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UNITED STATES OF AMERICA

Selected Issues

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Approved by the Western Hemisphere Department

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PART I: REAL DEVELOPMENTS

I. BOOM-BUST CYCLES IN HOUSING: THE CHANGING ROLE OF FINANCIAL STRUCTURE[1]

1.   ***This paper examines the effect of the structure of the U.S. mortgage market on real housing activity and housing prices***. Following a brief review of structural changes in mortgage finance, the paper analyzes their impact on real housing activity and housing prices, and carries out an econometric investigation of house price dynamics. In addition, it explores whether the current system of housing finance may have reduced risks of a speculative boom-bust housing cycle.

A.   Structural Changes in Mortgage Finance

2.   ***Through the mid-1980s, mortgage lending was mainly a local business, prone to local and regional shocks***. Residential mortgages were originated locally, and most mortgages were kept on the balance sheets of local lenders—such as savings and loan institutions (S&Ls)—for the lifetime of the loan. The availability of mortgage credit in any region depended largely on local financial conditions, including the quality of bank and thrift loan portfolios and levels of capital, as restrictions on interstate banking inhibited the flow of lending between regions.

3.   ***Monetary policy and bank regulations contributed to the volatility of housing finance***. Monetary policy had a first-order impact on housing activity (the mortgage lending channel) through the prominent role of depositories' balance sheets in mortgage flows. The supply of credit fluctuated more severely—including through credit rationing under tight monetary conditions—than would have occurred through changes in interest rates alone. Bank regulations—including Regulation Q (Reg Q), which limited the interest rate to be paid on bank deposits—also restricted mortgage finance.

4.   ***Under such a market structure, local markets were subject to a boom-bust financing cycle***. Real mortgage growth slowed sharply during several episodes in the 1960s when Reg Q ceilings on deposit rates became binding and banks and S&Ls were unable to retain deposits (Figure 1). Lending shrank in response to the declining funding base, and would subsequently rebound as monetary policy eased and deposit growth resumed.

Figure 1: Real Mortgage Growth and Real M1 Deposit Growth
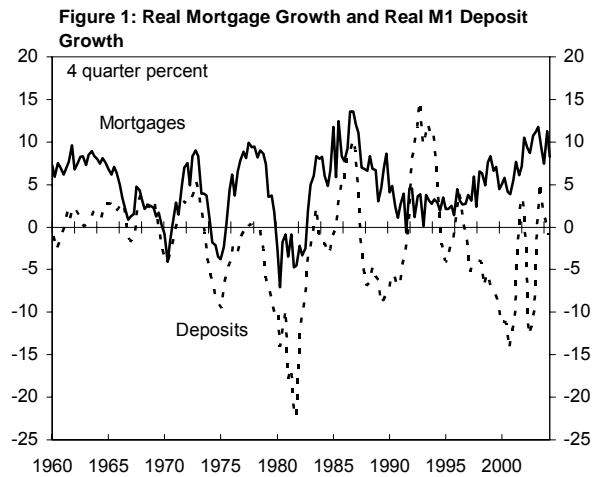
Source: Board of Governors, Federal Reserve.

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[1] Prepared by Calvin Schnure.

5.   ***The S&L crisis precipitated a shift toward nationwide funding of housing activities based on mortgage securitization***. S&Ls had funded long-term fixed-rate mortgage loans with short-term deposits, incurring large interest rate exposures. They suffered major capital losses when interest rates rose in the early 1980s, which contributed to the failure of many institutions. In their place, a system evolved under which loans originated by mortgage banks were subsequently pooled and securitized by Government Sponsored Enterprises (GSEs). Subsequently, home mortgages held by depositories dropped from above 70 percent of the market in the 1970s to below 40 percent in recent years (Figure 2).

Figure 2. Mortgage Market Structure

Source: Board of Governors, Federal Reserve.
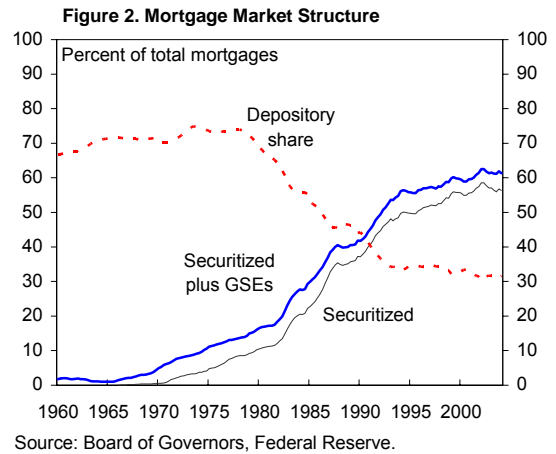
6.   ***This market-based financial structure has reduced the volatility of mortgage lending***. The availability of funds is no longer limited by conditions at local depository institutions or the strength of regional economies, and the supply of mortgages is less impacted by policy-induced fluctuations in high-powered money expanding or contracting bank balance sheets. Tighter or looser monetary conditions still affect the market interest rate and the general willingness to lend, of course, but this has a smaller direct impact on the mortgage lending channel.[2]

7.   ***Changes in the structure of the mortgage market have coincided with lower volatility of real housing activity***. In the past, housing construction and transactions tended to fluctuate strongly with the cycle, as evidenced by the boom-bust phases between the late 1960s and 1980s (Figure 3). Residential investment spending also exhibited pronounced cycles, with growth rates of 40 percent or more not uncommon during booms, and declines of nearly the same magnitude during busts. This cyclical volatility has diminished markedly, however, and housing starts have grown at a relatively stable pace since 1990. Although starts have risen somewhat faster in the past few years, their growth still remains well below rates reached in previous booms.

Figure 3: Housing Starts and Residential Investment

Sources: BEA and Census Bureau.

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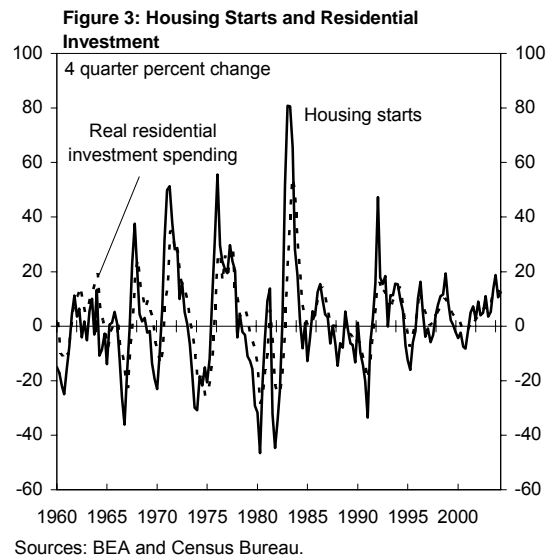
[2] See Peek and Wilcox (2005) for further discussion of how the GSEs and secondary mortgage markets have moderated the cyclicality of mortgage flows.

8.   ***Housing activity has also become more synchronized across regions***. Cycles of housing starts in past decades often moved independently in different parts of the country, especially during the early 1960s and the 1980s (Figure 4). Beginning in 1990, however, growth trends in housing starts have been similar across all major regions.

Figure 4. Regional Housing Starts

Housing starts, 12 mo. moving average, 1960=100

Source: Census Bureau.
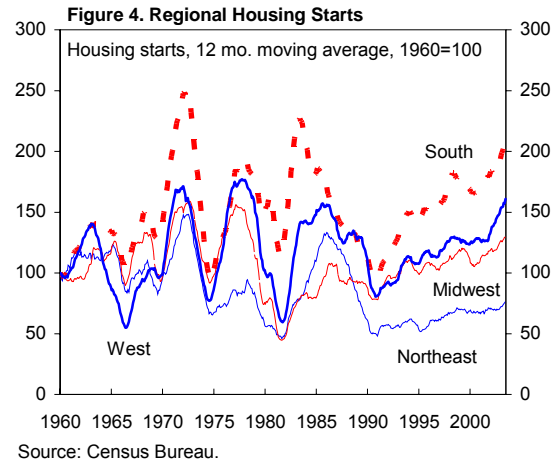
9.   ***Housing prices have also converged toward more steady growth since the early 1990s***. Amid high volatility*,* housing prices increased strongly in the 1970s, both in nominal terms and relative to the overall consumer price index (Figure 5). Nominal gains slowed sharply during the recessions in the early 1980s and prices declined in real terms in most regions. Since the late 1980s, price swings have had lower amplitude, and price trends have converged across regions.

B. House Prices and Fundamentals

10.   ***The smoothing of the boom-bust cycle in mortgage lending, real activity, and housing prices raises two questions***. Have structural changes in mortgage finance improved the process of price formation? And what do these developments tell us about the risk of a sharp collapse in prices following the ongoing housing boom? To address the first question, an econometric approach is used to analyze the impact of financial market changes on price formation in the housing market. The results are subsequently used to address the second question.

11.   ***Economic fundamentals for housing prices include regional variables for income, unemployment rates, and the labor force for the nine regions in Office of Federal Housing Enterprise Oversight's (OFHEO) housing price index (HPI)***. A number of national variables are included to control for business cycle dynamics, namely interest rates, the CPI, and GDP growth. The model was estimated allowing coefficients to vary by region in a set of stand-alone regressions, as well as in a fixed-effects panel in which only constants vary by location.[3]

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[3] In the short run the housing stock is fixed, and most home sales involve existing dwellings rather than new construction. The availability of open land, as well as the presence of zoning restrictions, has been found to have an important effect on housing prices, explaining a portion of the more rapid appreciation in recent years in the mature cities of the East Coast and California (see McCarthy and Peach, 2004, and Glaeser and Gyourko, 2003).

Figure 5: Regional House Prices
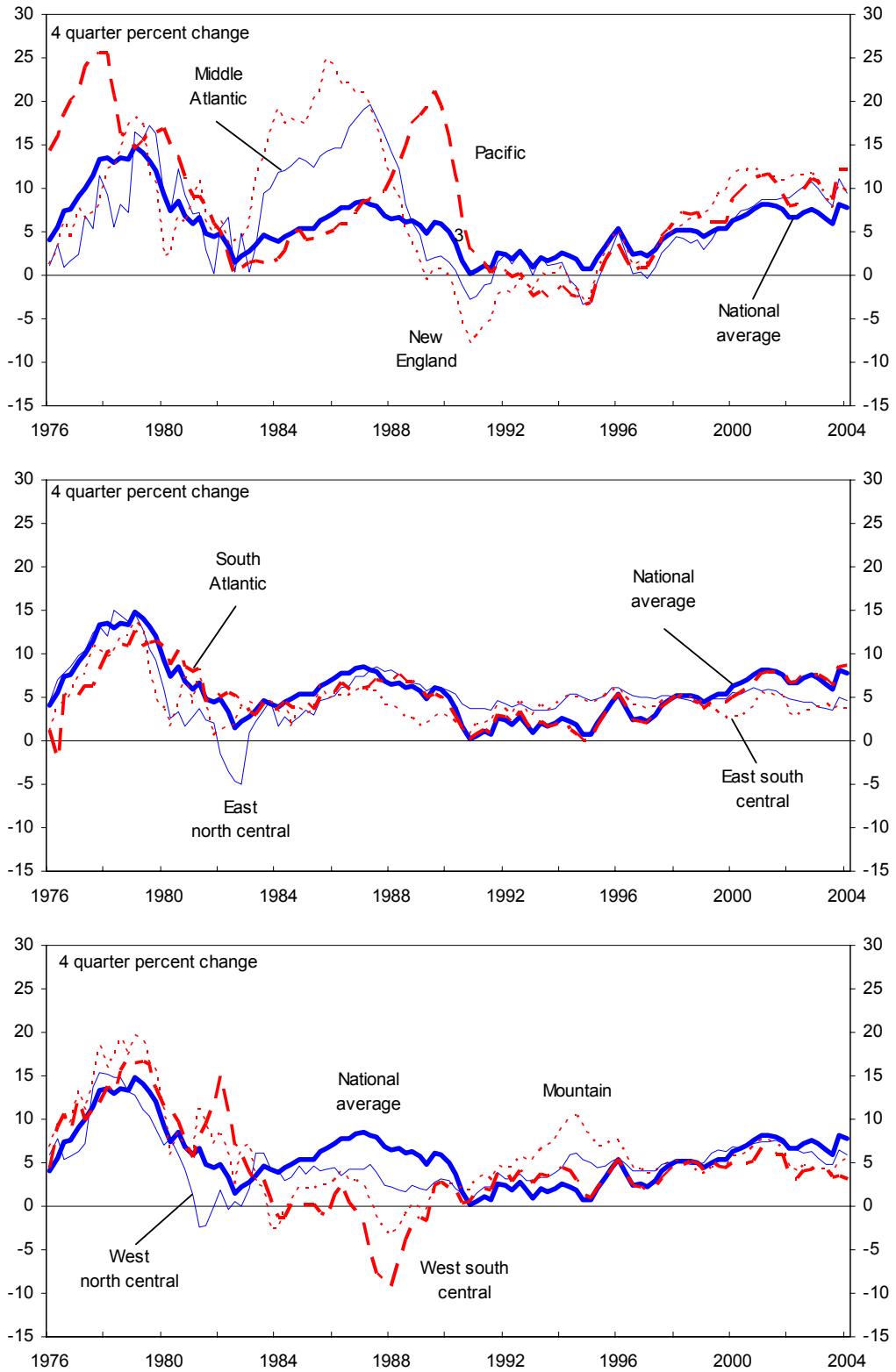
Source: Office of Federal Housing Enterprise Oversight.

12.   ***The results suggest that fundamental factors generally have the expected impact on housing prices*** (Table 1).[4] Regional income growth and unemployment rates have statistically significant and correctly signed effects on housing prices. The panel estimates imply that a 10 percent rise in regional incomes is associated with a 2.5 percent increase in housing prices. Similarly, a 1 percentage point rise in the unemployment rate depresses housing prices by about 1 percent. National business cycle indicators are not estimated to have a significant impact, suggesting that their effect is captured by the regional measures. The coefficient on CPI inflation is small and insignificant as price effects may be captured through nominal incomes. Somewhat surprisingly, interest rates are not estimated to have a significant effect, which could reflect endogeneity problems. Results of the region-by-region regressions are similar in character, although the standard errors are larger.

