Policies to Rebalance the Global Economy After the Financial Crisis*

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This paper considers some of the main risks and opportunities currently facing the world economy. Against a baseline forecast of October 2009, it first discusses a number of policy mistakes or policy failures that could lead to even worse outcomes than currently envisaged. It then describes the policy choices that would help to support global demand on a more sustainable basis while rebalancing its regional elements and therefore current accounts. Using the United States as an example, the paper also provides estimates of the long-term damage from protracted excessive fiscal deficits, and of the benefits from significant fiscal consolidation.

JEL Codes: E62, F41, F42, H30, H63.

1. Introduction

Over recent years, the global economy has been hit by large negative demand shocks that resulted from a sizable loss of wealth, following sharp declines in house and stock prices and the tightening of financial conditions associated with the ongoing financial crisis (see Decressin and Laxton 2009). The combination of the financial crisis, the downturn in the global economy, and the increase in unemployment also gave rise to a loss of confidence that intensified the downward pressures on the economy. The downturn was particularly

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steep in industrialized economies and in some emerging economies such as those of Eastern Europe.

Governments and central banks responded to financial-sector difficulties by introducing a number of substantive and innovative measures to deal with both liquidity and solvency problems in financial institutions and financial markets. Central banks reduced interest rates to unprecedented levels to offset the increase in private-sector risk premia and to underpin aggregate demand, and they used non-conventional measures in the form of quantitative easing and qualitative or credit easing to bring about reductions in risk premia and to provide liquidity to markets in difficulty. In spite of these efforts, credit conditions remained tight, and aggregate demand and employment in many countries weakened rapidly. There were negative spillovers from the weakening economies to those economies that had appeared to be more robust, and increased concern that the global economy might be moving into a period of deep and prolonged recession (International Monetary Fund 2009a).

Governments around the world therefore went beyond monetary policy measures by introducing large stimulative fiscal packages.[1] In this context, questions were raised about how effective temporary government fiscal policy actions would be in lessening the depth and duration of the slowdown, and what the preferred mix of fiscal policy actions would be. These issues were addressed in a number of IMF studies which came to the following principal conclusions.[2] First, even temporary expansionary fiscal actions can have an appreciable effect on GDP. Second, there are important differences in the size of fiscal multipliers depending on the particular fiscal measure being used to stimulate the economy, with government investment and consumption expenditures having the largest effects, followed by targeted transfers and consumption taxes, while cuts in labor income taxes, capital income taxes, and general transfers have the

[1]The IMF called for global fiscal stimulus and discussed core principles for the fiscal response to the crisis. See Lipsky (2008), Spilimbergo et al. (2008), and Decressin and Laxton (2009). See also International Monetary Fund (2009c) for a discussion of the state of public finances after the 2008 crisis.

[2]Examples include Freedman et al. (2009) and Coenen et al. (2010a, 2010b). Coenen et al. (2010a, 2010b) estimate short-run multipliers using models developed at the Bank of Canada, the European Commission, the European Central Bank, the International Monetary Fund, the OECD, and the Board of Governors of the Federal Reserve System.

smallest multipliers. Third, monetary accommodation plays a very important role in increasing fiscal multipliers. Fourth, multilateral actions taken by a number of economic areas increase the size of the multipliers in every area as spillovers that are relatively small with respect to any single economic area accumulate to an appreciable size as more and more economic areas participate in the fiscal stimulus.

For the most part, the earlier analyses tended to focus on the short-run to medium-run stimulative effects of the fiscal stimulus and did not pay as much attention to its potential longer-run effects. They assumed that fiscal policy in all countries was viewed as being sustainable in the long run, in the sense that the public expected the temporary budgetary deficits eventually to be offset and not to lead to sharply higher or ever-increasing ratios of public debt to GDP. As a result, the analyses typically did not show the fiscal actions leading to increases in global long-term real interest rates and/or increases in risk premia in specific countries, which would result in the crowding out of private investment. Although the earlier studies did sometimes mention as a caveat the risk that the temporary fiscal stimulus might be allowed to become permanent and lead to crowding out of private expenditures and a loss of credibility on the part of the fiscal authorities, this was not central to the analysis.

This trade-off between the short-run stimulative effects and the long-run crowding-out effects of fiscal stimulus—that is, of lower public saving rates—has an exact corollary in the short-run and long-run effects of changes in private saving rates, which are an essential ingredient of the policy packages now being proposed, and implemented, to resolve global current account imbalances.

Against this background, we need to employ a modeling framework that is suitable for analyzing not only the short-run but also the longer-run results of permanent changes in saving rates, and that is also suitable for jointly simulating a wide array of realistic fiscal and monetary policy measures. The IMF's Global Integrated Monetary and Fiscal model (GIMF) is a dynamic stochastic general equilibrium model designed precisely for that purpose. It has been extensively used inside the IMF for a wide variety of policy and scenario analyses.[3]

[3]See Kumhof and Laxton (2007, 2009) for applications of GIMF to the topic of U.S. current account deficits.

GIMF is used here to assess the short-run and long-run outcomes of recently adopted or considered policy actions, by examining scenarios in which economic developments and policy measures interact to produce either negative or positive outcomes over time. These will indicate the nature of the policy approaches that the authorities need to take and to avoid. A central focus of attention is the need to rebalance global growth such that the current account imbalances that were prevalent before the crisis recede over time.

What are the important upside and downside risks as we look forward in late 2009?

1. Will the financial sector return to health and be able to function effectively as an intermediary between savers and investors? If it does not, future productivity will be adversely affected.
2. Second, as is well known, to achieve an improvement in current account imbalances will require an increase in national saving in the United States and a decrease in national saving in emerging Asia and other countries with large current account surpluses. In this context a real appreciation of Asian currencies would be helpful, as it would raise real incomes and household consumption expenditures in that region. Will there be such changes in regional saving rates and a real appreciation of Asian currencies?
3. Third, will protectionist policies that would reduce competition in product and labor markets result in a reduction of international trade and output?
4. Fourth, will there be a continued increase in government infrastructure investment (perhaps for green initiatives) that helps to increase productivity?
5. Fifth, will there be excessive fiscal deficits or fiscal consolidation in the long run, and what will be the implications for the crowding out or crowding in of private-sector investment expenditures and for current account imbalances?

The paper presents a downside scenario and an upside scenario relative to a baseline projection. Each scenario combines a number

of the risks set out in the previous paragraph in order to provide examples of the kinds of outcomes that can arise as we exit from the current economic situation. The downside scenario involves unfavorable outcomes for risks 1, 2, 3, and 5, while the upside scenario involves favorable outcomes for risks 1, 2, 4, and 5.[4]

The remainder of the paper is organized as follows. Section 2 presents an outline of the theoretical structure of GIMF. Section 3 discusses its calibration and key differences between GIMF and conventional infinite-horizon models. Section 4 briefly introduces the baseline scenario against which we compare the downside and upside scenarios. Section 5 presents the downside scenario, while section 6 presents the upside scenario. Section 7 provides concluding remarks.

2. The Model

This section, to conserve space, contains only a relatively brief overview of the model, followed by some details that are critical to understanding its fiscal policy implication. A complete description can be found in Kumhof et al. (2010), henceforth KLMM. Time periods represent years.

2.1 Overview

The world consists of five regions: the United States, the euro area, Japan, emerging Asia, and other countries.[5] Region-specific variables and parameters will be denoted by an index j where necessary. The regions trade with each other at the levels of intermediate and final goods, with a matrix of bilateral trade flows that is calibrated on recent historical averages. International asset trade is limited to nominally non-contingent bonds denominated in U.S. dollars. When bilateral goods or asset trade between one region and the United States is described, we will refer to U.S. quantities by a superscript

[4]There has been considerable discussion in the media in recent months of policy strategies to assist economies in exiting from the crisis. See, for example, articles on the United States, China, Germany, and Japan in issues of *The Economist* of July 25, 2009; August 1, 2009; August 8, 2009; and August 15, 2009, respectively.

[5]Emerging Asia comprises China, Hong Kong S.A.R. of China, India, Indonesia, Korea, Malaysia, Philippines, Singapore, and Thailand.

asterisk. The world economy's technology grows at the constant rate $g = T_t/T_{t-1}$, where T_t is the level of labor augmenting world technology, and world population grows at the constant rate n. To simplify the exposition, we present the perfect foresight version of the model.

Each country is populated by two types of households, both of which consume final retailed output and supply labor to unions. First, there are liquidity-constrained households who do not have access to financial markets, and who consequently are limited to consuming their after-tax income in every period, as in Galí, López-Salido, and Vallés (2007). The share of these agents in the population equals $\psi(\mathrm{j})$. Second, there are overlapping-generations households with finite planning horizons as in Blanchard (1985). The share of these agents in the population equals $1 - \psi(\mathrm{j})$. Each of these agents faces a constant probability of death $(1 - \theta)$ in each period, which implies an average planning horizon of $1/(1-\theta)$.[6] In addition to the probability of death, households also experience labor productivity that declines at a constant rate $\chi < 1$ over their lifetimes.[7] Life-cycle income adds another powerful channel through which fiscal policies have non-Ricardian effects. Households of both types are subject to uniform labor income, consumption, and lump-sum taxes.

Firms and unions are managed in accordance with the preferences of their owners, myopic overlapping-generations households, and they therefore also have finite planning horizons. Except for capital goods producers, entrepreneurs, and retailers, they are monopolistically competitive and subject to nominal rigidities in price setting.[8] Each country's primary production is carried out by manufacturers producing tradable and non-tradable goods. Manufacturers buy

[6]Galí, López-Salido, and Vallés (2007) interpret the complete inability to smooth consumption of their model's liquidity-constrained households as (among other possible interpretations) extreme myopia, or a planning horizon of zero. We adopt the same interpretation for the average planning horizon of the finite-horizon model. We therefore allow for the possibility that agents may have a shorter planning horizon than what would be suggested by their biological probability of death.

[7]This stylized treatment of life-cycle income is made possible by the absence of explicit demographics in our model, which means that we only need the assumption of declining labor productivity to be correct for the average worker.

