions by exiting particular lines of business, selling subsidiaries, or raising fresh capital. The plans, which are developed in conjunction with the authorities, would also aid in the identification of issues surrounding a potential failure without giving rise to systemic disruptions. A pilot exercise by the FSA is underway with

[3] The following items may be exempted from deduction each up to 10 percent and in aggregate up to 15 percent of common equity net of all other deductions, and subject to full disclosure: (i) significant investments in the common shares of unconsolidated financial institutions; (ii) mortgage servicing rights; and (iii) deferred tax assets arising from timing differences.

several major UK banking groups. Effectively handling the failure of large entities with complex cross-border operations will also require greater international cooperation to establish stronger mechanisms for cross-border supervision and resolution.

10. **Meanwhile, the European Commission is working toward an EU directive on resolution regimes**. As this process moves ahead, some work will be necessary to ensure compatibility between the UK and what will ultimately be a system of national resolution regimes among EU countries. The directive would likely require as a minimum that resolution regimes facilitate the transfer of deposits and viable assets to another bank, with bad assets and other creditor claims going into an insolvency process—which is already a part of the UK system.

Table 1. Key Financial Sector Reform Initiatives

Issue	UK Position	EU, BCBS, FSB, and other positions
	Crisis Management Framework	
Bank resolution legislation to replace the commercial insolvency framework.	The Banking Act of 2009 sets out a credible arrangement whereby the BoE administers the bank resolution process. The process is effective for domestic banks, but is untried for large, cross-border banks and does not apply to nonbank financial institutions. Related to this, public consultation is ongoing for the introduction of a special regime for investment banks, with the intention to enact legislation in 2011.	The European Commission seeks an EU regime for managing crises in cross-border banking groups, with the objective that banks can fail without damaging financial stability.
Recovery and Resolution Plans (living wills): Requires that systemically important financial groups have in place well-defined recovery and resolution plans. Requirement would be imposed by the home country/consolidated supervisor.	The UK authorities endorse living wills. Section 7 of the Financial Services Act of 2010 requires the FSA to issue rules requiring authorized firms to draw up and maintain recovery and resolution plans. A pilot exercise by the FSA is underway involving several major UK banking groups.	BCBS/FSB/IMF are studying the idea (along with subsidiarization and contingent capital).[4] BoE Deputy Governor Paul Tucker chairs an FSB working group that is reviewing the utility of recovery and resolution plans. The United States has endorsed living wills in recent legislation (Frank-Dodd Act).
	Regulatory initiatives	
Improved microprudential standards to increase the amount and quality of capital and liquidity in the system.	The UK actively contributes to and supports ongoing work by the BCBS and the EU on the reform of microprudential regulations. The FSA published a new liquidity regulation in October 2009.	Basel III will issue new minimum quantitative liquidity requirements in stages. The Liquidity Coverage Ratio (LCR) will require banks to maintain high-quality liquid assets to meet short-term stresses lasting up to 30 days. The LCR will be subject to observation beginning in 2011, with the standard to be introduced in 2015. The Net Stable Funding Ratio (NSFR) is designed to ensure a better matching of asset and liability maturities and discourage overuse of volatile funding. The NSFR will be under observation beginning in 2012, with implementation planned for 2018.

[4] Subsidiarization for cross-border banks calls for greater reliance on subsidiaries (rather than branches) to segregate capital and impose liquidity requirements. Contingent capital is debt that converts into equity when certain criteria are met that triggers the conversion.

Table 1. Key Financial Sector Reform Initiatives (continued)

Issue	UK Position	EU, ECBS, FSB, and other positions
Introduction of macroprudential policy to improve the overall resilience of the financial system by addressing aggregate risks and vulnerabilities across the system and to enhance macroeconomic stability by addressing cyclical imbalances through the financial system, e.g. damping the credit cycle.	The UK actively contributes to and supports ongoing work by the BCBS, EU, and FSB on macroprudential policy measures. The authorities are currently consulting on tools that the FPC may need to meet its macroprudential objectives, including countercyclical buffers and possibly other tools.	The BCBS has led much of the work on countercyclical buffers and has proposed an initial calibration of up to 2.5 percent of risk-weighted assets. (BIS **press release**) The FSB has proposed additional loss absorbency for systemically important financial institutions (FSB **press release**).
	Structural Reform/Activity Restrictions	
Curbs on activities, notably proprietary trading, intended to reduce conflicts of interest and prevent particularly high-risk activity in universal banks benefiting from deposit insurance and/or implicit guarantees.	In the UK, the Independent Commission on Banking is studying the proposal; a final report with recommendations will be published in September 2011.	Curbs on proprietary trading (Volcker rule) are included in the recent Frank-Dodd Act in the US. Limited support elsewhere.
Forced separation of commercial and investment banking (a la Glass/Steagall) to reduce conflicts of interest within universal banks and shield critical commercial bank functions from high-risk activities in investment banking.	In the UK, the Independent Commission on Banking is studying the proposal; a final report with recommendations will be published in September 2011.	No current initiatives in this direction.