Table 1. House Price Regressions[1]

Regression	(1)	(2)	(3)	(4)	(5)
	Panel	Panel	Panel	Panel	Panel
Dependent Variable	HPI	HPI	HPI	HPI	HPI
Period	1978–2004	1978–2004	1978–2004	1978–89	1990–2004
Constant	8.96	9.13	7.87	13.59	23.73
	(11.08) **	(11.04) **	(9.58) **	(5.85) **	(20.43) **
Income	0.254	0.282	0.234	0.246	0.206
	(4.84) **	(4.73) **	(4.00) **	(2.35) *	(4.57) **
Unemployment	-1.056	-1.030	-0.877	-0.511	-1.2
	(6.85) **	(6.58) **	(5.66) **	(1.74)	(9.03) **
Interest rates	0.111	0.085	0.014	-0.606	-1.651
	(1.12)	(0.83)	(0.14)	(2.97) **	(11.26) **
CPI	0.054	0.039	-0.008	-0.083	-0.097
	(0.72)	(0.52)	(0.11)	(0.77)	(0.80)
GDP		-0.068	-0.072	-0.177	-0.389
		(1.00)	(1.09)	(1.72)	(5.41) **
Labor force			1.018	1.782	0.347
			(6.67) **	(5.69) **	(3.14) **
Observations	946	946	946	406	531
Adjusted R-squared	0.11	0.11	0.15	0.2	0.39

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Office of Federal Housing Enterprise Oversight; and Fund staff calculations.

[1] Absolute value of t-statistics in parenthesis; * significant at 5 percent; ** significant at 1 percent.

13.   ***The model's fit improves considerably when estimated separately over the periods corresponding to different mortgage market structures***. For example, the model explains more than twice as much of the overall variation in housing prices over 1990–2004 compared to estimates over the entire time horizon (Columns 3 and 5). Moreover, the interest rate is

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[4] The model is estimated in log differences, as is common in the literature on housing prices. Tests of regional housing prices and income do not find evidence of a cointegrating relationship, suggesting that a cointegrating equation may not be appropriate. See also Gallin (2003), who finds no cointegration between housing prices and income in metropolitan areas.

now found to have the expected negative effect (also significant at the 1 percent level) in both the earlier and later time periods (Columns 4 and 5), although the different coefficients suggest that housing prices have become more sensitive to long-term interest rates as the importance of quantity restrictions on mortgage lending has waned.

14.   ***Assuming that estimation residuals represent pricing errors, the results also indicate significant improvements in the pricing process***. Pricing errors in the earlier years often were quite large but decreased through the mid-1980s and 1990s (Figure 6, Table 2). Price movements also appear to have converged across regions as the financial structure changed from a local and regional to a national basis (Figure 7).

Table 2. Pricing Errors

(Panel regressions in percent)

Period	Inflation	Market Structure	Average Absolute	Median Absolute	Standard Deviation
1978–82	High	Depository	6.2	4.8	5.6
1983–90	Low	Mixed	4.9	3.7	4.2
1990–2004	Low	Market	2.7	2.0	2.5

Sources: Office of Federal Housing Enterprise Oversight; and Fund staff calculations.

15.   ***Tests of the relative importance of mortgage market structure and macroeconomic variables suggest an important effect from financial structure***. Average absolute pricing errors from the housing price model were regressed on the securitized share of the mortgage market (a proxy for structural change in housing finance) and the 4-quarter rate of CPI inflation (Table 3). The results indicate that changes in mortgage market structure are associated with improvements in the house price formation process: higher securitization tends to reduce pricing errors. The estimates suggest that the results are economically significant, with a 10 percentage point rise in securitized share, all else equal, lowering the average absolute pricing error by 0.8 percentage point. The rise in securitization from 10 percent of the total mortgage market to 60 percent or more between the mid-1970s and 2004 would thus be associated with a 4 percentage point decline in absolute pricing errors—essentially all of the improvement that is estimated to have occurred. Inflation, in contrast, was not found to have a significant effect on the price formation process.

16.   ***Pricing errors may have resulted from rational decisions by home buyers potentially facing credit rationing at some later date***. When mortgage lending was subject to quantity restrictions, potential home buyers who otherwise would qualify for a loan may at times have been unable to obtain financing. Knowing this, a potential homebuyer may have rationally paid a premium over a house's fundamental value during periods when financing

Figure 6: Pricing Errors from Panel Regression
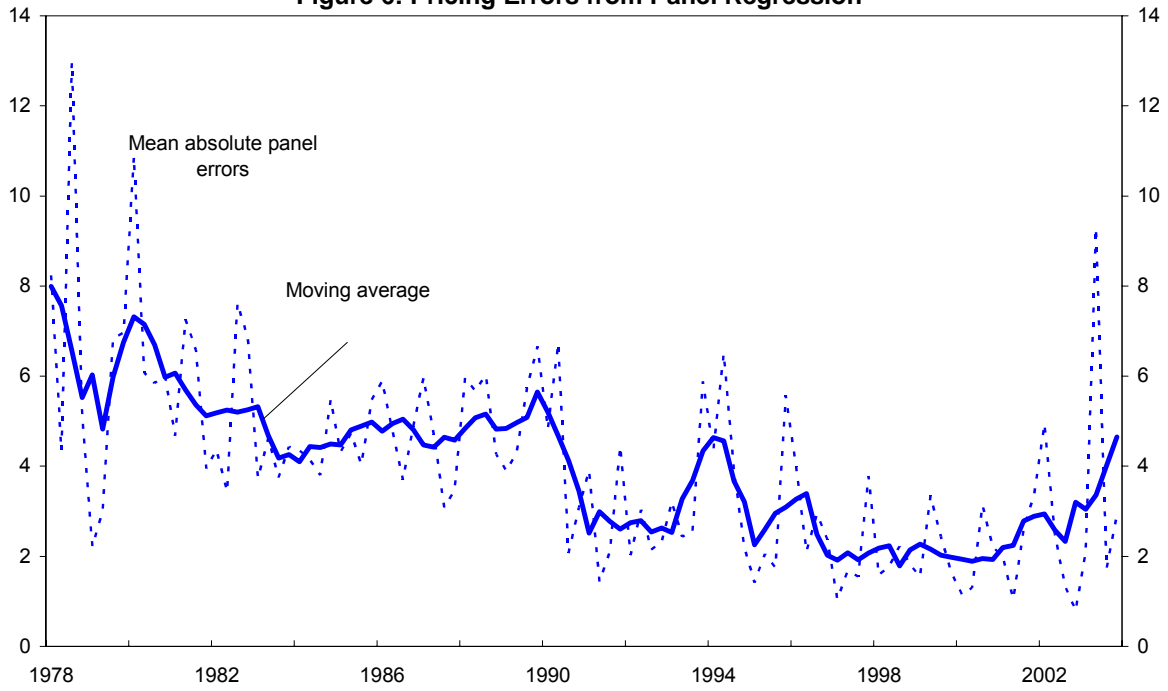
Mean absolute panel
errors

Moving average

Sources: Office of Federal Housing Enterprise Oversight; BEA; BLS; and IMF staff estimates.

Figure 7: Pricing Errors from Panel Regression

Standard deviation of
panel errors

Moving average
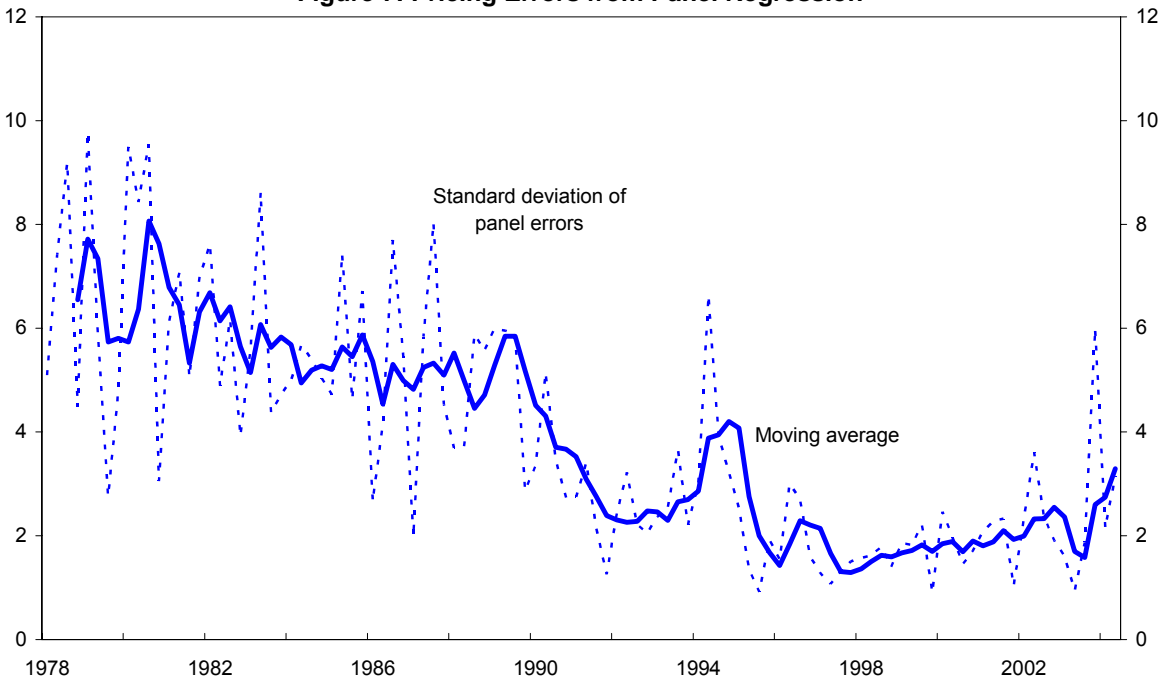
Sources: Office of Federal Housing Enterprise Oversight; BEA; BLS; and IMF staff estimates.

Table 3. Pricing Error Regressions[1]

Regression	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Dependent Variable	Av. Abs. Pricing Error by Regions	Var. Pricing Error by Regions	Av. Abs. Pricing Error from Panel	Var. Pricing Error from Panel
Constant	5.96	6.67	7.08	8.08
	(7.54) **	(9.01) **	(8.91) **	(11.41) **
MBS share	-0.064	-0.079	-0.083	-0.106
	(4.59) **	(6.01) **	(5.88) **	(8.48) **
CPI	0.056	0.037	0.026	0.010
	(0.78)	(0.56)	(0.37)	(0.15)
Observations	106	106	106	106
Adjusted R-squared	0.31	0.42	0.40	0.57

Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; Office of Federal Housing Enterprise Oversight; and Fund staff calculations.

[1] Absolute value of t-statistics in parenthesis; *significant at 5 percent; ** significant at 1 percent.

was readily available. Conversely, homeowners forced to sell during periods when potential buyers had difficulty obtaining financing may have reduced sales prices.

17.   ***An alternative test using earlier historical data was performed to confirm the importance of the impact of mortgage market structure for the pricing process***. While
reliable data on house prices are available only for the most recent three decades, data on real and nominal residential investment spending are available since 1948. As inflation and macroeconomic volatility remained low until the late 1960s, spending data from 1948–1968 provide a control period for testing whether the elevated volatility of residential investment and price changes from the late 1960s through the early 1980s was more related to macroeconomic factors or to the structure of the mortgage market.

Figure 8: Real Residential Investment and Mortgage Growth
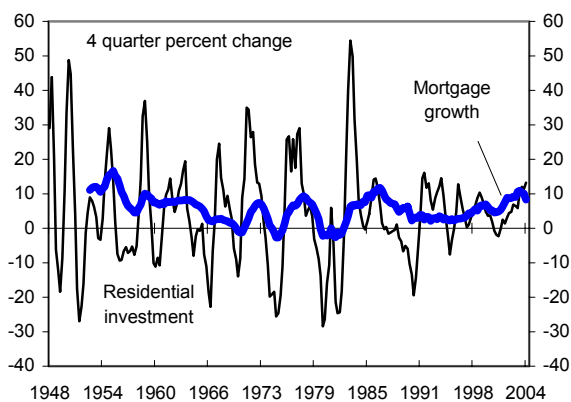
Sources: BEA; BLS; and Board of Governors, Federal Reserve.

18.   ***Before the 1990s, boom-bust cycles were similar during the low and high inflation decades, suggesting that the structure of the mortgage market was mainly responsible for generating large upswings and downswings in activity***. Residential investment was highly procyclical from 1948 through the late 1960s (Figure 8, previous page). There were four episodes in which residential investment grew at more than a 25 percent rate over 4 or more quarters, with a surge of nearly 50 percent in the early 1950s. During bust periods, spending often declined at a 20 percent rate or faster. These swings in real activity are comparable to (and at times greater than) those that occurred during the higher-inflation years of the 1970s and 1980s.

C. Will the Current Boom Be Followed by a Bust?

19.   ***There are widespread concerns about the recent run-up in housing prices***. While financing in a nationwide securitized market may have reduced the stop-go cycle of mortgage flows, it could be argued that the freer flow of financing may aid in the development of a nationwide bubble. Indeed, nationwide housing prices have risen 50 percent over the past five years, with some metropolitan and regional markets soaring much higher. While some of these gains may reflect a catch-up following little or no appreciation in previous years, recent increases have been particularly rapid, and may be ahead of fundamentals.

20.   ***Several indicators point to speculative pressures on prices***. Purchases of second homes, often for investment purposes, have risen, as has the use of interest-only mortgages that allow a more expensive purchase for a given monthly payment. Surveys suggest home buyers have extrapolated past gains into their expectations for future appreciation. The price-to-rent ratio has increased, suggesting that in some markets the valuations can only be justified by expectations of rapid appreciations. These warning signs could foretell a drop in prices, or an adjustment through a long period of slow nominal gains until real valuations came back in line with fundamentals.[5]

21.   ***Other factors, however, mute some of these risks***. Estimated pricing errors from the model presented earlier are not particularly large, suggesting that much of the recent gains can be explained by rising incomes, rising employment, and low interest rates. Moreover, the positive surprises in housing prices over the past five years follow a decade of negative surprises, especially on the East and West Coasts (Figure 9). These patterns suggest that much of the recent gains may be a catch-up after a prolonged period of prices lagging fundamentals. In addition, there have been other changes in homebuilders' behavior since the

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[5] Many observers have noted that the rapid rise in housing prices may more likely be followed by slow appreciation than a price collapse. See, for example, Case and Shiller (2003), Genesove and Mayer (2001), IMF (2003), IMF (2004), Macroeconomic Advisers (2004), McCarthy and Peach (2004). Angell and Williams (2005) find that booms may be followed by busts, but that "this pattern may be more the exception than the rule" (FDIC 2005).