[8]We assume quadratic inflation adjustment costs as in Ireland (2001) and Laxton and Pesenti (2003), meaning that inflation rather than the price level is sticky.

capital services from entrepreneurs and labor from unions. Unions buy labor from households. Entrepreneurs buy capital from capital goods producers. Entrepreneurs are subject to an external financing constraint and a capital income tax. Capital goods producers are subject to investment adjustment costs. Manufacturers sell to domestic and foreign distributors, the latter via import agents located abroad that price to their respective markets. Distributors combine a public capital stock with non-tradable goods and domestic and foreign tradable goods, subject to an import adjustment cost. They sell to domestic and foreign consumption and investment goods producers, via import agents in the case of foreign sales. Consumption and investment goods producers combine domestic and foreign output, again subject to an import adjustment cost. Consumption goods are sold to retailers and the government, while investment goods are sold to capital goods producers and the government. Retailers, who are also monopolistically competitive, face real instead of nominal rigidities, which generates inertial consumption dynamics.

2.2 Overlapping-Generations (OLG) Households

The key result for OLG households is their optimal consumption rule, which states that consumption equals the marginal propensity to consume out of wealth times real wealth. The latter is the sum of real aggregate financial wealth and of the present discounted values of, first, households' time endowments evaluated at the after-tax real wage and, second, capital or dividend income net of lump-sum taxes to the government. The implication is that government debt adds to agents' net worth, that the time profile of taxes affects the time profile of consumption, and that in the long run government debt crowds out private capital and net foreign assets. The reason is that a household with a finite planning horizon attaches less importance to higher tax payments in the distant future, by discounting future tax liabilities at rates that are higher than the market real interest rate due to their myopia $\theta < 1$ and the rate of decline of their labor income $\chi < 1$. Government debt is therefore net wealth to the extent that households, due to short planning horizons, disregard part of the future taxes necessary to service that debt.

A fiscal stimulus through lower taxes represents a tilting of the tax payment profile from the near future to the more distant future.

The present discounted value of the government's future primary deficits has to remain equal to the current debt *when future deficits are discounted at the market real interest rate.* But for households, the same tilting of the tax profile represents an increase in human wealth because an increasing share of future taxes becomes payable beyond the household's planning horizon. This leads to an increase in consumption.

Our preferences allow for an intertemporal elasticity of substitution $1/\gamma$ different from one. For the conventional assumption of $\gamma > 1$, the income effect of an increase in the real interest rate is stronger than the substitution effect and tends to increase the marginal propensity to consume. This partly offsets the contractionary effects of a higher real interest rate on human wealth. A larger γ therefore tends to give rise to larger interest rate changes in response to fiscal shocks.

2.3 Liquidity-Constrained (LIQ) Households and Aggregate Households

The objective function of LIQ households is assumed to be identical to that of OLG households. These agents can consume at most their current income, which consists of their after-tax wage income plus net government transfers. This group of households therefore has a very high marginal propensity to consume out of present income, so that fiscal multipliers of revenue-based stimulus measures such as tax cuts and increases in transfers are particularly high whenever such agents constitute a high share of the population.

2.4 Firms

KLMM contains the complete details for all firm and union sectors. Except for entrepreneurs, who solve a one-period problem along the lines of Bernanke, Gertler, and Gilchrist (1999) and Christiano, Motto, and Rostagno (2009), firms solve conventional optimization problems for input choice and price setting, subject to a number of real and nominal rigidities. Each firm maximizes the present discounted value of net cash flow or dividends. The first-order conditions are standard except for the presence of the term θ in the discount factors.

2.5 Government and the Central Bank

2.5.1 Budget Constraint

Fiscal policy consists of a specification of government spending G_t; lump-sum transfers Υ_t; tax rates on labor, consumption, and capital; and lump-sum taxes. Government consumption spending is unproductive, while government investment spending augments a stock of publicly provided infrastructure capital that depreciates. Tax revenue τ_t is endogenous and given by the sum of labor, consumption, capital, and lump-sum taxes. The government budget constraint is

$$\check{b}_t = \frac{i_{t-1}}{\pi_t gn}\check{b}_{t-1} + \check{G}_t + \check{\Upsilon}_t - \check{\tau}_t = \frac{i_{t-1}}{\pi_t gn}\check{b}_{t-1} - \check{s}_t, \tag{1}$$

where the inverted hat denotes a variable detrended by technology and population growth, and where $\check{b}_t$ is real government debt, i_{t-1} is the policy interest rate, π_t is the inflation rate, and $\check{s}_t$ is the primary surplus.

2.5.2 Fiscal Policy

A fiscal policy rule stabilizes deficits and the business cycle. First, it stabilizes the interest-inclusive government deficit to GDP ratio gd_t^{rat} at a long-run target (structural) level $gdss^{rat}$, which rules out default and fiscal dominance. Second, it stabilizes the business cycle by letting the deficit fall with the output gap. We have

$$gd_t^{rat} = gdss_t^{rat} - d^{gdp} \ln\left(\frac{g\check{d}p_t}{g\check{d}p_{pot}}\right). \tag{2}$$

Here $d^{gdp} \geq 0$, and gd_t^{rat} is given by

$$gd_t^{rat} = 100\frac{\frac{(i_{t-1}-1)\check{b}_{t-1}}{\pi_t gn} - \check{s}_t}{g\check{d}p_t} = 100\frac{\check{b}_t - \frac{\check{b}_{t-1}}{\pi_t gn}}{g\check{d}p_t}. \tag{3}$$

Shocks to $gdss_t^{rat}$ represent changes in government savings preferences. We denote the current value and the long-run target of the government debt to GDP ratio by $\check{b}_t^{rat}$ and $\check{b}ss_t^{rat}$. The relationship between bss_t^{rat} and $gdss_t^{rat}$ follows directly from the government's budget constraint as

$$bss_t^{rat} = \frac{\bar{\pi} gn}{\bar{\pi} gn - 1} gdss_t^{rat}, \tag{4}$$

where $\bar{\pi}$ is the inflation target of the central bank. In other words, for a given trend nominal growth rate, choosing a deficit target $gdss_t^{rat}$ implies a debt target $\check{b}ss_t^{rat}$ and therefore keeps debt from exploding. We note that the implied long-run autoregressive coefficient on debt, at $1/(\bar{\pi} gn)$, is quite close to one. An identical relationship holds between the long-run net foreign liabilities to GDP ratio and the long-run current account deficit to GDP ratio.

Our model allows for permanent shocks to public and private saving and to technology, all of which have permanent effects on potential GDP due to the non-Ricardian features of the model. Potential output is therefore modeled as a moving average of past actual values of GDP to allow for the gap to close over time. Fiscal policy can typically be characterized by the degree to which automatic stabilizers work. This has been quantified by the OECD, which has produced estimates of d^{gdp} for a number of countries that we use to calibrate our model.[9] The rule (2) is not an instrument rule but rather a targeting rule. Any combination of the available tax and spending instruments can be used to make sure the rule holds.

2.5.3 Monetary Policy

Monetary policy uses an interest rate rule to stabilize inflation. The rule is similar to a conventional inflation-forecast-based rule that responds to one-year-ahead inflation, but with the important exception that the "steady state" of the real interest rate needs to be formulated as a (geometric) moving average, similar to potential output above.

3. Calibration and Simulation

3.1 Calibration

Detailed calibration tables are presented in KLMM. Parameters are equal across countries unless otherwise mentioned. The shares of liquidity-constrained agents $\psi(\mathrm{j})$ are 25 percent in the United

[9]See Girouard and André (2005).

States, the euro area, and Japan, and 50 percent in emerging Asia and other countries. The intertemporal elasticity of substitution is 0.25, or $\gamma = 4$. The average planning horizon is equal to twenty years, or $\theta = 0.95$. The average remaining time at work is twenty years, or $\chi = 0.95$. The main criterion used in choosing θ and χ is the empirical evidence of Laubach (2003), Engen and Hubbard (2004), and Gale and Orszag (2004) for the effect of government debt on real interest rates. They find that a 1-percentage-point increase in the government debt to GDP ratio in the United States leads to an approximately 1 to 6 basis points long-run increase in the U.S. (and therefore world) real interest rate. Our calibration is at the lower end of that range, at around 1 basis point. Our estimates of the long-run crowding-out effects of higher fiscal deficits and debt are therefore very conservative. For the public capital stock, we adopt the Ligthart and Suárez (2005) estimate of the elasticity of aggregate output with respect to public capital of 0.14. Calibration of the financial accelerator sector is similar to Christiano, Motto, and Rostagno (2009).

3.2 Simulating Fiscal Shocks

This subsection discusses the logic of the intertemporal effects of saving rate shocks in GIMF, as this issue will recur throughout our discussion of the scenarios. Assume for illustrative purposes that the economy in question exhibits a 5 percent annual nominal growth rate. In that case, a permanent 1-percentage-point increase in the fiscal deficit to GDP ratio corresponds to a 20 percent increase in the long-run government debt to GDP ratio. Infinite-horizon models assume that in the long run the additional saving of consumers who are not liquidity constrained perfectly offsets reduced government saving, with zero effects on national saving. The long-run net foreign liabilities position in such models must therefore be specified independently of the level of government debt. By contrast, in GIMF all consumers save insufficiently to fully offset fiscal deficits. Instead, their increased investment in government debt is partly financed by liquidating (crowding out) other forms of investment—specifically, physical capital and foreign assets.

Another distinctive feature of GIMF concerns the determination of the long-run equilibrium real interest rate. In the infinite-horizon

model, this rate is tied down by the rate of time preference and trend productivity growth, while in GIMF it is related to all fundamental parameters that affect the saving-investment relationship. These include not only the rate of time preference and the growth rate but also the level of government debt, households' planning horizon, the intertemporal elasticity of substitution, and the production technology.

Assume now that a 1 percent increase in fiscal deficits in a given region is realized by reducing taxes in the short run and by raising the same taxes in the longer run to finance the interest cost of a higher debt stock. The short-run effect is an increase in aggregate demand in that region, and at this stage real interest rates rise temporarily due to the monetary policy response to the resulting higher inflation. But the long-run effect comes through a reduction in that region's saving, which if the region is large enough also leads to an appreciable reduction in world saving. This permanently raises the world real interest rate and leads to two types of crowding out. First, it crowds out private capital and therefore reduces output, and second, it crowds out net foreign asset investment and therefore leads to current account deficits.

4. Baseline Scenario

The baseline scenario is based on the projections of the IMF's October 2009 *World Economic Outlook* (*WEO*). It is presented in the figures below as the thin solid line in the panels illustrating the upside and downside scenarios (figures 1–3 and 5–7). This scenario portrays global economic growth turning positive in the second half of 2009, following the steep downturn associated with the global recession. This is partly the result of government and central bank actions that have reduced uncertainty with respect to financial institutions and financial markets, and which have bolstered the macro economy. Nonetheless, GDP growth rates in the industrialized countries remain low (at about 2 percent over the medium run), and at no point do they show the temporary strong overshoot above potential growth rates that has been characteristic of typical business cycles and which would imply actual GDP returning to an unchanged path of potential GDP. Instead, the path of both actual and potential GDP in industrialized countries falls to well below that anticipated

in early 2007 (see the April 2007 *WEO*). The downward adjustment in potential GDP is typical of crises that impinge upon both the financial sector and the macro economy (International Monetary Fund 2009b). For example, in the current crisis the sources of the decline in the path of potential GDP in the United States include the reduction in the effective capital stock as a result of the collapse in the automobile sector and some other sectors, the ongoing structural changes in the U.S. economy as a result of the adjustment to these collapses, and the reduced size and efficiency of the financial sector (Benes et al. 2010). Also, with the protracted increase in the rate of unemployment, partial hysteresis may result in a medium-term reduction in U.S. productivity. The relatively slow recovery of actual GDP is attributable not only to the downward adjustment of potential but also to the gradual withdrawal of fiscal and monetary stimulus over time, and to the need for the private sector to rebuild its assets following the collapse in asset prices.

The "green shoots" that have been the source of considerable recent financial market optimism are clearly more deeply rooted in the emerging economies than in the industrialized economies. In part, this is a result of the much less severe impact of the crisis on the financial sector of many emerging economies and, in some cases, stronger fiscal stimulus actions that were permitted by a better initial public debt situation. Over time, growth rates in emerging Asia return to slightly above 8 percent. The other countries grouping, which includes both industrialized countries (such as the United Kingdom, Canada, and Australia) and non-Asian emerging countries, returns to a long-run growth rate of just above 4 percent.

5. Downside Scenario

In terms of the five risks discussed in the introduction, the downside scenario involves unfavorable outcomes relative to baseline for the following:

- *Lower productivity growth globally, reflecting difficulties in repairing financial systems* to the extent envisaged in the baseline, or even further deteriorations in financial systems, particularly in the United States and the euro area. Productivity growth is assumed to be lower from 2010 to 2017, by

0.6 percentage points in the United States and the euro area and by 0.3 percentage points in Japan, emerging Asia, and the other countries. The reason for the difference among regions is that the deterioration in financial sectors during the financial crisis and the effect on their ability to support economic growth were greatest in the United States and the euro area and lesser in magnitude in Japan, emerging Asia, and the other countries, so that a failure to recover represents a larger deviation from the baseline in the former.

- *Private saving rate increases rather than decreases in emerging Asia.* As noted earlier, to facilitate the rebalancing of current accounts across regions, saving would have to rise in the United States and fall in other regions, especially in emerging Asia. These changes could be supported by allowing the currencies in emerging Asia to appreciate, so that real incomes would rise in emerging Asia. In the downside scenario, there is no increase in the saving rate in the United States, and the saving rate in emerging Asia rises rather than falls. The amount of the increase is 1 percent of GDP permanently by 2014, phased in over five years from 2010. The nominal exchange rate in emerging Asia is assumed to remain pegged to the U.S. dollar and is not allowed to appreciate.
- *Increased protectionism that results in lower competition in product and labor markets.* Specifically, we assume an increase in wage markups of 2.5 percentage points per year for four years. From 2013 on, the level of markups is 10 percentage points higher than in the baseline.
- *Larger and protracted fiscal deficits.* For a clearer exposition, the specification and consequences of this shock are presented separately in subsection 5.4. We limit ourselves to a discussion of larger U.S. fiscal deficits, but the logic is equally applicable to any other region.

Figures 1 to 3 show the baseline scenario (thin solid line) and the effects on the regional economies of the unfavorable shocks in the downside scenario, with the exception of the fiscal deficit shock. The gray panels show results in the form of shock minus control, and therefore do not show the baseline scenario. The dashed line shows the effect of shocks in the United States (US); the dotted line shows

the additional effects of shocks in the euro area (EU), Japan (JA), and the other countries (OC), all taken together and labeled as RW for rest of the world; and the thick solid line shows the additional effects of shocks in emerging Asia (EA). Comparing the thick solid line with the thin solid line (or with zero in the case of the gray panels) shows the effects of the shocks in all regions.

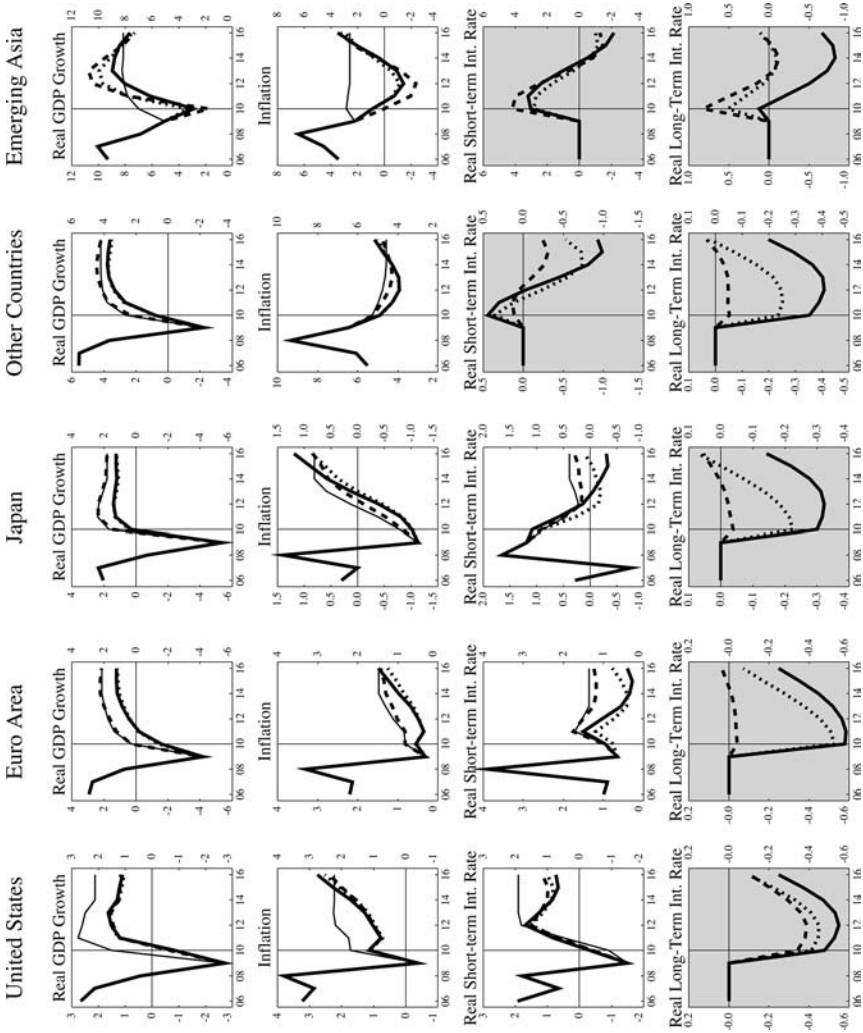
5.1 Effects of Changes in the United States

Comparison of the dashed line with the thin solid line in the top row of figure 1 shows that U.S. real GDP growth in the downside scenario for the period to 2016 is consistently below the baseline scenario. In fact, the decline relative to baseline is such that the 2016 level of real GDP is about 8 percent lower, as seen in figure 2. The principal driving force behind the weaker growth in the United States is the negative productivity growth resulting from continuing or worsening problems in the financial sector, while increased protectionism also results in an appreciable decline.

A crucial element in the adjustment of the U.S. economy to the U.S. shocks is the strong appreciation of the U.S. real effective exchange rate, which is illustrated in figure 2. This result is driven by the permanent long-run reduction in U.S. potential output relative to the rest of the world. In the short run, the appreciation is mitigated by a decline in U.S. real interest rates as monetary policy responds to the fall of domestic demand caused by private-sector anticipation of lower growth ahead.