Figure 9. Regional Pricing Errors, 1978–2004
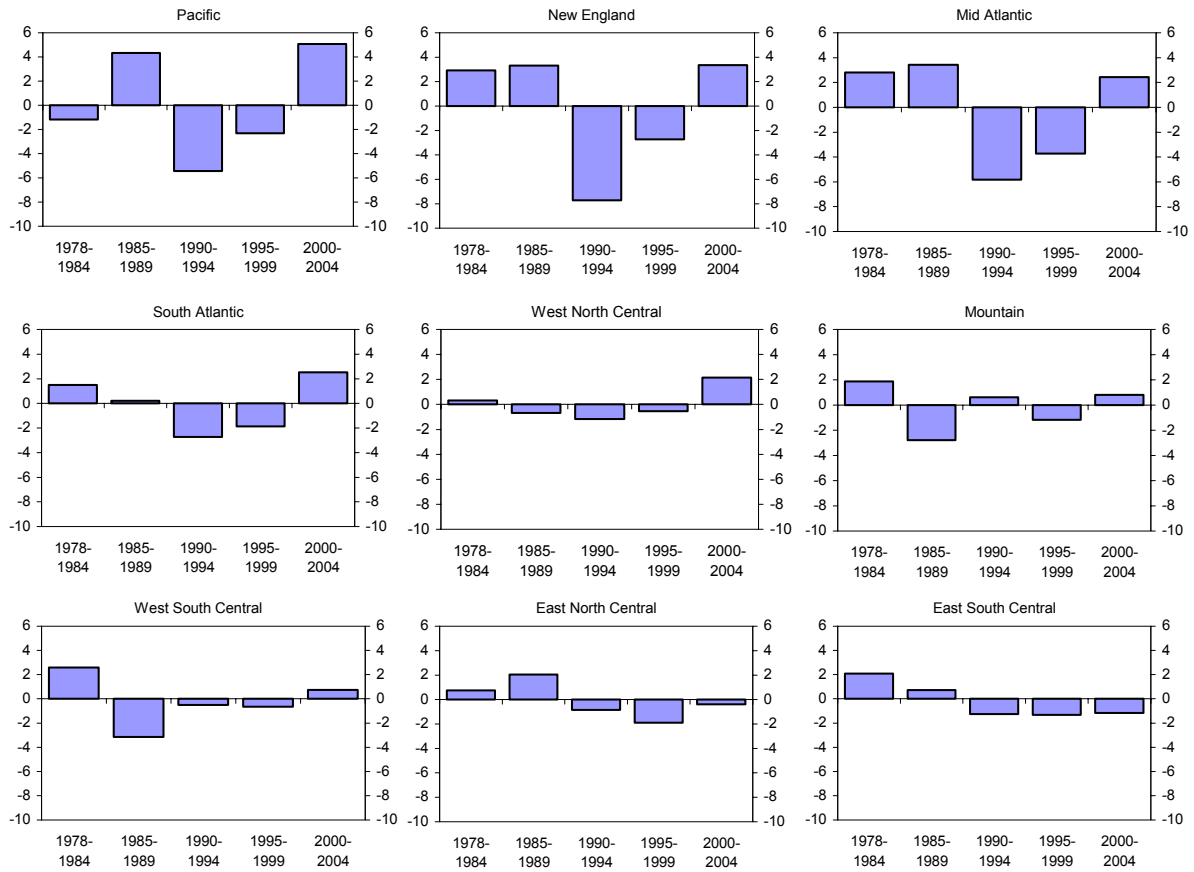
Sources: Office of Federal Housing Enterprise Oversight; BEA; BLS; and IMF staff estimates.

1980s—including in speculative housing starts and in the accumulation of inventories of new homes—that may moderate these risks.

22.   ***Speculative homebuilding used to dominate housing activity***. Using data on the completion status of a new home sale, one can identify speculative building (sales of houses already completed or under construction) versus nonspeculative building (construction not yet started at the time of sale). From the 1960s through the 1980s, builders often engaged in speculative starts, largely due to the necessity to build an inventory of homes for sale in advance of a (relatively short) "hot" market (Figure 10).

Figure 10. Construction status at time of sale
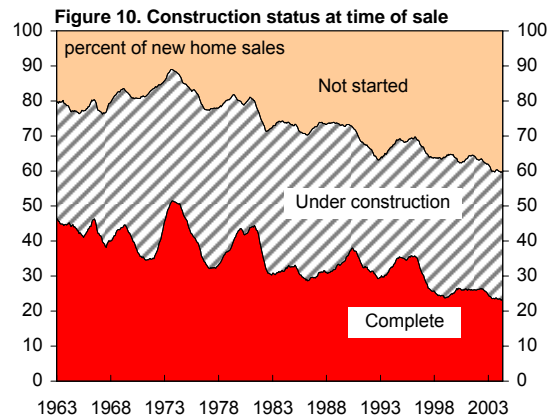
Source: Census Bureau.

23.   ***Speculative construction has declined since the 1980s***. With builders' demand no longer subject to stop-go cycles, the incentives to build an inventory of new homes in anticipation of a surge in demand are much diminished, limiting the overhang of new homes available for sale. Indeed, inventories of new homes have only recently returned to the levels of the early 1970s, despite a doubling of sales since then (Figure 11).

Figure 11: New Home Sales and Supply

Source: Census Bureau.
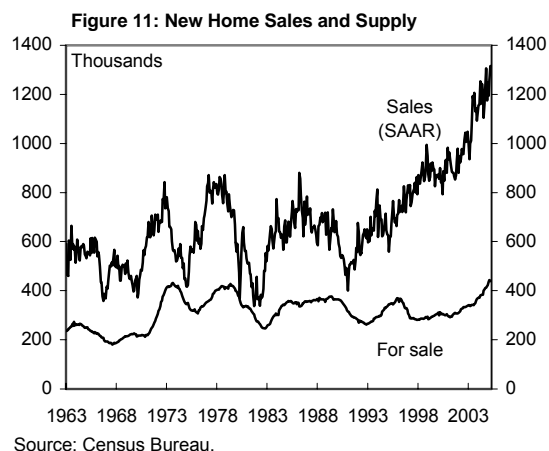
24.   ***During previous boom-bust cycles, a buildup of inventories preceded price collapses when demand waned***. The amount of new home inventories divided by the monthly sales pace gives an indication of the vulnerability of housing markets to a drop-off in demand, and how long it may take to work off any excess inventories. During a typical cycle, an early increase in housing prices would have prompted more rapid building and a rise in months' supply. As demand would wane later in the cycle—most often due to a constraints from the supply of mortgage finance— prices would decline to absorb the excess supply. For example, new home inventories reached nearly 10 months' supply on the west coast during the early 1980s, and a high of 15 months' supply during the boom in the northeast in the late1980s (Figures 12 and 13). Prices subsequently fell as much as 10 percent in order to work off excess stocks of new homes.

25.   ***During the current boom, however, months' supply has remained near historic lows even in the regions where housing markets are particularly strong***. Current inventories are at less than 4 months' supply in the northeast and less than 3 months' on the west coast. These levels are below those at which housing prices stabilized during previous bust cycles, and suggest that housing supply has not gotten far ahead of demand.

D. Conclusion

26.   ***The change in mortgage market structure from a system based on balance sheet lending by depositories to a market-based system of securitized mortgage finance has damped the volatility of financing flows and real activity***. With funding conditions now determined in a national market, trends in real activity and prices have become less cyclical and converged across all regions of the United States. As a result, a model of housing prices based on economic fundamentals finds that pricing errors—the deviations of actual prices from those estimated in the model—have fallen by half. Moreover, a change in homebuilders' behavior—in particular, a move away from speculative starts and a reduction of levels of inventories of new homes—has reduced the risk of a sharp decline in housing prices, although some indicators continue to suggest speculative pressures in a number of metropolitan areas.

Figure 12: Housing Supply and Prices in the Pacific/West Region

Housing prices
(4 quarter percent change, left scale)

New house supply
(months, right scale)
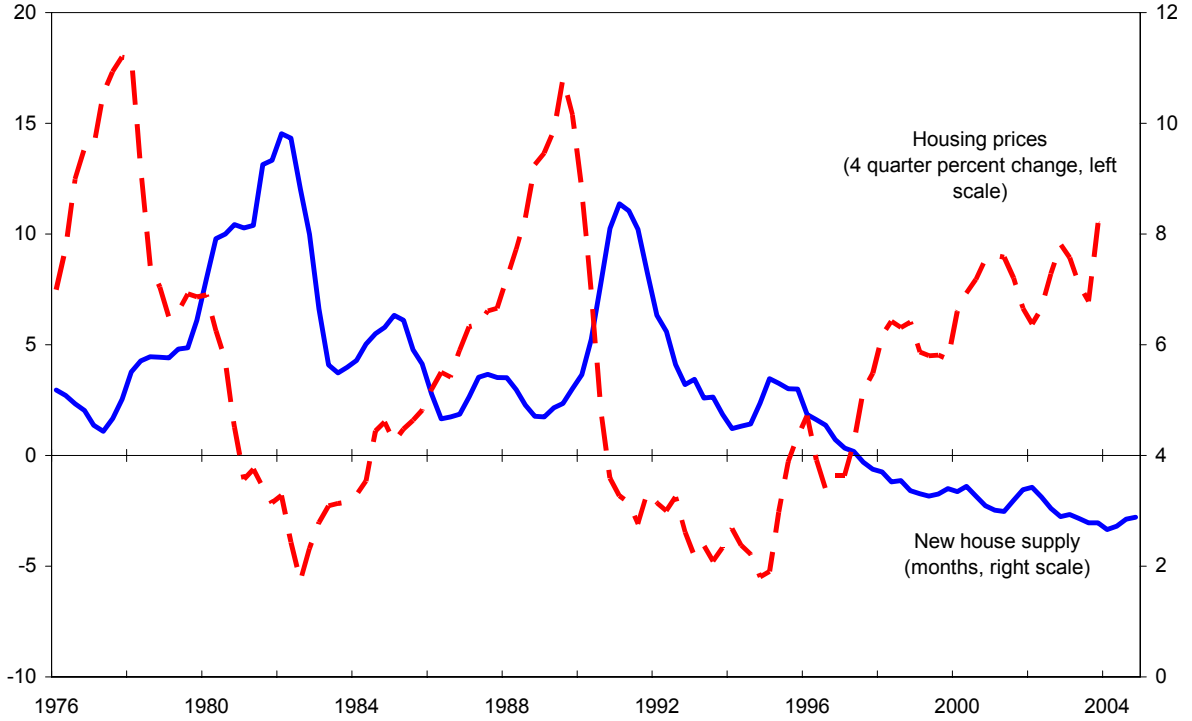
Figure 13: Housing Supply and Prices in the North East/New England Region

Housing prices
(4 quarter percent change, left scale)

New house supply
(months, right scale)
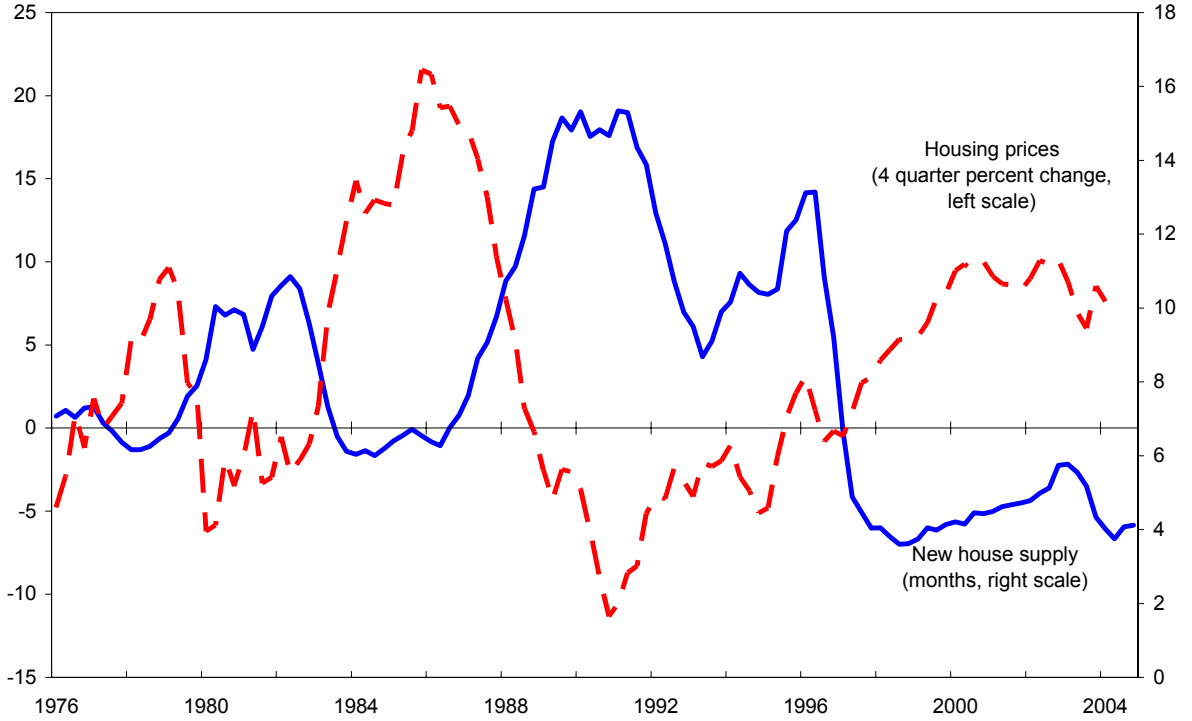
Sources: Census Bureau, Office of Federal Housing Oversight, and IMF staff estimates.

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II. EXPLAINING LABOR'S SHARE IN NATIONAL INCOME[6]

A. Introduction and Summary

1.   *After rising steadily through the 1960s and 1970s, labor's share of national income in industrial countries experienced a decline in recent decades* (Figure 1). While temporary and cyclical factors may have played a role (such as wage restraint in response to slower growth), the pervasiveness of the trend suggests that it may have also reflected deeper forces. This paper empirically compares the role of three such factors in explaining movements in labor's share over the last 40 years—factor-biased technological progress, openness to trade, and changes in employment protection.