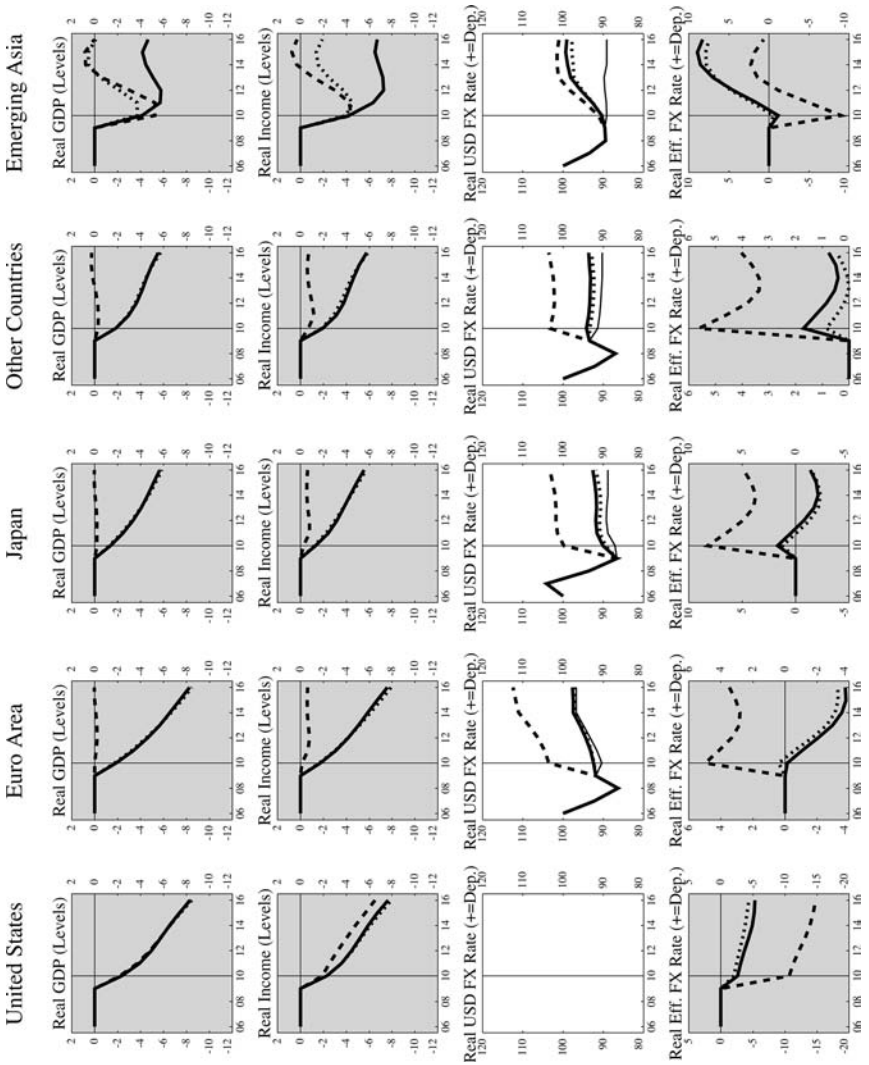
Figure 3 turns to a decomposition of current account imbalances. The ratio of government deficits to GDP in the United States is assumed to hardly respond to the negative shocks, as the government recognizes the permanent rather than cyclical nature of the decline in productivity growth and the increase in protectionism. It therefore mostly neutralizes the normal workings of automatic stabilizers, by quickly updating its estimate of potential output following the shocks. The same will be assumed for fiscal policy behavior in the other four regions. See subsection 5.4 for a discussion of fiscal shocks. With the U.S. investment to GDP ratio also barely affected by the shocks, the critical determinant of the current account is the private saving rate, which declines by between 1 and 2 percent of GDP, thereby widening current account imbalances with all other

Figure 1. Downside Scenario—Growth, Inflation, and Interest Rates



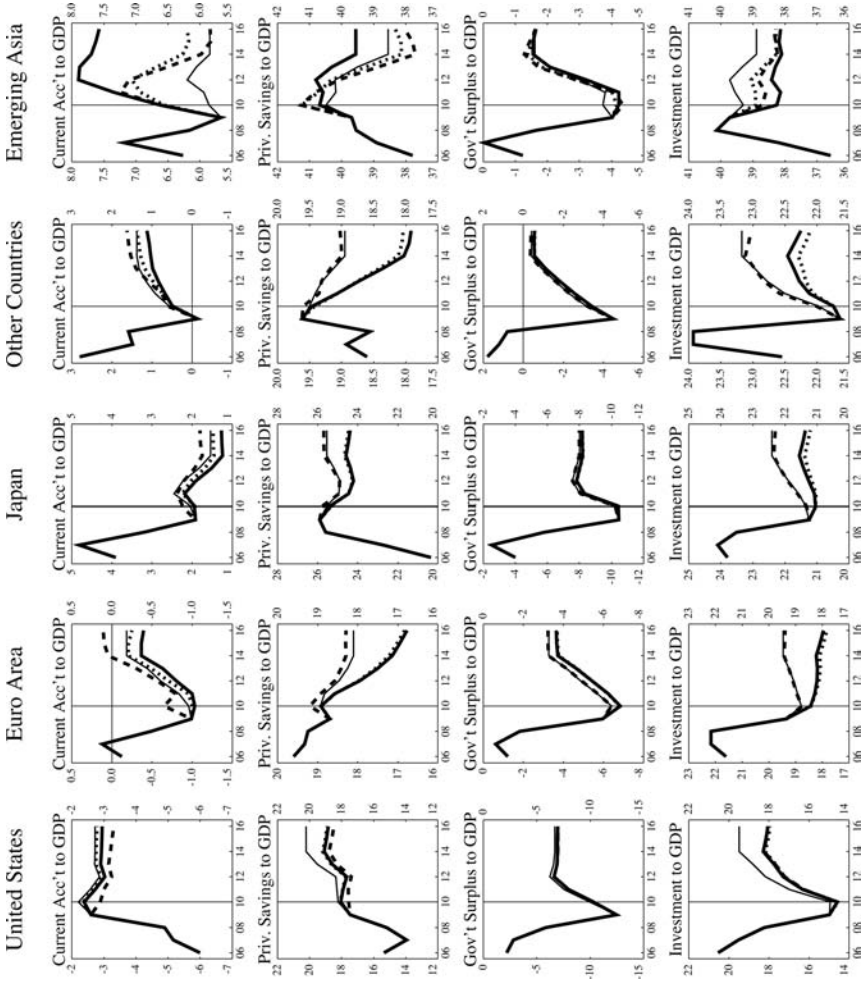
Notes: (variables in levels on white; variables in % deviation from baseline on gray; x-axis in years) — = October 2009 WEO, - - - = Add US Shocks, ... = Add US+RW Shocks, ‾‾ = Add All Shocks

Figure 2. Downside Scenario—GDP, Income, and Exchange Rates



Notes: (variables in levels on white; variables in % deviation from baseline on gray; x-axis in years) — = October 2009 WEO, - - - = Add US Shocks, ... = Add US+RW Shocks, ▔ = Add All Shocks

Figure 3. Downside Scenario—Current Account, Saving, and Investment



Notes: (variables in levels on white; variables in % deviation from baseline on gray; x-axis in years) — = October 2009 WEO, - - - = Add US Shocks, ... = Add US+RW Shocks, ‾‾ = Add All Shocks

regions of the world economy, with the weakening in the U.S. current account balance of course matched by a strengthening in the current account balances of the other regions.

One of the striking features of the simulations is the relative importance of the own-region shocks on economic developments, particularly on GDP. That is, there are only very small spillovers from the U.S. shocks onto the GDP of the euro area, Japan, and other countries. The exception is emerging Asia, where the U.S. shocks push GDP growth below baseline in the short term, with the level of GDP not returning to baseline for some years. The reason is the assumed exchange rate peg in emerging Asia, which induces a contractionary policy as the United States appreciates against other countries, thereby appreciating emerging Asia's real effective exchange rate. In the longer run, emerging Asia's real exchange rate needs to depreciate vis-à-vis the United States, and given the fixed nominal exchange rate this happens through a significant decline in inflation. This drives up real interest rates and causes an economic contraction.

5.2 Effects of Changes in the Euro Area, Japan, and Other Countries

The results of the RW shocks are similar to those of the U.S. shocks, as shown by a comparison of the dotted line with the dashed line in figures 1 to 3. There is a considerable decline in cumulative real GDP by 2016 in the three regions, with the largest decline (8 percent) in the euro area, due to larger downside risks from failing to repair the financial system, and smaller declines (about 6 percent) in Japan and the other countries. Similar to the shocks in the United States, the shocks in RW lead to an appreciation of the real effective exchange rate in the RW regions and a depreciation in the United States and emerging Asia. The current account weakens in RW and strengthens in the United States and emerging Asia.

5.3 Effects of Changes in Emerging Asia

The scenario for emerging Asia exhibits two features that are different from shocks elsewhere. First, there is one additional type

of shock, an increase in the private saving rate. And second, the assumption of a pegged exchange rate regime vis-à-vis the U.S. dollar changes the transmission mechanism. A comparison of the thick solid lines with the dotted lines in figures 1 and 2 shows that the shocks in emerging Asia cause a decline in real GDP growth in that region but have very little effect elsewhere. The inability of the currency in emerging Asia to diverge in nominal terms from the U.S. dollar prevents the real exchange rate from changing rapidly in response to shocks. Furthermore, the increase in emerging Asia's private saving rate—that is, a decline in the region's aggregate demand—puts pressure on the currency to depreciate and thereby offsets the pressure to appreciate coming from domestic productivity and protectionist shocks. The net effect on the real exchange rate, both bilateral and effective, is small.

Figure 3 shows that the increase in the private saving rate results in a further increase in the current account to GDP ratio in emerging Asia of about 1 percentage point and a weakening in current account balances in all the other regions. Failure to stimulate aggregate demand in emerging Asia would therefore further complicate the task of rebalancing global current accounts.

Note that under the downside scenario, the private saving rate declines relative to baseline in all regions except emerging Asia. Therefore, world private saving falls. The "world current account" equals zero by definition, and government deficits are assumed to not change significantly relative to the baseline. The corollary for the decline in world private saving is therefore the decline in funding needs due to lower world investment in a lower growth environment.

5.4 Larger and Protracted U.S. Fiscal Deficits

This section sets out the additional effects of a significant deterioration in the U.S. fiscal situation over time, relative to the downside scenarios presented so far. In effect, it is assumed that the United States has difficulty reversing the earlier fiscal stimulus measures, and instead allows them to increase relative to the baseline, by 2 percent of GDP from 2011 to 2020. Thereafter the deviation of the deficit from the baseline declines to around 1 percent of GDP. It is assumed that these fiscal adjustments are not anticipated in 2010.

This leaves the U.S. debt to GDP ratio 23 percentage points higher than in the baseline scenario. Automatic stabilizers are allowed to operate during the transition, but, as in the previous experiments, their effect is small, because the government quickly updates its estimate of potential output following the shocks.

The deficit increases are implemented as follows. In 2011 and 2012, the United States uses the same fiscal stimulus package that it committed to implementing in 2010, adjusted to achieve a deficit that is 2 percent of GDP higher than in the baseline scenario by increasing general transfers.[10] In 2013, the initial fiscal stimulus package is replaced by a proportional reduction in labor, consumption, and capital taxes. Over the period between 2014 and 2020, these taxes start to rise gradually to maintain the deficit target while servicing the increase in interest payments on the growing stock of public debt. The reduction in the deficit target around 2020 is financed by a further proportional increase in labor, consumption, and capital taxes.

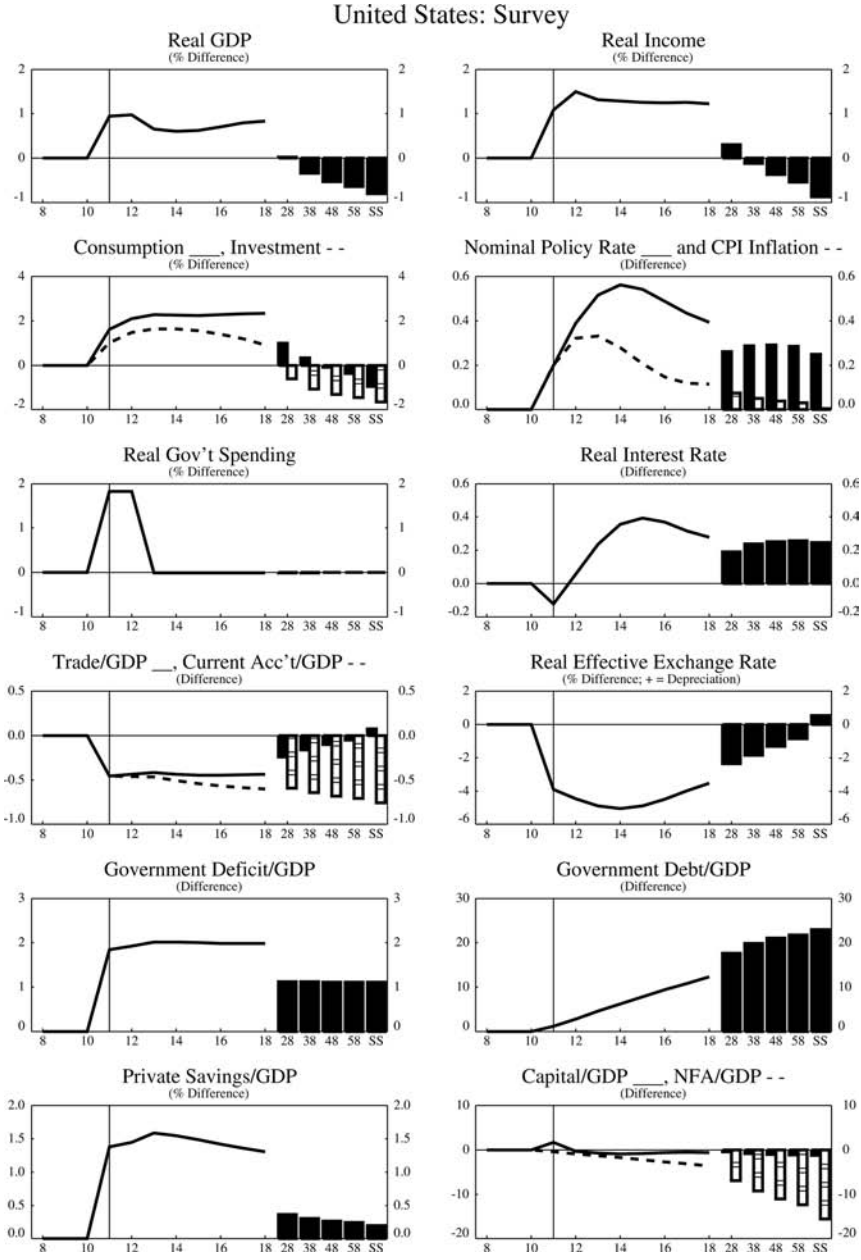
Figure 4 illustrates the effects on the U.S. economy. In the first ten years following the increase in deficits, U.S. GDP, consumption, and investment increase, with a multiplier of around 0.3 that is typical for tax-based stimulus measures not accompanied by monetary accommodation.[11] At the same time, the higher level of aggregate demand leads to a deteriorating trade balance and a real appreciation. It also gives rise to higher inflation and a higher level of nominal and real interest rates. During this initial phase, the latter is mostly associated with the monetary policy response to higher inflation.

In subsequent decades, real GDP declines relative to baseline by ultimately about 0.8 percent. There are two reasons, one connected with real interest rates and the second with tax rates. Higher fiscal deficits lead to lower U.S. saving and world saving, given the size of the U.S. economy. Given the non-Ricardian behavior of households, an increase in private saving only partly offsets the decline of public saving in the medium run, with the offset even smaller in the long run. The result is an increase in the world real interest rate that

[10]The stimulus package equals 1.8 percent of GDP, which is derived from the G-20 stimulus numbers compiled by the IMF and used in Coenen et al. (2010a, 2010b).

[11]See Coenen et al. (2010a, 2010b).

Figure 4. Downside Scenario—Permanent, Excessive U.S. Fiscal Deficits



crowds out investment in U.S. physical capital and therefore real output. It also crowds out U.S. investment in net foreign assets, and because the current account and the net foreign asset position exhibit the same type of long-run relationship as government deficits and government debt in equation (4), it leads to a progressive deterioration in U.S. current account imbalances with the other regions. The rising interest payments to foreigners require a reversal of the initially negative trade balance, which in turn necessitates a depreciation of the real effective exchange rate, back to about the baseline level. The second reason for the long-run decrease in GDP is the evolution of U.S. distortionary taxes. While they fall initially, contributing to the short-run increase in GDP, in the longer run they must rise above the baseline to service a larger stock of public debt that carries a higher real interest rate.

The U.S. fiscal actions have only small short-run effects on GDP in the other regions, except for emerging Asia, but there is a decline in the long run. In the short run, the shock to the U.S. deficit results in higher real interest rates and a depreciation of the exchange rate in the other regions, with lower domestic demand and higher U.S. demand roughly offsetting. In the longer run, higher world real interest rates result in lower capital ratios and hence lower GDP in all regions. In emerging Asia, there is an initial decline in real GDP as the region imports the contractionary U.S. monetary policy response.

In sum, an expansionary fiscal policy that is not reversed for a full decade, and which thereafter maintains debt at a permanently higher level, has short-run to medium-run favorable consequences for the domestic economy, but these come at the expense of very unfavorable long-run consequences, with lower real consumption and real GDP, and with higher interest payments on a larger foreign debt. If markets were in addition to perceive fiscal policy to be unsustainable, because they are concerned that the government will not be prepared to raise taxes or reduce expenditures in order to eventually reverse the deficit, there may also be an increase in the country risk premium, with results that can partly offset the shorter-run favorable consequences of the fiscal expansion or even turn the expansion into an immediate contraction. However, we have not incorporated this possibility into our simulations.

6. Upside Scenario

In terms of the five risks raised in the introduction, the upside scenario involves favorable outcomes relative to the baseline for the following:

- *The financial sector returns to health even faster than in the baseline*, especially in the United States and the euro area, and thereby allows for higher productivity growth globally. Specifically, compared to the baseline, productivity growth from 2010 to 2017 is higher by 0.55 percentage points in the United States and the euro area, 0.4 percentage points in the other countries group, 0.35 percentage points in Japan, and 0.2 percentage points in emerging Asia.
- *Private saving and exchange rates move to support global demand and current account rebalancing.* First, private saving falls in all regions outside the United States, especially in emerging Asia: the euro area—0.5 percent of GDP, phased in over five years starting in 2010; Japan and the other countries—1 percent of GDP, phased in over five years, starting in 2010; and emerging Asia—2 percent of GDP, phased in over five years, starting in 2012.[12] Second, both the nominal and real bilateral U.S. dollar exchange rates in emerging Asia are allowed to appreciate by 2 percent per year for ten years, for a total of 20 percent.
- *Government investment expenditures increase permanently worldwide.* Examples are green initiatives and infrastructure improvements. The increase in government investment, which starts immediately in 2010, equals 0.25 percent of GDP in the United States, the euro area, and Japan, and 1 percent of GDP in emerging Asia and other countries.

[12]The decrease in private saving in emerging Asia is larger but starts two years later than elsewhere, as the government is more focused in 2010 and 2011 on engineering an exchange rate appreciation through its labor policy (to be discussed shortly). The drop in Asian saving could be the result of improved social policies, particularly in the areas of health care, pensions, and education, or the expansion of the availability of insurance products, any of which could lessen the incentives that underlie the current high levels of precautionary saving.

- *Significant fiscal consolidation.* For a clearer exposition, the specification and consequences of this shock are presented separately in subsection 6.4. We limit ourselves to a discussion of a U.S. fiscal consolidation, but the logic is equally applicable to any other region.

For the shocks in the United States and RW, we assume that emerging Asia keeps both its nominal and real exchange rate vis-à-vis the United States constant, while shocks in emerging Asia include a gradual 20 percent nominal and real appreciation. For all shocks, the target for the nominal exchange rate is achieved through nominal interest rate adjustments. The target for the real exchange rate is assumed to be achieved through what we consider to be a reasonable description of one of the main policy options available to countries in this region, especially China. Specifically, we assume that the government can sufficiently direct the flows of labor in its internal labor market to bring about real wage movements that are large enough to move the real exchange rate.

We will always discuss the effects of all transmission mechanisms when decomposing the effects of shocks to the world economy's different regions under the upside scenario. But we stress that the effects of emerging Asia's labor market policies on these individual decompositions should not be taken too literally, as we see these policies as only making sense as an integral part of a broader policy package in that region, with other key components of that package including large stimulative demand policies.