2.   *Relatively few empirical studies have attempted to link movements in the labor share to productivity and trade developments*. Harrison (2002) analyzed the relationship between factor shares and standard measures of globalization, such as trade shares, exchange rate crises, movements in foreign investment, and capital controls. Ripatti and Vilmunen

Figure 1. Cross-Country Average Compensation Share
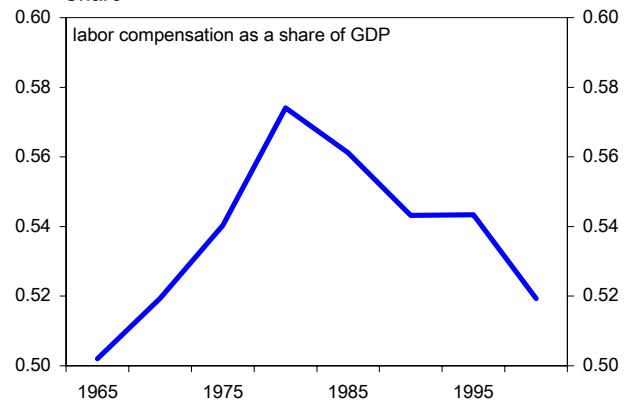
Source: OECD, Structural Analysis Database.

(2001) linked the decline in the labor share in Finland to capital-augmenting technological progress. Bentolila and Saint-Paul (1999) suggested that movements in the labor share can be decomposed into movements along and off a technology determined SK (share-capital) schedule. Using a panel of 12 OECD countries over the period 1972−1992 they found evidence of movements in the labor share from shifts along the SK schedule, arising from total factor productivity and changes in the price of oil, and movements off this schedule, arising from labor adjustment costs and from the bargaining power of labor.

3.   *This paper jointly examines the effects of technological progress, globalization, and employment protection on the labor share*. Some of these factors—notably, technological progress and opening to trade—improve the allocation of factors of production and raise national income.[7] Leaving these beneficial effects aside, the paper focuses on the more limited question of income distribution between capital and labor.

4.   *The results suggest that the rise and fall in labor's share in national income largely reflect changes in the nature of technological progress, as well as trends toward more*

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[6] Prepared by Anastasia Guscina.

[7] See Bhagwati (2004), Deardorff (2003), and Aisbett (2005).

openness to trade. Before 1985, more rapid technological progress appears to have boosted labor's share of national income. In contrast, the post-1985 IT revolution appears to favor capital. In addition, trade openness may also have played a more important role in eroding returns to labor in recent decades.

B. The Empirical Approach

5.   ***Several factors may affect labor's share of the national income***:

- ***Openness to trade***. In the Heckscher-Ohlin model, trade allows countries to specialize in areas of comparative advantage and tends to equalize factor returns across countries. Accordingly, with increasing openness, capital-rich (industrialized) countries would specialize in the production of capital-intensive goods. Returns to labor, the relatively scarce factor, would gradually decline and the labor share would fall as specialization progressed.

- ***Technological progress***. Factor-biased technological progress changes the income shares of labor and capital.[8] If a technology is labor-augmenting (as may have been true in the 1960s and 1970s) then the boost in the effectiveness of labor inputs raises real wages and hence the share of national income going to labor.[9] Conversely, capital-augmenting technological progress—which may be the nature of the IT revolution—will boost capital's returns and share.[10]

- ***Employment protection***. Employment protection will tend to increase real wages by increasing labor's market power. Under standard assumptions, such protection will boost the share of income going to labor.

6.   ***These linkages were tested on a panel of 18 industrialized countries over a period of 40 years (1961−2000)***. The data are averaged over successive 5-year periods to eliminate cyclical effects. Since most studies identify a change in the nature of technological progress and a (possibly related) acceleration in the globalization process in the mid-1980s, the sample is split in 1985, with the earlier period designated "pre-IT revolution" and later period "post-IT revolution."

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[8] Although the constant returns to scale Cobb-Douglas production function often used by macroeconomists implies constant factor shares in the national income, the more general constant elasticity of substitution (CES) production function allows for factor-augmenting technological progress. Such factor-biases tilt the distribution of income between factors.

[9] This assumes that the absolute value of the elasticity of substitution between labor and capital is below one.

[10] See, for example, IMF (2002).

7.   ***The basic specification is a panel regression with country fixed effects***.[11] Different measures of the labor share were regressed on explanatory variables capturing the effects of technological change, openness, and employment protection:

$$Y_{it} = \beta_{0i} + \beta_1 X_{it} + u_{it}, \quad i=1,..., N, \ t=1, ..., T \tag{1}$$

where Y is a measure of labor's share, X is a matrix of explanatory variables, u_i is the error term, and the βs represent estimated coefficients. To check the robustness of our results, the model was also estimated in first differences:

$$\Delta Y_{it} = \beta_0 + \gamma_t + \beta_1 \Delta X_{it} + u_{it}. \tag{2}$$

8.   ***Both equations were estimated using various proxies for the labor share and the three explanatory factors***. The data used were the following (see Appendix for sources and countries):

- ***Two measures of the labor share: compensation share and employment share***.

    o ***Compensation share*** (CS) includes the share of wages and salaries, employer-financed benefits, unemployment insurance, social security payments, and workmen's compensation in national income.

    o ***Employment share*** (ES) is a broader measure, which also includes self-employment income. Since some self-employment income represents a return on investment or economic profit, the paper follows the convention introduced by Johnson (1954) of allocating two-thirds to labor earnings, and one-third to capital income.

- ***Four proxies for openness to trade***. The trade-to-GDP ratio is a standard measure of openness. In addition, we also experimented with share of trade with developing countries (to capture the effect of trading with lower-cost countries), foreign direct investment-to-GDP ratio (to measure direct transfers of capital), and the gross capital flow-to-GDP ratio (as a test of capital mobility more generally). Based on Heckscher-Ohlin effects, it is anticipated that the labor share would decrease in all these variables.

- ***Two proxies for productivity***. The paper uses labor productivity of the total economy (LProd) and labor productivity per worker (ProdW).[12] Since there might be a delayed response of compensation to productivity increases, we also experimented with lags of these two variables (LagLProd and LagProdW, respectively). It is anticipated that

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[11] Time-fixed effects were initially included, but were dropped after a Hausman specification test indicated that they were not necessary.

[12] It would be preferable to use total factor productivity, but data were not available for a sufficient number of countries over the time period.

technological progress prior to 1985 may have benefited labor, while productivity increases since the start of the IT revolution may have been capital augmenting.

- ***Two proxies for the bargaining power of labor***. Union Density (UN) is the percentage of unionized workforce while Employment Protection (EP) is a variable that ranges from zero to two, increasing with the strictness of employment protection. A higher degree of unionization and employment protection should have a positive effect on wages, but negative effects on employment. Under the standard assumption that the wage elasticity of labor demand is less than unity, the net effect of these variables on the labor share should be positive.

C. Empirical Results

9.   ***A wide range of possible specifications were examined***. Bivariate regressions indicated that the explanatory variables affected labor compensation with the expected sign. However, multivariate estimates suggested that many of the variables representing similar concepts—for example, the two measures of productivity—were collinear. As a result, the focus moved to specifications including only one proxy variable for each explanatory factor, plus the unemployment rate.

10.   ***In the preferred specification, the right-hand side variables were trade as a ratio to GDP, lagged labor productivity per worker, and employment protection*** (Table 1). The ratio of trade to GDP is the most frequently used measure of openness. Lagged labor productivity per worker

Table 1. Determinants of Labor's Share in National Income[1]		
Compensation Share Regressions	Pre-Globalization	Globalization Era
(Exports+Imports)/GDP	-0.075	-0.144 ***
	(0.082)	(0.016)
Lagged Productivity Per Worker	0.346 ***	-0.238 ***
	(0.021)	(0.057)
Employment Protection	0.013	0.018
	(0.008)	(0.017)
Country Effects:	fixed	fixed
Time (Period) Effects:	none	none
N	48	72
R^2	0.95	0.94
Employment Share Regressions		
(Exports+Imports)/GDP	-0.21	-0.17 **
	(0.069)	(0.041)
Lagged Productivity Per Worker	0.29 ***	-0.11 ***
	(0.008)	(0.042)
Employment Protection	0.05 ***	0.10
	(0.002)	(0.025)
Country Effects:	fixed	fixed
Time (Period) Effects:	none	none
N	31	68
R^2	0.98	0.81

Sources: OECD; IMF; Bureau of Economic Analysis; and Fund staff estimates.

[1] One, two, and three asterisks indicate that coefficient is significant at 10, 5, and 1 percent level, respectively. Standard errors in parenthesis.

was used to account for delays between changes in productivity and in real wages. Employment protection appears to be the most direct measure of labor's bargaining power.

11.   ***The results suggest that the nature of technological progress changed in the 1980s, moving from being labor augmenting earlier to capital-augmenting more recently***. For example, in the regressions using compensation share, the coefficient on lagged labor productivity switches from +0.35 before 1985 to -0.25 after, and both are highly statistically significant. As a result, while before the mid-1980s productivity growth increased labor's share in national income, since 1985 productivity the impact has been the opposite. Openness to trade has a negative and relatively stable effect on the labor share in industrialized countries, consistent with the prediction of the Heckscher-Ohlin theory. While labor protection policies tend to increase the income share of labor, the effect is small and generally not significant.

12.   ***Technological progress has been an important driver of labor's share, while trade openness has become more important in recent years***. Changes in the labor's share during the pre-IT revolution period mostly reflect productivity increases, partly offset by increases in trade. After the IT-revolution, changes in productivity remain an important driver of the distribution of national income, but their importance is now approximately on a par with the impact of trade openness. Changes in employment protection have small effects in both periods.

13.   ***Regression results were broadly similar across a range of specifications***.[13] Robustness checks included estimating the equation using first differences, different proxy variables for the hypotheses, dropping countries or periods from the sample, including the inflation rate in the regressions (to account for the impact of nominal interest payments on nominal incomes), and dropping the unemployment rate. None of the changes altered the basic character of the results.

14.   ***The estimating equation predicts trends in national income shares in most of the 18 countries in the sample relatively well, including in the United States*** (Figure 2). In the pre-IT revolution period, the model predicts a relatively muted increase in labor's share in U.S. national income of some 3½ percent of GDP, and a 2-percentage point fall in labor share since 1985. Trends in other countries are generally more pronounced, reflecting stronger movements in underlying determinants, although the model overpredicts pre-1985 trends in Spain and the United Kingdom and post-1985 trends in Japan. Other regressions, not reported for the same of brevity, suggest that similar explanatory variables help explain the fall and then rise in income inequality within countries.

D. Conclusion

15.   ***The results in this paper suggest that the rise and decline in labor share since 1960 in industrial countries may have reflected underlying trends in the global economy***. In particular, the distribution of national income between labor and capital appears to have

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[13] Details are available from the author.

Figure 2. Compensation Share: Actual and Fitted Values
(Ratio of national income)
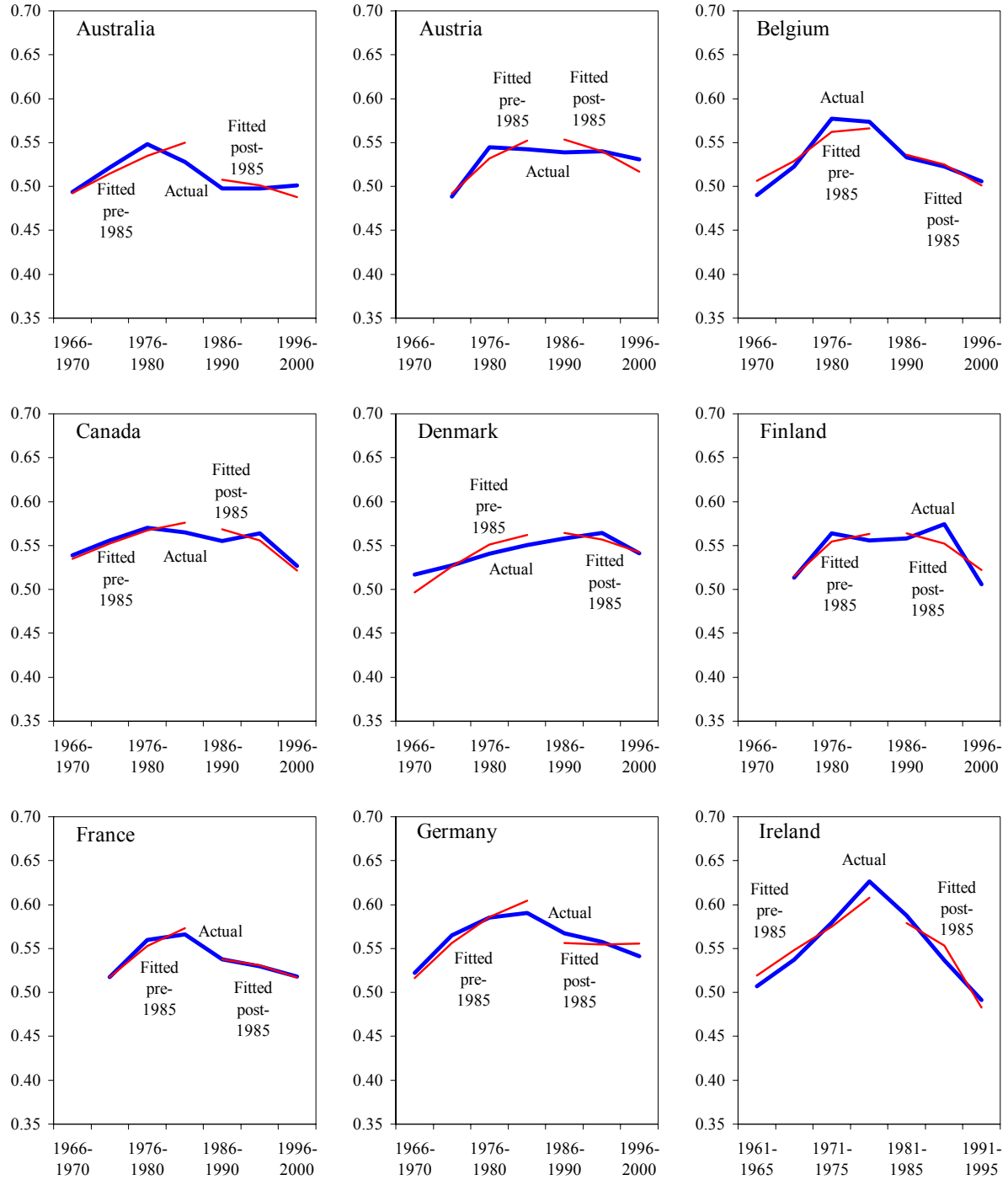
Sources: OECD Structural Analysis Database; and Fund staff calculations.