Consider, for example, a situation in which the emerging Asian governments control the movement of labor from the agricultural sector (outside the market economy) to the manufacturing sector. If a real appreciation alone was desired, the government could slow the movement into manufacturing and thereby bring about an increase in the real wage and an appreciation of the real exchange rate, but at the expense of a loss in production.[13] If the real appreciation was,

[13]In the earlier downside scenarios, in contrast, interest rates were used to hold the bilateral nominal exchange rate fixed, but the bilateral real exchange rate was allowed to adjust in response to the differential in inflation rates between emerging Asia and the United States.

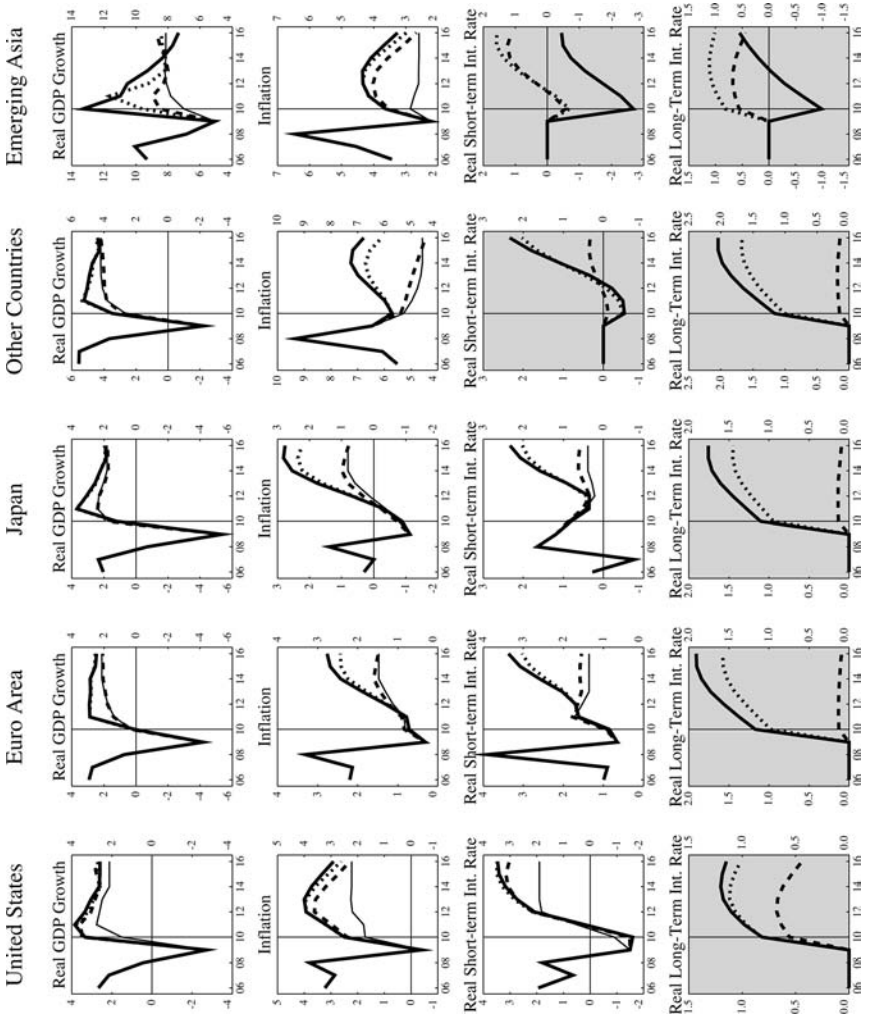
more realistically, accompanied by a boost to aggregate demand, the government could permit a faster movement into manufacturing to prevent an excessive real appreciation. Such a combined policy could significantly reduce the current account surplus by stimulating domestic demand, but at the same time it would not dramatically reduce, or might even increase, total real GDP, despite the labor supply implications of the real exchange rate policy.

The critical implication of our assumption about emerging Asia's labor market policies is that we obtain large spillover effects on emerging Asia from some of the shocks hitting other regions. This differs markedly from the relatively small spillover effects in the other regions, where the exchange rate movements under a flexible exchange rate regime play an important role in buffering the economies from external shocks.

6.1 Effects of Changes in the United States

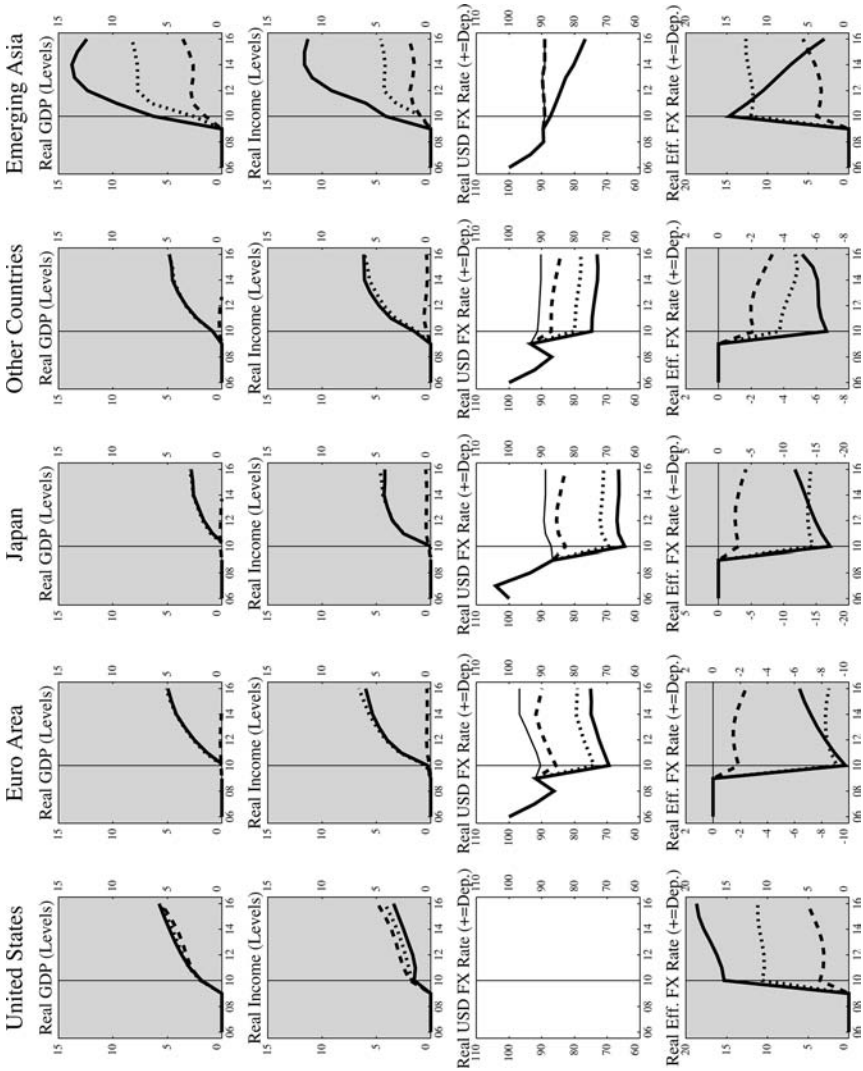
As shown in figures 5 to 7, higher productivity and higher public investment in the United States lead to a considerable increase in U.S. real GDP growth, with the level of real GDP 6 percent higher in 2016 than in the baseline. U.S. inflation rises in the short run as the private sector anticipates future productivity growth and therefore immediately boosts aggregate demand. Given that the main medium-run impact of U.S. shocks is on the supply side, the U.S. real exchange rate experiences a sizable depreciation against regions with flexible exchange rate regimes, with a 5 percent real effective depreciation by 2016. In the short to medium run, there is little impact on real GDP and inflation in the other regions, except for emerging Asia, where the level of real GDP in 2016 is about 4 percent higher than in the baseline scenario. There are two reasons for this. First, the region's real exchange rate vis-à-vis RW moves with that of the United States, leading to a real effective depreciation of 5 percent by 2016. Second, maintaining a constant real exchange rate vis-à-vis the United States in the presence of pressure toward bilateral appreciation requires lower real wages and therefore an increase in labor supply that further increases GDP growth. As for current account balances, U.S. shocks (which are not to saving rates) lead to only very small changes.

Figure 5. Upside Scenario—Growth, Inflation, and Interest Rates



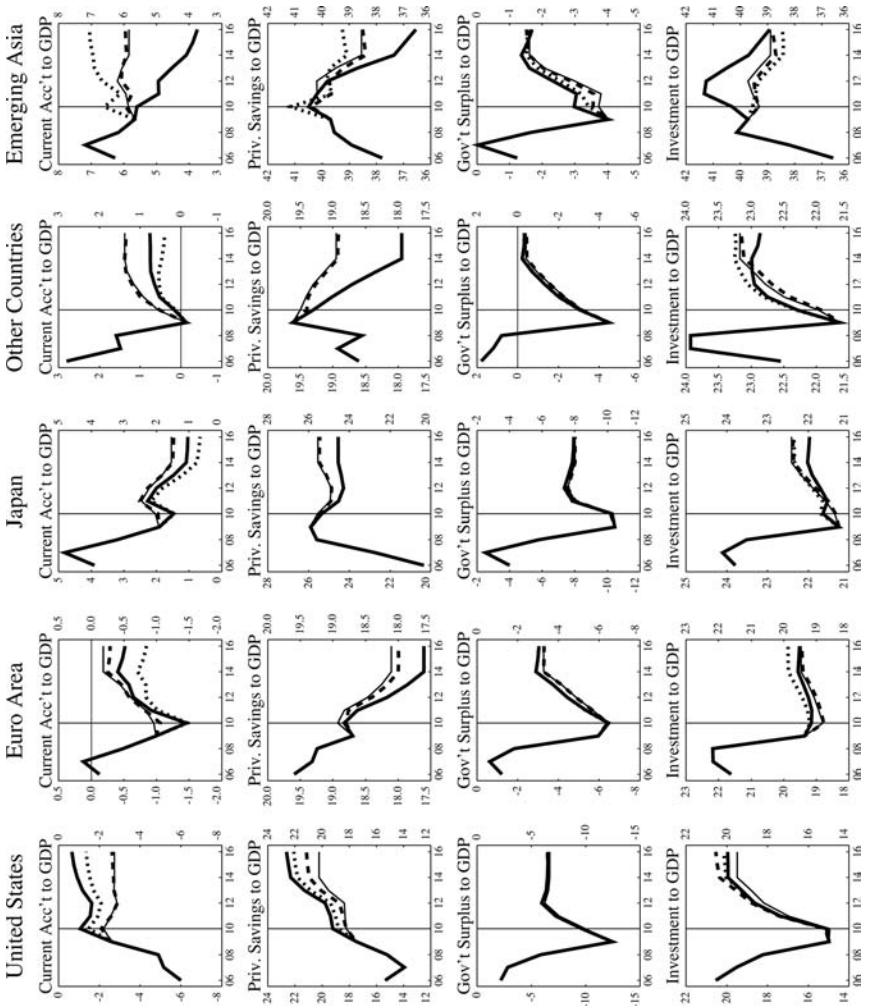
Notes: (variables in levels on white; variables in % deviation from baseline on gray; x-axis in years) — = October 2009 WEO, - - - = Add US Shocks, ... = Add US+RW Shocks, ‾‾ = Add All Shocks

Figure 6. Upside Scenario—GDP, Income, and Exchange Rates



Notes: (variables in levels on white; variables in % deviation from baseline on gray; x-axis in years) — = October 2009 WEO, - - - = Add US Shocks, ... = Add US+RW Shocks, ‾‾ = Add All Shocks

Figure 7. Upside Scenario—Current Account, Saving, and Investment



Notes: (variables in levels on white; variables in % deviation from baseline on gray; x-axis in years) — = October 2009 WEO, - - - = Add US Shocks, ... = Add US+RW Shocks, ‾‾ = Add All Shocks

6.2 Effects of Changes in the Euro Area, Japan, and Other Countries

The combination of the three sets of shocks in the euro area, Japan, and the other countries, which we will again refer to collectively as RW, raises cumulative real GDP by 2016 almost 5 percent in the euro area and the other countries and by about 3 percent in Japan, accompanied in each RW region by increases in inflation of around 1 percent in the medium run.

Real GDP in the United States is not significantly affected, while cumulative real GDP by 2016 in emerging Asia increases by a further 4.4 percent. The reason is to be found in the distribution of world trade flows, combined with Asia's exchange rate and labor market policies. In the world trade matrix, the share of U.S. exports going to RW is larger than the share of emerging Asia's exports going to RW. The positive demand shock in RW therefore affects the United States significantly more, which leads to a U.S. depreciation against RW and would lead, in the absence of emerging Asia's pegged real exchange rate, to a U.S. depreciation against that region also. Emerging Asia, to counter this pressure toward bilateral appreciation, brings about a decline in the real wage by increasing the supply of labor to the manufacturing sector. This keeps the bilateral exchange rate with the United States constant, but it leads to a real depreciation against RW, with a real effective depreciation of around 8 percent. And, of course, the other effect of the increase in the labor supply is the above-mentioned increase in GDP.

Real interest rates in RW rise in the short run due to the monetary policy response to higher inflation. In the longer run, real interest rates rise worldwide by around 1 percentage point, due to the permanent reduction in private saving in RW. For the same reason, the current account balance strengthens in the United States and emerging Asia and weakens in the RW regions. For a satisfactory resolution of global current account imbalances, the assumed further response from emerging Asia, described in the following subsection, is therefore critical.

6.3 Effects of Changes in Emerging Asia

The combination of shocks in emerging Asia leads to a further increase in real GDP in that region. For emerging Asia to achieve its

targeted real appreciation alone would require a reduction in labor supply that would have negative effects on GDP. But the real appreciation is assumed to be part of a broader policy package, whose key other elements are a large increase in domestic demand, increased productivity growth, and increase in public capital. Together these policies require an increase rather than a decrease in labor supply, even with the targeted real appreciation, and they lead to a further 4 percent increase in cumulative real GDP by 2016.

A further stimulative effect comes from lower nominal and real interest rates in emerging Asia, which are needed to equilibrate asset and goods markets while the nominal and real exchange rates appreciate. Specifically, the assumed annual 2 percent appreciation in the nominal and real exchange rates implies that the nominal and real short-term interest rates in emerging Asia are roughly 2 percentage points below that in the United States.

As striking as the increase in real GDP is the sharp increase in real income (nominal GDP deflated by the CPI) in emerging Asia. This is primarily the result of the very significant real appreciation of the currency, which leads to a strengthening of the terms of trade. Higher real incomes in emerging Asia in turn lead to increased consumption and an improved standard of living for households in that region.

The changes in emerging Asia do not have much effect on real GDP outside the region. However, current account balances change significantly, with surpluses falling by 2016 by over 2 percent of GDP in emerging Asia and strengthening in the other four regions, especially in the United States. The main drivers of current account rebalancing are the reduced private saving rate and the real appreciation in emerging Asia, with the latter reflected in a real depreciation especially in the United States, but also in the euro area and Japan.

6.4 Significant U.S. Fiscal Consolidation

This section discusses the effects of adding significant U.S. fiscal consolidation, beginning in 2011, to the upside scenario just discussed. Specifically, the United States is assumed to announce in 2011 that its budget deficit target will be reduced to 5.5 percent of GDP in 2012, 5 percent of GDP in 2013, 4.5 percent of GDP in 2014, 4 percent of GDP in 2015, and 3 percent of GDP thereafter. Once again,

it is assumed these actions are not anticipated in 2010. This implies a gradual reduction in the U.S. government deficit to GDP ratio, relative to the baseline, of more than 4 percentage points, and a long-run fall of roughly 80 percentage points in the U.S. government debt to GDP ratio. As mentioned above, the baseline is based on the projections of the IMF's October 2009 *World Economic Outlook*, which projects a very strong upward trend in the U.S. government debt to GDP ratio, similar to recent projections of the U.S. Congressional Budget Office.[14] The upside scenario should therefore be seen as one of fiscal consolidation that keeps debt near its present levels in the long run.

The consolidation is effected through a combination of a permanent increase of 1.5 percentage points in the consumption tax rate and a permanent reduction in entitlement programs (modeled as general lump-sum transfers), with the latter accounting for around two thirds of the consolidation. As debt falls over time, the labor tax rate is reduced in order to maintain the targeted deficit ratio. In the very long run, the consolidation is large enough to account for a drop in the labor tax rate of around 10 percentage points, again of course relative to a baseline that would see that rate rise by a similar magnitude to service increasing debt obligations.

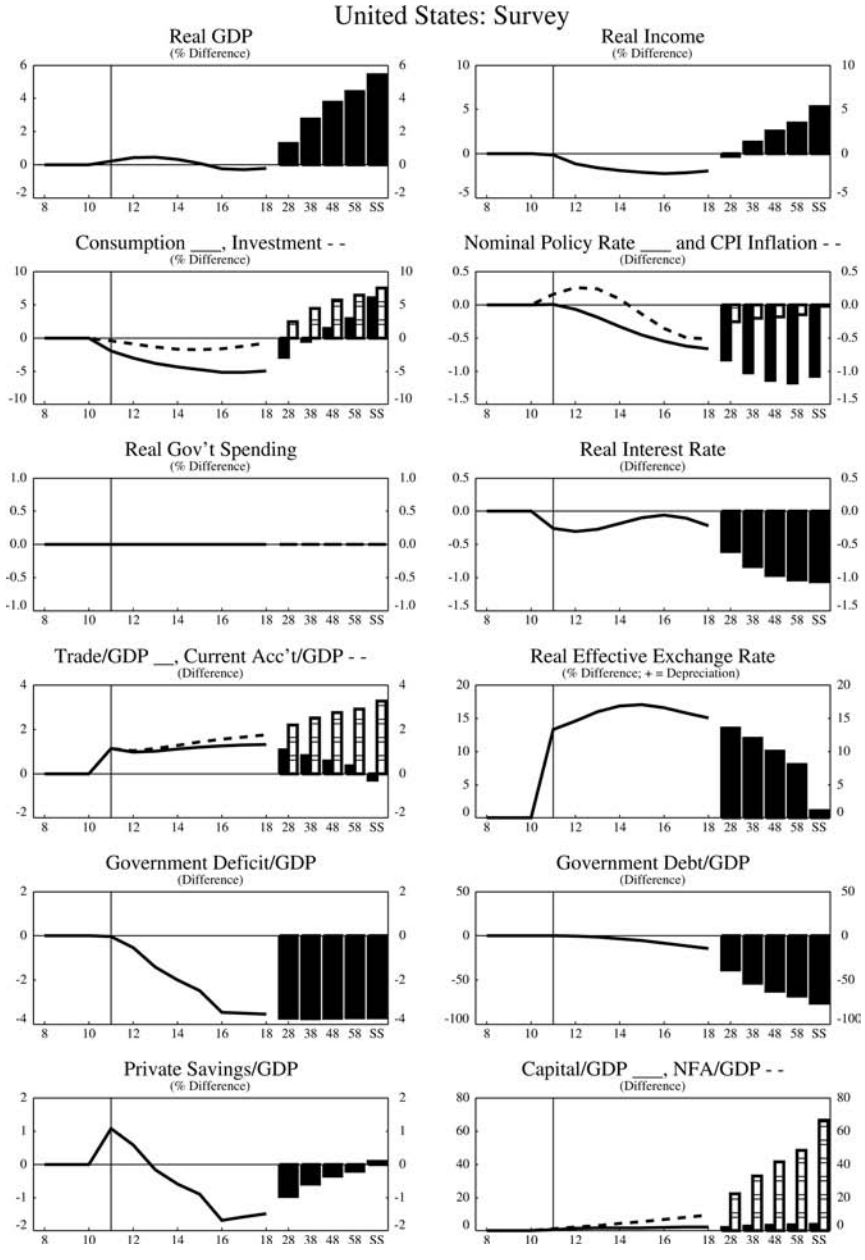
As shown in figure 8, the short-run effect on real GDP in the United States of the reduction in fiscal deficits is small. Positive effects come from a large (around 15 percent) real depreciation that boosts the trade balance, but in the short run this is almost offset by a large drop in consumption, in response to both higher consumption taxes and lower entitlements. The latter has a particularly severe effect on liquidity-constrained households.[15] Investment is initially also negatively affected by the drop in domestic demand.