Figure 2. Compensation Share: Actual and Fitted Values (continued)
(Ratio of national income)
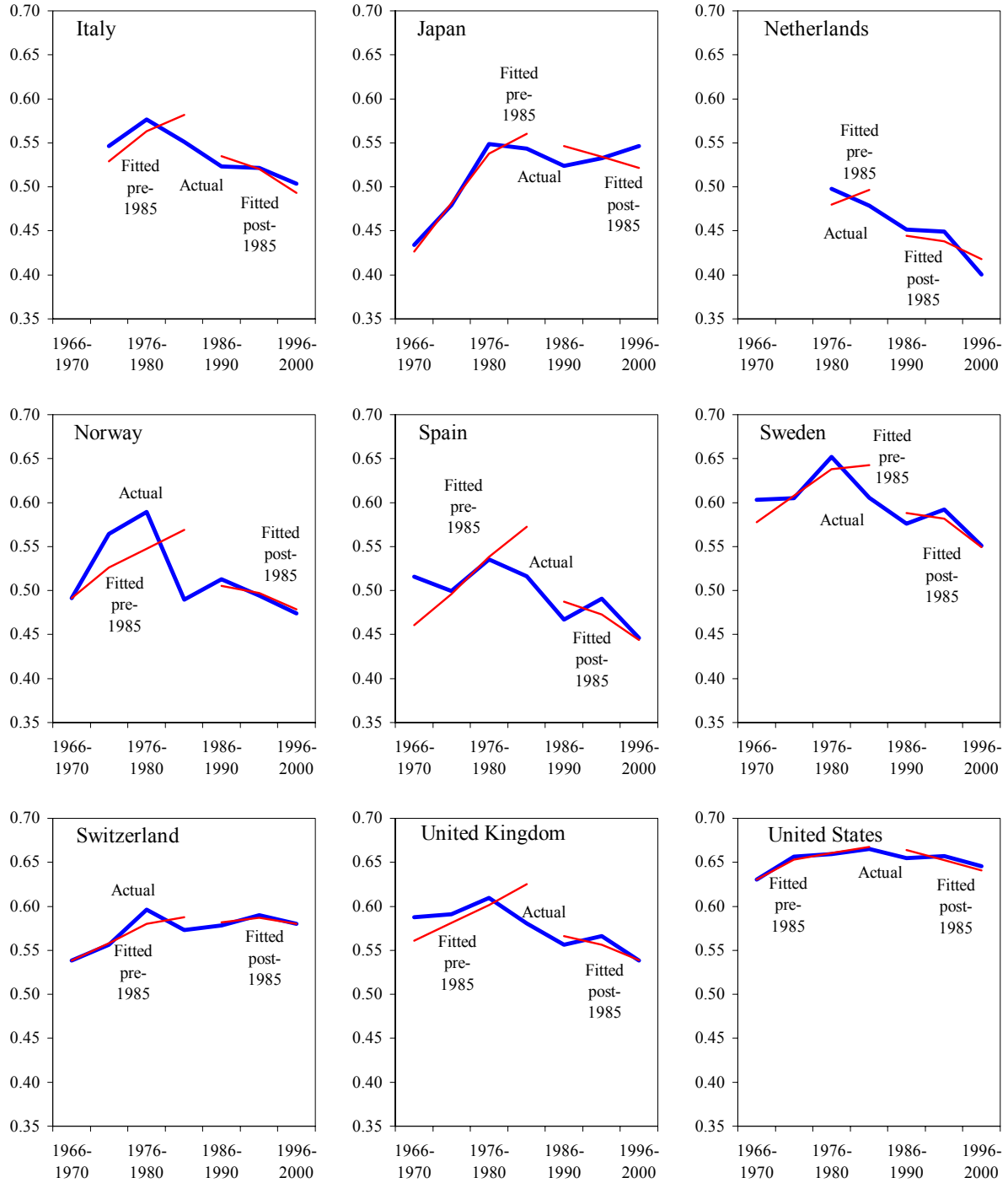
Sources: OECD Structural Analysis Database; and Fund staff calculations.

reflected changes in the nature of technological progress, as well as the impact of an increasingly globalized world economy. One should recall, however, that even as labor's share of national income has been declining, workers spending power has also been supported by higher capital income, both directly and indirectly through its impact on personal wealth.

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Data Sources

1.   Data on compensation of employees and self-employment income (used to compute compensation and labor share in the national income) are from OECD Analytic Database with the following exceptions:

- For Belgium, the data on compensation of employees and self-employment income are from the Fund's *Government Finance Statistics* database. For Canada, Germany, Ireland, Italy, Japan, Norway, Switzerland and Spain these data came from OECD-BSDB database, which provides quarterly data since 1960.

- For the United Kingdom, the data are from the National Statistics Office: http://www.statistics.gov.uk/STATBASE/tsdataset.asp?vlnk=205&More=N&All=Y.

- For the United States, the data are from the Bureau of Economic Analysis: http://www.bea.gov/bea/dn/nipaweb/TableView.asp#Mid.

2.   For all countries, data on Gross National Income, GDP, Exports, Imports, and unemployment are from IMF sources. Data on labor productivity of the total economy and productivity per worker are from the OECD's *Structural Database*. Data on FDI flows are from the IMF *Balance of Payments and Trade Statistics*. Data on employment protection and union density are from a *World Economic Outlook* dataset.

PART II: EXTERNAL LINKAGES

III. WHY HAS THE U.S. TRADE BALANCE WIDENED SO FAST?[14]

A. Introduction and Summary

1.   ***The rapid decline of the U.S. trade balance in recent years presents something of a puzzle***. Notwithstanding a 15 percent real depreciation of the dollar between 2002 and 2004, the U.S. current account deficit increased from 4½ percent of GDP to 5¾ percent of GDP, mainly driven by a widening trade deficit. Many forecasters have been surprised that the weaker dollar appears to have induced neither a slowdown in real imports nor an acceleration of real exports.

2.   ***Explanations for the rising trade deficit often focus on differences in growth rates and trade elasticities between the United States and its trade partners***:[15]

- The large gap between U.S. exports and import levels, as well as rapid growth in the United States compared with its trading partners, mean that the trade deficit would widen even if income elasticities of exports and imports were similar across countries (e.g., Greenspan, 2003).

- The income elasticity of U.S. imports is also typically estimated to be higher than the foreign income elasticities of U.S. exports (Houthakker and Magee, 1969). While the existence and implications of differential income elasticities are still a matter of debate, they would imply a widening trade deficit even under similar growth rates.[16]

3.   ***More recently, attention has focused on the growing penetration of U.S. markets by Chinese imports and a—possibly related—decline in exchange rate pass-through to import prices***.[17] This reflects the fact that traditionally estimated growth and elasticity differentials may not be sufficient to explain the recent deterioration in the trade balance. It also raises the question whether the real effective exchange rate remains an accurate gauge of the overall competitiveness of the U.S. economy.

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[14] Prepared by Alejandro Justiniano and Kornélia Krajnyák.

[15] Mann (2003) notes that there are a number of ways of analyzing the external sector—trade flows, savings and investment relationships, or the financing through the capital account. The different angles serve to highlight particular aspects of the external sector. This paper focuses on the trade dimension. Proposed explanations of for the U.S. current account deficit also include other factors, such as the role of technology and savings opportunities for foreign investors (Ferguson, 2003), an international "savings glut" (Bernanke, 2005), or the U.S. fiscal deficit (Roubini and other, 2005; Roubini and Setser, 2004).

[16] A review of the empirical literature on the income elasticity of U.S. imports by Marquez (2000), for instance, reveals that estimates for this coefficient have varied widely. Chinn (2004, 2005) finds evidence in favor of the Houthakker-Magee effect, although its magnitude diminishes when some components are excluded from imports.

[17] See, for instance, Greenspan (2005) for a discussion of how changes in pass-through have influenced the current account.

4.   ***This paper finds some link between shifts in the geographical composition of imports and the decline in pass-through***. Using cross-country information, we find that changes in a country's trade structure are associated with lower pass-through. These results suggest that rapid changes in the trade structure may have reduced the ability of trade models to explain recent developments in the trade balance.

5.   ***The paper also finds that recent developments in the trade balance cannot be fully explained by differential income elasticities***. Reflecting findings of a declining pass-through, the staff's trade model is modified to include relative prices of imports and exports—rather than the effective exchange rate—in the trade volume equations. Two variants of this new model are used to explore whether accounting for possible asymmetries in income elasticities—the Houthakker-Magee effect—can help explain the deterioration in the trade balance. Despite improvements in fit, the models cannot fully account for the widening trade deficit, partly due to the recent unimpressive performance of U.S. exports.

B. Pass-Through and Shifts in the Trade Structure

6.   ***The relationship between exchange rate changes and U.S. import prices has loosened considerably in recent years***. Despite a significant nominal and real effective depreciation of the dollar since 2002, the relative price of imports remained broadly stable (Figure 1), suggesting a lower pass-through coefficient.

Figure 1. Relative import prices have not risen as fast as the dollar has depreciated.

Sources: BEA; and Board of Governors, Federal Reserve.

7.   ***A simple equation was used to analyze how exchange rate pass-through has changed over time***. Staff's standard trade model includes the following import price equation:
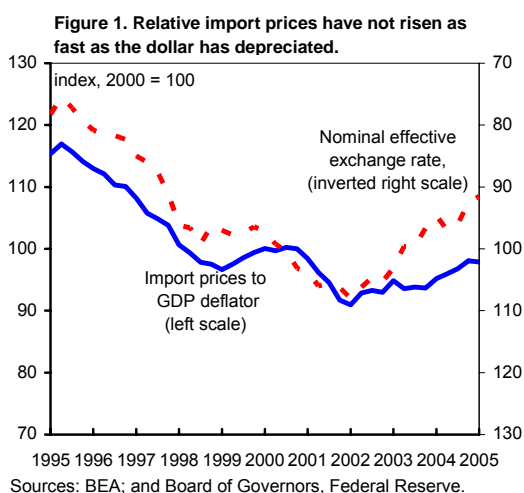
$$\Delta p^{M} = \beta_0 + \beta_1 \Delta p^{M}_{-1} + \beta_2 \Delta p^{*}_{-1} + \beta_3 \Delta p^{Y}_{-1} + \beta_4 \Delta E$$
$$- \beta_5 (p^{M}_{-1} - p^{Y}_{-1} - \beta_6 e_{-1} - \beta_7 t) + \varepsilon \tag{1}$$

where all variables are in logs (see Annex for variable definitions and sources) and lags are denoted by the subscript -1. Over the long run, import prices move together with domestic prices (p^{Y}) and the real effective exchange rate (e), as well as a time trend. Over the short run, changes in import prices are influenced by its own recent behavior, past changes in foreign and domestic prices (Δp^{*} and Δp^{Y}); contemporaneous changes in the nominal effective exchange rate (ΔE); and a measure of the distance from the long-term equilibrium (an "error correction term"). Similar equations are estimated for subindexes, such as import prices excluding commodity prices.

8.   ***The estimated coefficients suggest that pass-through has weakened in recent years*** (Figure 2). To capture possible changes in the strength of pass-through—defined as the short-run coefficient on the nominal exchange rate (β_4)—we perform rolling estimations (with a 10-year window) on quarterly data over the 1984-2004 period. The results suggest that this coefficient has dropped from about -0.3 in 1984-1994 to around -0.1 more recently.[18] Much of the decline in the strength of pass-through appears to have happened since 2000, driven by changes in the sensitivity of non-commodity goods to exchange rate movements (Figure 3).[19]

Figure 2. Estimated short-term pass-through coefficients (all commodities)

9.   ***The results are robust to using import weights instead of overall trade weights in the construction of the effective exchange rate***. Obtaining relevant pass-through coefficients depends on using the most appropriate exchange rate concept, particularly in periods when the trade structure is changing rapidly. For example, if the composition of imports changes relatively faster, using a broad trade-weighted effective exchange rate measure could contribute to

Figue 3. Estimated short-run pass-through coefficients

underestimating the strength of exchange rate pass-through. The model was therefore re-estimated with an import-weighted exchange rate, with only minor differences in the results.[20]

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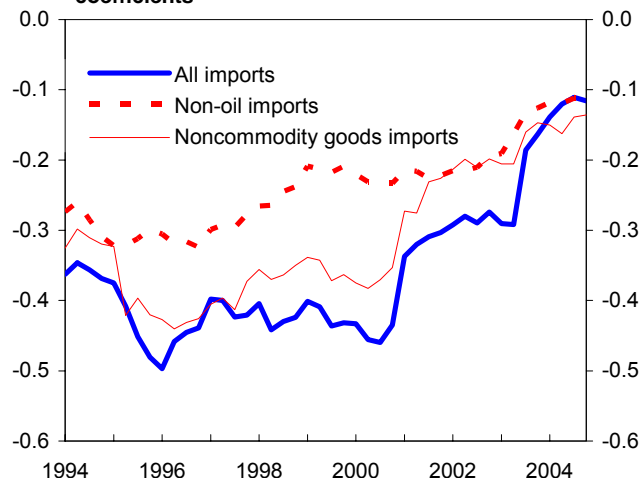
[18] The exchange rate is defined in units of foreign currency per U.S. dollar, so that a decline in the exchange rate corresponds to a depreciation. Pass-through coefficients are therefore expected to have a negative sign.

[19] Marazzi and others (2005) have argued that commodity prices function as an indirect transmission channel for exchange rate changes. Indeed, including oil and commodity prices separately in equation (1) appears to weaken the estimated direct pass-through, even when restricted to prices of noncommodity goods imports. However, we found no strong evidence that in recent years, weaker pass-through may have been accompanied by stronger commodity price effects.