Real interest rates are initially driven down by the monetary policy response to the lower inflation that follows the drop in domestic demand. But over the medium to long run, the main determinant of real interest rates is the fiscal consolidation, which results in long-term nominal and real interest rates falling below baseline by about

[14]See, for example, Congressional Budget Office (2009).

[15]The paper does not take into account that distributional considerations of this kind may impose political limits on the feasibility of a fiscal consolidation program.

Figure 8. Upside Scenario—Significant U.S. Fiscal Consolidation



100 basis points. Lower real interest rates combined with a lower debt burden account for a very large increase in fiscal space that permits the above-mentioned 10-percentage-points reduction in the labor tax rate. The combination of lower real interest rates and lower distortionary taxes causes real GDP to rise by around 5.5 percent in the very long run, reflected in a similar or even larger increase in consumption and investment. Or in other words, forestalling the crowding-out effects of higher debt through a timely fiscal consolidation prevents what would, in the long run, be a very severe contraction.

The stock-flow dynamics of fiscal consolidation can be seen at the bottom of figure 8. Lower government deficits, by (4), lead to lower government debt in the long run. Due to the non-Ricardian behavior of households, private saving only partly offsets the increase in government saving in the medium run, and not at all in the very long run. Overall U.S. saving therefore increases, and because the United States accounts for a large share of the world economy, this leads to a large increase in world saving, which is of course the reason for the drop in the world real interest rate. The latter implies that lower U.S. debt crowds in investment in the U.S. (and world) physical capital stock, which boosts output. It also crowds in investment in U.S. foreign assets equal to around 60 percent of GDP. Because the current account and the net foreign asset position exhibit the same type of long-run relationship as government deficits and government debt in equation (4), fiscal consolidation turns out to be critical for the reversal of global current account imbalances, a point made recently by Bernanke (2009) and Kumhof and Laxton (2007, 2009). Finally, to facilitate the payment by foreigners of the rising U.S. interest receipts requires a reversal of the positive trade balance, which, in turn, necessitates a gradual appreciation of the real effective exchange rate, back to near its baseline level.

The lower global real interest rate also leads to increases in real GDP of around 2.3 percent in all the other regions of the world economy, both directly through increases in investment and capital and in wealth and consumption, and indirectly through increases in fiscal space that allow governments to lower distortionary taxes. Of course, the United States benefits more under this scenario, because it is assumed to be the only country committing to a fiscal consolidation, thereby allowing it to reduce distortionary labor taxes much

more significantly than in other regions. Clearly, a worldwide fiscal consolidation would multiply long-run benefits around the world.

7. Concluding Remarks

In this paper we have presented a scenario analysis that outlines the major risks and opportunities facing the world economy going forward from the current deep recession. Our emphasis has been not only on the prospects for a generalized pickup in GDP growth but also on the need for a rebalanced growth in demand that is capable of addressing the problem of global current account imbalances.

This requires an analytical approach that stresses the key role of permanent private and public saving rates shocks in the determination of equilibrium current accounts and real interest rates. We therefore use the IMF's GIMF model, which is designed to answer questions of this nature as well as questions that concern the joint effects of monetary and fiscal policies in a realistic environment.

The paper constructs downside and upside scenarios around the baseline of the October 2009 *World Economic Outlook*. A comparison of the two scenarios leads to the following conclusions.

First, it is critical that governments take the appropriate actions to return the financial sector to health since the effect of that sector on future productivity growth will have a major effect on global economies in both the short run and the long run. Second, it will be important to avoid protectionist measures that would create distortions in global product and labor markets. Third, continued increases in government infrastructure investment expenditures, particularly in regions where the public capital stock may currently be suboptimally low, will lead to higher GDP in the global economy. Fourth, a decrease in private saving outside the United States will not only stimulate recovery in the short run but will also help to rebalance current accounts across regions in the desired direction. Fifth, a nominal and real appreciation of the currencies of emerging Asia will also contribute to rebalancing current accounts in the global economy. This will strengthen real incomes in emerging Asia as a result of an improvement in the terms of trade, and consequently it will lead to increased consumption and an improved standard of living in that region. Sixth, while protracted and excessive U.S. fiscal deficits may boost the U.S. economy in the short run, they will

have significant negative implications for the long run, by reducing world saving and thereby increasing world real interest rates, and by reducing fiscal space and therefore creating a higher tax burden in the long run. Furthermore, if U.S. fiscal deficits result in an increase in the U.S. country risk premium, even shorter-term benefits may be small or non-existent. In contrast, U.S. fiscal consolidation will have very favorable effects in the long run. These results indicate the potential benefits of developing fiscal frameworks that prevent large fiscal deficits from becoming very long term or permanent.

The focus by governments on the development of packages of policies that will result in favorable outcomes in both the short run and the long run will be crucial in creating an exit strategy that will lead to a well-functioning global economy.

References

Benes, J., K. Clinton, R. Garcia-Saltos, M. Johnson, D. Laxton, and T. Matheson. 2010. "The Global Financial Crisis and Its Implications for Potential Output." Forthcoming IMF Working Paper.

Bernanke, B. 2009. "Asia and the Global Financial Crisis." Speech at the Federal Reserve Bank of San Francisco's Conference on Asia and the Global Financial Crisis, Santa Barbara, California, October 19.

Bernanke, B. S., M. Gertler, and S. Gilchrist. 1999. "The Financial Accelerator in a Quantitative Business Cycle Framework." In *Handbook of Macroeconomics*, Vol. 1C, ed. John B. Taylor and Michael Woodford. Amsterdam: Elsevier.

Blanchard, O. J. 1985. "Debt, Deficits, and Finite Horizons." *Journal of Political Economy* 93 (2): 223–47.

Christiano, L., R. Motto, and M. Rostagno. 2009. "Financial Factors in Business Cycles." Working Paper, Northwestern University and European Central Bank.

Coenen, G., C. de Resende, C. Erceg, C. Freedman, D. Furceri, J. in't Veld, M. Kumhof, R. Lalonde, D. Laxton, J. Lindé, A. Mourougane, D. Muir, S. Mursula, J. Roberts, W. Roeger, S. Snudden, and M. Trabandt. 2010a. "A Detailed Analysis of the Effects of Fiscal Stimulus in Structural Models." Forthcoming IMF Working Paper.

———. 2010b. "What Determines the Effects of Fiscal Stimulus in Structural Models?" Forthcoming IMF Working Paper.

Congressional Budget Office. 2009. "A Preliminary Analysis of the President's Budget and an Update of CBO's Budget and Economic Outlook." (March). Congress of the United States.

Decressin, J., and D. Laxton. 2009. "Gauging Risks for Deflation." IMF Staff Position Note No. 09/01. Available at http://www.imf.org/external/pubs/ft/spn/2009/spn0901.pdf.

Engen, E. M., and R. G. Hubbard. 2004. "Federal Government Debt and Interest Rates." *NBER Macroeconomics Annual 2004* 83–138.

Freedman, C., M. Kumhof, D. Laxton, and J. Lee. 2009. "The Case for Global Fiscal Stimulus." IMF Staff Position Note No. 09/03. Available at http://www.imf.org/external/pubs/ft/spn/2009/spn0903.pdf.

Gale, W. G., and P. R. Orszag. 2004. "Budget Deficits, National Saving, and Interest Rates." *Brookings Papers on Economic Activity* 2: 101–87.

Galí, J., J. D. López-Salido, and J. Vallés. 2007. "Understanding the Effects of Government Spending on Consumption." *Journal of the European Economic Association* 5 (1): 227–70.

Girouard, N., and C. André. 2005. "Measuring Cyclically-Adjusted Budget Balances for OECD Countries." OECD Economics Department Working Paper No. 434.

International Monetary Fund. 2009a. "Global Economic Slump Challenges Policies." *World Economic Outlook Update* (January). Washington, DC: World Economics and Financial Surveys.

———. 2009b. "Global Prospects and Policies." Chapter 1 in *World Economic Outlook* (October). Washington, DC: World Economics and Financial Surveys.

———. 2009c. "The State of Public Balances: Outlook and Medium-Term Policies After the 2008 Crisis." Fiscal Affairs Department. March 6.

Ireland, P. N. 2001. "Sticky-Price Models of the Business Cycle: Specification and Stability." *Journal of Monetary Economics* 47 (1): 3–18.

Kumhof, M., and D. Laxton. 2007. "A Party without a Hangover? On the Effects of U.S. Government Deficits." IMF Working Paper No. 07/202.

———. 2009. "Fiscal Deficits and Current Account Deficits." IMF Working Paper No. 09/237.

Kumhof, M., D. Laxton, D. Muir, and S. Mursula. 2010. "The Global Integrated Monetary and Fiscal Model—Theoretical Structure." Forthcoming IMF Working Paper.

Laubach, T. 2003. "New Evidence on the Interest Rate Effects of Budget Deficits and Debt." Finance and Economics Discussion Series Paper No. 2003-12, Board of Governors of the Federal Reserve System.

Laxton, D., and P. Pesenti. 2003. "Monetary Rules for Small, Open, Emerging Economies." *Journal of Monetary Economics* 50 (5): 1109–52.

Ligthart, J. E., and R. M. M. Suárez. 2005. "The Productivity of Public Capital: A Meta Analysis." Working Paper, Tilburg University.

Lipsky, J. 2008. "The Current Macroeconomic Outlook 2009: Issues of Systemic Stability." Speech for the Devisen Forum 2008, Frankfurt, December 10. Available at http://www.imf.org/external/np/speeches/2008/121008a.htm.

Spilimbergo, A., S. A. Symansky, O. J. Blanchard, and C. Cottarelli. 2008. "Fiscal Policy For the Crisis." IMF Staff Position Note No. 08/01.