Import prices and globalization

10. ***The reasons for the decline in pass-through are not well understood, but a number of explanations have been proposed, several of them related to globalization***:

- Substitution effects arising from the growing presence of low-cost producers in world markets may dampen import prices. Given China's peg to the dollar, a shift in U.S. import composition towards Chinese goods in recent years may be particularly relevant in dampening U.S. pass-through (Figure 4).

Figure 4. U.S. Effective Exchange Rate Weights, 1995 and 2002

- High productivity growth in the export sector of newly-integrating countries may help contain or even reduce their export prices.

- Potential competition from emerging low-cost producers may decrease other producers' willingness to increase prices if their currencies appreciate.

- Foreign exporters may increasingly "price to market" by absorbing exchange rate changes into profit margins, reflecting competitive pressures from more open trade as well as cyclical factors.

- Trade composition may also play a role. If the share of goods with exchange rate sensitive prices—e.g., commodities—in total imports fall, aggregate pass-through may decline. An increase in the share of goods with high productivity growth—e.g., high-tech goods—may also depress pass-through.
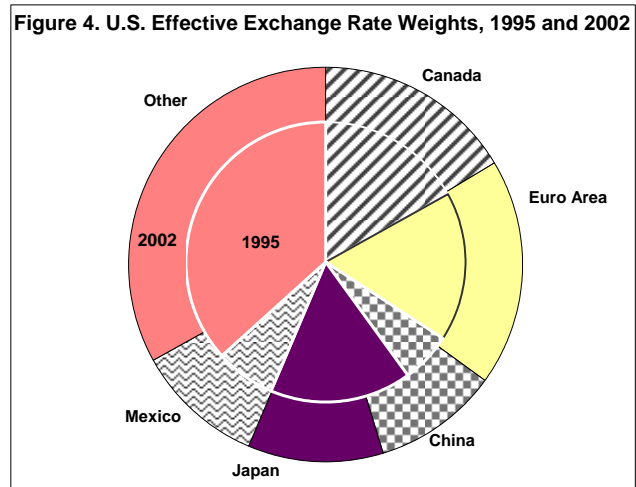
11. ***This paper confirms that import price inflation tended to be lower in sectors where China's share in imports—an indicator of the impact of of low-cost producers—increased more***. Following Kamin and others (2004) and Marazzi and others (2005), we use 5-digit end-use category import price and trade share data. Although our sample is constrained by data availability to 49 categories, it covers about 50 percent of total U.S. imports, and about 75 percent of U.S. imports from China.[21] We consider the change in China's share in imports

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[20] Interestingly, using import-weighted exchange rates leads to estimates of marginally weaker pass-through, possibly indicating that the "broad" effective exchange rate—which also incorporates information about third markets—captures more accurately the relevant relative price of the dollar.

[21] The sample includes sectors with price data going back to at least 1987. The results are robust to extending the sample to include sectors with shorter price data series. See Annex for data sources.

Figure 5. China's import share of selected end-use goods
In percent of all U.S. imports by sector

■ 1993 ■ 2004

Sector	
(40040) Footwear of leather, rubber, or other materials	
(40030) Nontextile apparel and household goods	
(41120) Toys, shooting and sporting goods, and bicycles	
(41050) Other (clocks, port typewriters, oth household gds	
(40020) Apparel and household goods-other textiles	
(41210) Radios, phonographs, tape decks, and other stereo	
(41020) Cookware, cutlery, house and garden wares, tools	
(40140) Other products (notions, writing and art supplies)	
(41030) Household and kitchen appliances	
(41000) Furniture, household items, baskets	
(40000) Apparel and household goods-cotton	
(40010) Apparel and household goods-wool	
(21190) Photo and service industry machnery & trade tools	
(12070) Other (tobacco, waxes, nonfood oils)	
(20000) Generators, transformers, and accessories	
(01000) Fish and shellfish	
(15100) Iron and steel manufactures-advanced	
(00130) Vegetables and preparations	
(15200) Finished metal shapes & advncd manuf, except steel	
(20005) Electric apparatus and parts, n.e.c.	
(12530) Industrial inorganic chemicals	
(41310) Jewelry (watches, rings, etc.)	
(41200) Television receivers, vcr's & other video equip.	
(40120) Toiletries and cosmetics	
(14000) Steelmaking and ferroalloying materials-unmanufacd	
(21301) Computer accessories, peripherals and parts	
(21160) Measuring, testing and control intruments	
(21180) Other industrial machinery	
(15000) Iron and steel products, except advanced manufacts	
(21120) Machine tools, metal working, molding and rolling	
(00120) Fruits and preparations, including frozen juices	
(21200) Agricultural machinery and equipment	
(12500) Plastic materials	
(11110) Paper and paper products, n.e.s.	
(14200) Bauxite and aluminum	
(00190) Wine and related products	
(21030) Excavating, paving, and construction machinery	
(00100) Meat products, poultry, and edible animals	
(21150) Pulp and paper machinery	
(14100) Iron and steel mill products-semifinished	
(12510) Fertilizers, pesticides, and insecticides	
(21320) Semiconductors and related devices	
(01010) Alcoholic bevs, except wine and related products	
(30000) Passenger cars, new and used	
(14280) Other precious metals	
(14220) Copper	
(13000) Lumber and wood in the rough	
(11100) Newsprint	
(11000) Pulpwood and woodpulp	

Source: Census Bureau.

as a simple indicator of a sector's exposure to globalization. Figure 5 (see previous page) shows that this indicator varies significantly across sectors, and that some sectors experienced a significant increase over the past decade.

12. ***Tests using sectoral averages suggest a negative correlation of Chinese import penetration and import price inflation, as found by Kamin and others (2004)***. Running a simple OLS regression confirms that sectors with a large increase in China's import share tended to experience lower import price inflation (Table 1 and Figure 6). Comparing data before and after 2000 also indicates that this effect may have become stronger in recent years.

Figure 6. Import Prices and China's Import Share
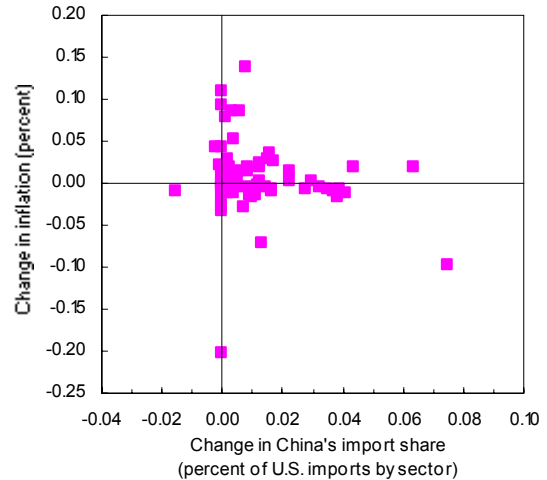
Source: Census Bureau.

13. ***There is also some evidence that Chinese import penetration may be associated with reduced volatility of import inflation***. In sectors where China's import share was large, or where China's import share increased rapidly, the standard deviation of import price changes (measured relative to the GDP deflator) tended to be lower (Table 2).[22]

14. ***Earlier work has also identified a link between Chinese import penetration and pass-through***. Marazzi and others (2005) postulated that, if globalization was associated with changes in import pricing, the decline in pass-through would be especially pronounced in sectors that became more exposed to imports from low-cost countries. They estimated pass-through coefficients by sector over two 10-year periods, 1985-94 and 1995-04. By correlating the change in sector-specific pass-through with the change in China's import share, they found a statistically significant relationship between China's import share and pass-through.

15. ***We test a similar relationship between Chinese import penetration and pass-through coefficients***. Applying the two-stage methodology of Marazzi and others (2005), sector-specific versions of equation (1) were estimated to obtain sectoral pass-through coefficients for 1985-94 and 1995-2004.[23] The link between changes in pass-through and

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[22] Although this finding could simply indicate that China happened to specialize in products that exhibit smaller price fluctuation, it may also suggest that a large and increasing market presence by China may have a stabilizing effect on prices.

[23] For sectors with shorter price data series, the pass-though coefficients for the earlier period are estimated from a correspondingly shorter sample.

Table 1. OLS Regression Results: Determinants of Average Import Price Inflation
Across Sectors

Dependent variable: Average import price inflation, 1993–2000

Explanatory variables	Coefficient	Std. Error	t- Statistic
Average import price inflation, 1985–92 [1]	-0.11	0.16	-0.07
Change in China's import share, 1993–2000	-0.80	0.47	-1.68
China's import share, 1993	0.02	0.05	0.05
Constant	0.01	0.01	1.46
R-squared	0.08		
Adjusted R-squared	0.02		
S.E. of regression	0.03		
Observations	49		
Log likelihood	110.61		

Dependent variable: Average import price inflation, 2001–04

Explanatory variables	Coefficient	Std. Error	t- Statistic
Average import price inflation, 1993-2000	-0.04	0.23	-1.70
Change in China's import share, 2000–04	-1.31	0.46	-2.82
China's import share, 2000	-0.01	0.04	-0.25
Constant	0.03	0.01	3.82
R-squared	0.21		
Adjusted R-squared	0.16		
S.E. of regression	0.04		
Observations	49		
Log likelihood	94.68		

Sources: Bureau of Census; Haver Analytics; Kamin and others (2004); and IMF staff calculations.

[1] Average over shorter periods for sectors where price data start later than 1985.

Table 2. OLS Regression Results: Determinants of the Standard Deviation of Relative Import Price Inflation
Across Sectors

Dependent variable: Standard deviation of changes in relative import prices, 1995–2004[1]

Explanatory variables	Coefficient	Std. Error	t-Statistic	Coefficient	Std. Error	t-Statistic
Standard deviation, 1985-94[2]	0.63	0.08	8.34	0.65	0.07	8.76
Change in China's import share, 1993-2004	-0.37	0.23	-1.62			
China's import share, 1993				-0.04	0.02	-1.84
Constant	0.01	0.00	1.62	0.01	0.00	1.63
R-squared	0.63			0.64		
Adjusted R-squared	0.62			0.62		
S.E. of regression	0.02			0.02		
Observations	49			49		
Log likelihood	134.52			134.90		

Sources: Bureau of Census; Haver Analytics; and IMF staff calculations.

[1] Import prices relative to GDP deflator.

[2] Standard deviation over shorter period for sectors where price data start after 1985.

increases in import penetration from China was tested by estimating the following cross-sectional regression:

$$\beta_{4,i}^{95-04} = \gamma_0 + \gamma_1 \beta_{4,i}^{85-94} + \gamma_2 \Delta China_i + \varepsilon_i \qquad (2)$$

where $\beta_{4,i}$ indicates the two sets of sectoral pass-through coefficients, and $\Delta China$ is the change in the share of Chinese imports. Based on the earlier results reported by Marazzi and others, the coefficient γ_2 would be expected to be significant and positive.

16.   ***The results do not suggest that the decline in pass-through is strongly related to Chinese import penetration***. The estimated coefficient has the expected sign but is not statistically significant. Figure 7, which depicts the data underlying equation (2), illustrates that pass-through declined in most sectors (the change in the pass-through coefficient is positive). But it also shows that some sectors have seen little change in pass-through despite a large increase in Chinese imports. Although this picture is similar to the one reported in the Marazzi study, the result may differ both because the sectoral coverage of the sample is smaller, and because the underlying import price equations used to estimate sectoral pass-through are different. Also, this paper did not have access to a full set of sectoral import weights, requiring the use of proxies for sectoral exchange rates and foreign exporters' prices (see Appendix).

Figure 7. Passthrough and China's Share in U.S. Imports

Change in passthrough coefficient, 1995-2004 vs. 1985-1994

Average annual change in China's share in U.S. Imports, 1993–2004

Source: Census Bureau.
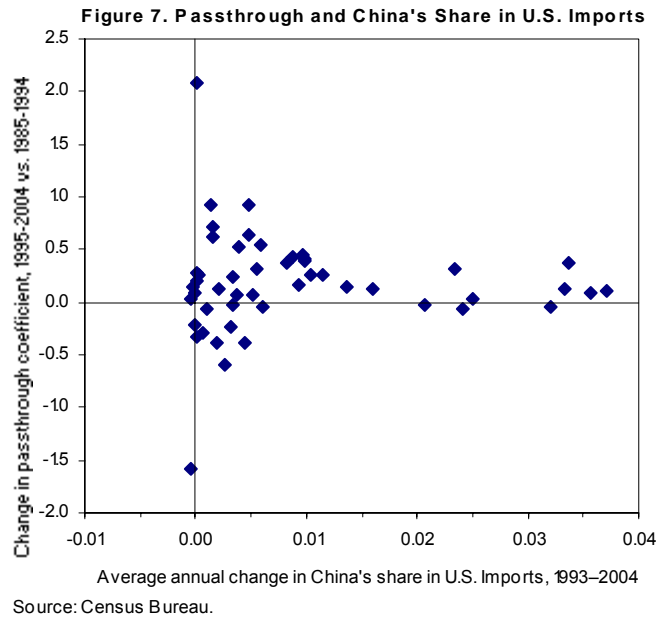
Pass-through across countries

17.   ***We use cross-country data to test whether shifts in the trade structure are associated with a change in pass-through***. The methodology of Marazzi and others (2005) is applied to relate changes in pass-through coefficients in a set of advanced economies to two different measures of the changing trade structure. One of these measures is—like in the previous section—the change in the share of imports from China. The other measure is an index of structural change based on the import shares (s_i) of multiple trading partners:

$$\frac{1}{2}\sum_i | s_i^{93} - s_i^{04} | \qquad (3)$$

18.   ***The results are suggestive of a link between falling pass-through and shifts in the structure of imports, although no direct "China effect" is observable*** (Table 3). While the

Table 3. OLS Regression Results: Pass-through and Indicators of Globalization

Dependent variable: Pass-through coefficient, 1995–2004

Explanatory variables	Co-efficient	Std. Error	t-Statistic	Co-efficient	Std. Error	t-Statistic
Pass-through coefficient	0.26	0.32	0.82	0.28	0.28	1.00
Change in China's import share	-0.56	1.29	-0.43			
Indicator of structural change				2.30	1.22	1.89
Constant	-0.34	0.18	-1.94	-0.70	0.23	-3.08
Euro area dummy	0.04	0.10	0.45	0.09	0.09	0.98
R-squared	0.10			0.29		
Adjusted R-squared	-0.10			0.12		
S.E. of regression	0.19			0.17		
Observations	17			17		
Log likelihood	6.70			8.65		

Sources: *Direction of Trade Statistics; International Finance Statistics;* OECD Analytical Database; and IMF staff calculations

coefficient on the change in Chinese import share is both wrongly signed and insignificant, the broader indicator of structural change has the expected and statistically significant impact. At face value, this finding would seem to suggest that pass-through analysis should not be limited to the impact of China alone and other indicators of changes in the trade structure may be usefully considered to capture the possible effect of globalization on exchange rate pass-through.

C. Revisiting the U.S. Goods Trade Model

19.   ***In view of the decline in pass-through, and considering the difficulties in predicting recent U.S. trade developments, this paper explores room for further improving the performance of a standard empirical trade model***. This section first explores if using relative prices—rather than real effective exchange rates—helps to better track the recent deterioration of the trade balance. The analysis then seeks to determine whether a possible asymmetry in the income elasticity of U.S. exports and imports—the Houthakker-Magee effect—has played an important role in accounting for the widening trade deficit.

20.   ***The starting point for the analysis is a multi-equation trade model describing import and export prices and volumes***. As reported in last year's *Staff Report*, this baseline model allows for long run and short-run dynamics through the introduction of an error correction mechanism. The model also allowed for productivity-related effects that can boost both a country's domestic growth *and* the demand for exports from that country ("supply effects").

21. ***The baseline model was revised in two ways, partly reflecting the results of the previous section***. First, as mentioned, we introduce an alternative measure of the real exchange rate. Specifically, in the import equation the ratio of import prices over domestic prices is substituted for the real effective exchange rate, which should improve robustness vis-à-vis changes in pass-through. Second, using this basic model, we then compare the performance of a specification with both demand and supply effects to a Houthakker-Magee model where only demand in the importing country enters the equation. In this way, it is possible to gauge whether differences in income elasticities are partly responsible for the recent evolution of the trade balance.

22. ***In formal terms, the basic model is provided by the following import equation***:

$$\Delta m_t = c + \alpha_y \Delta y_t + \alpha_{rp} \Delta rp_t^m$$
$$+ \gamma \left(m_t - \beta_y y_t - \beta_{y^*} y_t^* - \beta_{rp} rp_t^m - \beta_{rpf} rp_t^{mf} - \beta_{rpnf} rp_t^{mnf} \right) \tag{4}$$

The specification is used correspondingly for the export equation. Variables are defined as follows (all in logs):

m	U.S. goods import volumes.
y	U.S. real GDP.
rp^m	Relative price of imports (nominal import prices over GDP deflator).
y^*	Foreign real GDP.
rp^{mf}	Nominal fuel import prices over GDP deflator.
rp^{mnf}	Nominal non-fuel commodity import prices over GDP deflator.

23. ***We test the performance of this model under two different restrictions for long-run income elasticities***:

- The supply-demand (SD) model imposes: $\beta_y = \beta_{y^*}$.[24]

- For the demand-only (DO) model, we set: $\beta_{y^*} = 0$.

24. ***The two variations of the model fit the historical data equally well, although estimates for the long-run income elasticities differ sharply***. Table 4 reports coefficient estimates for import and export volumes under both specifications. Although standard measures of fit are almost identical across models, the long-run income elasticity of both imports and exports is substantially higher for the DO model. As for the Houthakker-Magee effect, the estimated income elasticities for imports and exports are almost identical in the SD model, but differ more substantially in the DO model. This illustrates the difficulties in establishing the empirical importance of the Houthakker-Magee effect.

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[24] Note that under this restriction, which has not been rejected by the data, both domestic and foreign income enter with the same sign, and both are afforded equal weight in determining the long-run income elasticity.

Table 4. Coefficient Estimates with the New Models

(sample 1980:4 2004:2)

Import of Goods Volumes

| Parameter | New Model (DS) | | New Model (DO) | |
| | Supply-Demand | Long-Run Effects | Demand Only | Long-Run Effects |
	Estimate	Standard Deviation	Estimate	Standard Deviation
C	-0.45	0.41	-1.37	0.78
α_y	1.90	0.35	1.92	0.36
α_{rp}	-0.09	0.15	-0.10	0.14
γ	-0.15	0.05	-0.17	0.05
β_y	0.73	0.17	1.63	0.35
β_{y*}	0.73	0.17		
β_{rp}	-1.43	0.61	-1.21	0.59
β_{rfuel}	0.08	0.06	0.07	0.05
β_{rcom}	0.17	0.24	0.11	0.22
R^2	0.36		0.36	

Export of Goods Volumes

| Parameter | New Model (DS) | | New Model (DO) | |
| | Supply-Demand | Long-Run Effects | Demand Only | Long-Run Effects |
	Estimate	Standard Deviation	Estimate	Standard Deviation
C	-0.27	0.24	0.03	0.13
α_y	2.22	0.55	2.33	0.54
α_{rp}	-0.12	0.08	-0.13	0.08
γ	-0.10	0.03	-0.10	0.03
β_y	0.67	0.15	1.34	0.29
β_{y*}	0.67	0.15		
β_{rp}	-1.58	0.35	-1.50	0.35
β_{rcom}	0.81	0.27	0.79	0.26
R^2	0.41		0.41	

Souces: Fund staff estimates.

In-sample forecasts

25.   *The revised specification improves the overall fit of the staff's trade model*
(Figure 8). The two new models perform quite similarly, at least over a short forecast
horizon. In particular, the use of relative prices in the volume equations makes the model
better suited to explain the strength of U.S. imports. This would suggest that the trade-
weighted real effective exchange rate may overestimate the degree to which dollar
depreciation has improved the competitiveness of domestic producers. It is also notable that
the Houthakker-Magee effect appears to play a relatively minor role, despite a substantial
growth differential between the U.S. and most trade partners. This result would tentatively

suggest that while differential growth rates may
have been a factor behind the recent decline in
the trade balance, the role of asymmetries in
income elasticities has remained limited.

26.   *However, despite improvements over
last year's specification, the trade model still
fails to explain much of the decline in the
trade balance since early 2002*. This owes in
large part to the weak performance of the
export equations, which continue to overpredict
export volumes. We checked whether a
different measure for income growth in U.S.
export markets could improve the model fit,
given that aggregate trade weights could be biased by large changes in the composition of
imports without corresponding changes in the composition of exports. However, an export-
weighted measure of foreign income with time-varying weights yielded no improvement in
fit.[25] The following section therefore explores whether export relationships have suffered a
structural break, or whether foreign demand has become more sensitive to fluctuations in
foreign income.
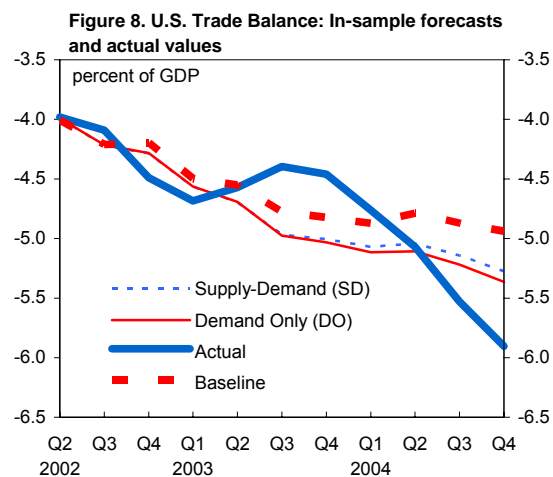
Stability analysis and the responsiveness to relative prices

27.   *Evolving trade patterns may have precipitated changes in the short-run elasticity of
both exports and imports to movements in relative prices*.[26] As already discussed, the
penetration of China and other low-cost exporters into import markets in industrialized
countries may have induced changes in competitiveness and pricing practices. Even after
accounting for structural changes in the price equations, it is still possible that the response of
volumes to (relative) import and export price movements have been similarly affected by
greater trade integration.

28.   *Rolling regressions indeed suggest that goods import volumes have become less
responsive not only to real effective exchange rates but also relative prices*. The short-run
coefficients for relative import and export prices are shown in Figure 9, based on a moving
window of 60 observations. The results suggest a dramatic drop in the sensitivity of imports
to relative prices in recent years, to the point that the coefficient is no longer significantly
different from zero. Estimating the equations for commodities and non-commodities
separately reveals that this is due to a lower relative price sensitivity for non-commodities,
for which competition may have increased more strongly.

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[25] Indeed, the forecast errors increased slightly, further deepening the export puzzle.

[26] It is also possible that the long-run sensitivity to relative price fluctuations have shifted. Unfortunately, the
short sample is unlikely to provide enough information to study the stability of long-run relationships.

Figure 8. U.S. Trade Balance: In-sample forecasts and actual values

Figure 9. Export and Import Volume Relative Price Elasticities
(rolling 60 quarter correlation with +/- 1.65 standard deviation bands)

Imports of Goods

Imports of Non-Commodity Goods

Exports of Goods

Exports of Non-Commodity Goods
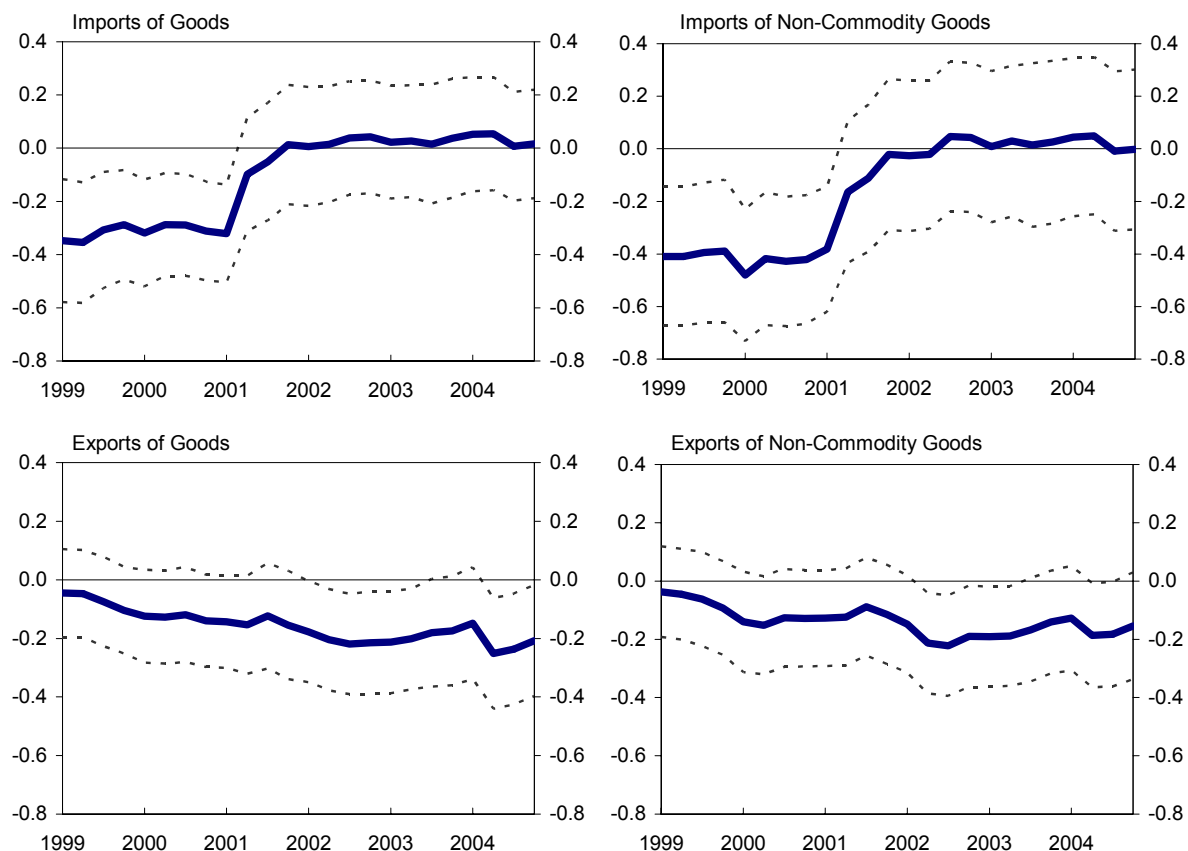
Source: IMF staff estimates.

29.   ***The opposite result holds for U.S. goods exports, however***. Overall exports of goods, in particular non-commodities, appear to have become somewhat more sensitive to short-term changes in relative prices. This finding deepens the puzzle over the recent U.S. export performance, as it would imply a larger boost to export volumes following the dollar's depreciation.

30.   ***Stability analysis also reveals increased responsiveness of exports to foreign income***. Rolling regressions show a rise in the coefficient measuring the short-run export response to foreign income growth. This would suggest that the sensitivity of the U.S. current account balance to foreign growth has increased in recent years, helping to explain some of the weakness observed in recent years.

31.   ***Increased openness to trade and foreign competition might help rationalize these changes***. Analyzing the possible causes for the observed change in short-run export elasticities vis-à-vis relative prices and income lies beyond the current analysis. However, we surmise that with greater openness to trade, the rise in the number of suppliers for a given

good may have increased both competition and the sensitivity of exports to relative price movements. Conversely, this could explain the lower responsiveness of imports to relative price fluctuations, as the presence of a greater number of competitors within one market facilitates expenditure switching across similar goods by consumers. It is also plausible that increased openness to trade may have magnified the transmission of international shocks, particularly through trade channels.[27]

Out–of-sample forecasts

32.   ***Comparing the out-of-sample prediction of the new models sheds some light on the role of income-elasticity differentials for the evolution of the trade balance***. Point estimates presented earlier indicate a slight difference in the long-run income elasticities between exports and imports, as well as a larger sensitivity to income changes for both equations in the DO specification compared to the SD version. As the forecasting performance of both models is fairly similar for short horizons (see above), assessing the possible role of the Houthakker-Magee effect and the importance of supply versus demand effects requires comparing forecasts over a longer horizon.

33.   ***Discrepancies in forecast paths suggest some limited role for elasticity differentials in accounting for the widening trade deficit***. Figure 10 presents the out-of-sample forecasts obtained through 2010Q4 with the new models using April 2005 *World Economic Outlook* data. The improvement in the trade deficit suggested by both models arises from the lagged effects of the U.S. exchange rate depreciation combined with the assumption of an acceleration in foreign output growth rates that entails a convergence towards U.S. levels. While the DO model—which incorporates a Houthakker-Magee effect—shows a slightly larger trade deficit over time, the difference between the two models amounts to a surprisingly modest ½ percentage point of GDP over 5 years.

Figure 10. U.S. Trade Balance: Out-of-sample forecasts
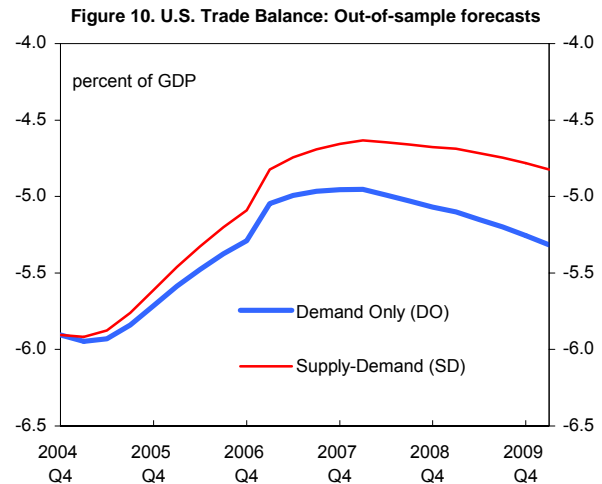
Source: IMF staff estimates.

34.   ***While the two models' forecasts show a similar sensitivity to exchange rate shocks, they react differently to changes in growth differentials***. A depreciation of the dollar and a narrowing of growth differentials between the U.S. and its major trade partners are often mentioned as factors in a gradual adjustment of the current account deficit. The two models would predict similar effect from exchange rate changes. However, the effects of a sustained acceleration of growth abroad compared with the baseline differ. Due to the higher long-run

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[27] See for instance Kose and others (2004).

income sensitivity of exports estimated in the DO model, the predicted increase is much larger compared to the model with supply effects.

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Data and Sources

Data for estimating aggregate pass-through equations

1.   Table 5 describes the variables used for estimating equation (1). In alternative specifications, price indices for non-oil imports and noncommodity imports were used as the left-hand side variable. Some specifications included oil and commodity prices as explanatory variables (source: WEO).

Table 5. Data Definitions and Sources for Aggregate Pass-Through Equations		
Symbol	Definition	Source
p^M	Import prices	Bureau of Economic Analysis
pY	Domestic prices: GDP deflator	Bureau of Economic Analysis
$p*$	Foreign prices: import -weighted GDP deflator of trading partners	WEO
E	Nominal effective exchange rate (broad index)	Federal Reserve Board
e	Real effective exchange rate (broad index)	Federal Reserve Board

Data for sectoral estimates

2.   Sectoral pass-through equations were estimated based on data described in Table 6.

Table 6. Data Definitions and Sources for Sectoral Pass-Through Equations	
Definition	Source
Import prices by end-use categories	Bureau of Economic Analysis
Domestic prices: GDP deflator	Bureau of Economic Analysis
Foreign prices: import -weighted GDP deflator of trading partners	WEO
Nominal effective exchange rate (broad index)	Federal Reserve Board
Real effective exchange rate (broad index)	Federal Reserve Board
Foreign prices (sector-specific weighted CPI of trading partners)	Staff calculations
Nominal effective exchange rate (sector-specific index)	Staff calculations
Real effective exchange rate (sector-specific index)	Staff calculations

3.   We experimented with two sets of proxies for the (nominal and real) exchange rate and foreign prices. Ideally, these variables should be sector-specific. However, this paper did not have access to sectoral data on the geographical composition of imports for the full sample period, which required constructing proxies:

•   The first set of proxies is simply the "broad" exchange rate and the aggregate foreign price variable that we used in the previous subsection. The broad exchange rate is constructed with time-varying weights based on the overall trade structure, i.e., it ignores cross-sectoral differences which, as Figure 5 illustrates, can be substantial.

- The other set of proxies includes an effective exchange rate and a foreign price variable based on constant 2004 sector-specific weights. This accounts better for differences in trade structure across sectors (at least in 2004), but ignores the changing importance of different trading partners over time. Again, Figure 5 illustrates that this omission can be important.

4.   The pass-through coefficients estimated using the "broad" and "sectoral" explanatory variables were found to be quite closely related. In line with intuition, sectoral-based estimates are significantly smaller, particularly in the earlier period; and the broad-based coefficient estimates vary across a broader range for the various sectors.

5.   China's share in imports by end-use category was calculated based on Bureau of Census data (for 2000-04). For 1993, shares reported by Kamin and others (2004) were used.

Data for country estimates

6.   Data cover 17 advanced economies: Australia, Austria, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom, United States.

7.   Import prices are overall import deflators from the OECD Analytical Database. Domestic prices are represented by GDP deflators (from the OECD Analytical Database), while foreign prices are import-weighted CPIs of trading partners (from the WEO). Nominal and real effective exchange rates are from the International Financial Statistics.

8.   Structural change variables—the change in China's share in total imports and the indicator of change in the trade structure—are constructed based on information from the Direction of Trade Statistics. The structural change indicator is based on the following breakdown of total imports:

- Industrial countries: Canada, Australia, Japan, New Zealand, Austria, Belgium (Belgium-Luxembourg), Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States

- Africa

- Asia: China, P.R., India, Indonesia, Korea, Malaysia, Other

- Emerging Europe

- Middle East

- Western Hemisphere: Argentina, Brazil, Mexico, Other

- Other

IV. A GLOBAL VIEW OF THE U.S. INVESTMENT POSITION[28]

1.   ***The rapid increase in the United States' net foreign liabilities has raised questions about foreign investors' willingness to continue to hold or acquire U.S. assets***. Federal Reserve Board officials, among others, have noted that the decline in the U.S. net international investment position (NIIP) is not sustainable over a longer time period (Ferguson, 2005, and Greenspan, 2005). This view is partly related to concerns that global investment portfolios may by now contain excessive holdings of U.S. assets, and that the financing of the current account deficit has recently shifted from equity to debt instruments. Both trends are seen as potential triggers of a disorderly exchange rate adjustment that could have harmful effects on financial markets and real activity (Cline, 2005, and Obstfeld and Rogoff, 2004).

2.   ***The paper analyzes various indicators of the U.S. NIIP from a portfolio perspective***. It examines whether investment portfolios have become more or less internationally diversified over time, and whether the increase in foreign claims on the United States can be explained by the growth of U.S. financial markets or a decline in home bias. The share of foreign portfolio exposure to U.S. assets is compared to the benchmark share of U.S. assets in the world portfolio. The U.S. NIIP is also compared with that of other countries, including a breakdown by investment category and analysis of recent changes.

A.   Measurement of Global Portfolio Shares

3.   ***When measuring the degree of home bias in large countries, the size of domestic financial markets needs to be taken into account***. The analysis starts from the assumption that, in order to maximize international risk sharing, the share of an investor's portfolio dedicated to claims on a particular country will equal the country's weight in the outstanding global financial stock.[29] However, it is a well-documented fact that investors favor their domestic markets—this is termed "home bias".[30] A standard measure of home bias that accounts for the size of the domestic financial market relative to the rest of the world is:

$$\text{Home Bias} \ = \ \frac{A*}{D} \bigg/ \frac{W - D}{W} \tag{1}$$

where $A*$ represents domestic holdings of foreign assets, D is the size of the domestic market, and W is the size of the world financial market. The numerator measures the actual share of foreign assets in the portfolio, while the denominator measures what this ratio would be in a fully diversified world. A value of zero indicates no holdings of foreign assets, while a value of one indicates that the country's portfolio is perfectly diversified from a geographic

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[29] See Karolyi and Stulz (2002) for a model and survey of the literature.

[30] Bertaut and Kole (2004) and Sorenson and others (2005) present recent data on home bias.

perspective. For small countries, the denominator in the above equation is close to one, and the results of the formula are close to those obtained by taking foreign assets as a share of investors' portfolios. For large countries, however, the denominator is lower, and the difference between the simple share of foreign assets in investors' portfolios and the above formula is larger. This implies that investors in countries with large financial markets—especially the United States—would be expected to hold a lower share of foreign assets and a higher share of domestic assets, reflecting the country's greater weight in the global financial universe.

4.   ***The paper analyzes the implications of home bias for NIIPs***. Replacing A^* in (1) with L^*, for foreign holdings of domestic assets, gives a measure of the degree of home bias displayed by foreign investors toward a particular country:

$$\text{Foreign Investors' Bias} = \frac{L^*}{D} \bigg/ \frac{W - D}{W} \tag{2}$$

This formula describes foreign investors' bias from the perspective of the country issuing the liabilities in question. Combining (1) and (2), the overall internationalization of a country's financial market, including both assets and liabilities, can be measured as:

$$\text{Internationalization} = \frac{\frac{1}{2}(A^* + L^*)}{D} \bigg/ \frac{W - D}{W} * 100 \tag{3}$$

Similarly, the difference between (1) and (2) provides a measure of a country's indebtedness scaled by the size of the domestic market:

$$\text{Indebtedness} = \frac{A^* - L^*}{D} \bigg/ \frac{W - D}{W} * 100 \tag{4}$$

5.   ***Scaling the NIIP by the size of the domestic market facilitates an examination of indebtedness based on portfolio shares***. The NIIP is typically stated as a ratio to GDP, combining a stock concept and a flow concept and focusing on a country's ability to service its debt. Determining whether a negative NIIP is large relative to the domestic market reveals whether the already high exposure of foreign investors to domestic assets might constrain a further rise in indebtedness.

6.   ***Data on international investment holdings and domestic financial market size are used to obtain measures for portfolio internationalization and net investment positions***, based on Equations (3) and (4).[31] The size of domestic financial markets—taken to be equal to the stock of financial instruments outstanding—is estimated for 45 countries. However,

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[31] The data used for this paper are described in the appendix.

data limitations restrict the analysis of foreign holdings of domestic financial instruments to 22 advanced economies.

7.   ***Reflecting diverse and complex data sources, the results of the following analysis are necessarily subject to a number of caveats***. Although the data are obtained from cross-country sources with standardized definitions, some important country-specific features may not have been captured and other problems remain:

- The definition of domestic equity outstanding may not include the market value of issuance abroad by domestic corporations; data on financial stocks are not adjusted for derivatives or other complex instruments; and country surveys on international holdings cannot always ascertain the final ownership of a financial instrument, reflecting limits on data for custodial holdings.[32]

- Data on international holdings tend to understate assets compared to liabilities, often resulting in an upward bias for net international indebtedness (Bertaut and Griever, 2004). This dataset confirms the bias toward net indebtedness.

- Because the rate of return the United States earns on foreign claims exceeds the rate it pays on claims held by foreigners, the indebtedness concept overstates the economic burden of the United States' negative NIIP (Cline, 2005).

- Valuation changes pose a further complication in analyzing external imbalances and NIIPs, as they weaken the link between a country's current account balance and the change in its NIIP (see Box 1).

B.   Trends in Portfolio Internationalization

8.   ***Possibilities for increased holdings of international assets have multiplied due to rapid financial deepening in the 1990s*** (Figure 1). In industrial countries, financial markets have deepened at a remarkable pace, with stocks of debt, equity, and loans expanding from around 300 percent of aggregate GDP in 1990 to around 450 percent in 2003, interrupted only temporarily by the bursting of the global equity market bubble. Despite the similarity in overall market size, the United States relies more heavily on debt and equity financing, and less on bank financing, reflecting the larger role of U.S. securities markets in financial intermediation.

9.   ***When adjusting for the size of the domestic financial market, the bias exhibited by foreign investors against U.S. assets and U.S. investors against foreign assets is slightly larger than for other countries***. As shown in Figure 2, this is true for all investment types, with the overall gap widening recently. Countries with highly internationalized portfolios include centers of global finance (the United Kingdom and Switzerland), countries that

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[32] See Griever, Lee, and Warnock (2001) for an in-depth examination of U.S. data on international financial holdings.

Box 1. Valuation Changes and the International Investment Position

This box examines the effects of valuation changes on the U.S. NIIP. The change in a country's NIIP as a ratio to GDP can be calculated as:

$$\Delta niip_t \approx -fa_t + vc_t - NIIP_{t-1} * g_t$$

where fa_t is the financial account balance as a share of GDP (which is approximately the inverse of the current account balance), vc_t is the sum of valuation changes as a share of GDP, and g_t is the growth rate of nominal GDP. BEA (2005) further decomposes valuation changes since 1990 into changes in the price of assets, exchange rate changes, and other valuation changes.

Since 1990, net valuation changes have eased the impact of financial flows on the NIIP (Figure). This is more than accounted for by large positive gains in 2002 and 2003. Valuation changes in those two years improved the NIIP by 7.2 percent of GDP, offsetting a large proportion of the 10.4 percent of GDP deficit in financial flows in 2002 and 2003. This is consistent with the findings of Gourinchas and Rey (2005), that valuation changes on the U.S. NIIP have tended to have a stabilizing effect on external imbalances.

The gains in 2002 and 2003 reversed small earlier losses, as the cumulative effect on the NIIP of valuation changes from 1990–2001 was a loss of about 1 percent of GDP (net valuation changes were also negative in the 1980s). Additionally, year-to-year persistence in valuation changes is low, with essentially no correlation between the change in one year and the next, implying that valuation changes have not been systematic.

United States: Change in the Net International Investment Position, 1990 – 2003

The importance of valuation changes in determining the NIIP has been increasing as gross positions rise (Figure)**.** Without valuation changes, the expected correlation between a country's current account balance and the change in its NIIP is 1, but in this dataset the correlation is only 0.1 (the correlation for the United States is also 0.1). Differences in the performance of domestic and foreign equity markets and movements in the exchange rate affect gross foreign assets in a different way than gross foreign liabilities, driving overall net valuation changes. For example, because U.S. foreign assets are mostly denominated in foreign currency and U.S. foreign liabilities in domestic currency, a depreciation of the dollar will boost the dollar value of U.S. asset holdings without changing the dollar value of U.S. liabilities, leading to an improvement in the NIIP. Tille (2003), for instance, shows that, even when the NIIP is balanced, a given change in the exchange rate will result in a larger change in the U.S. NIIP when gross positions are larger.

United States: Impact of Valuation Changes and Growth Effects on NIIP, 1990 – 2003

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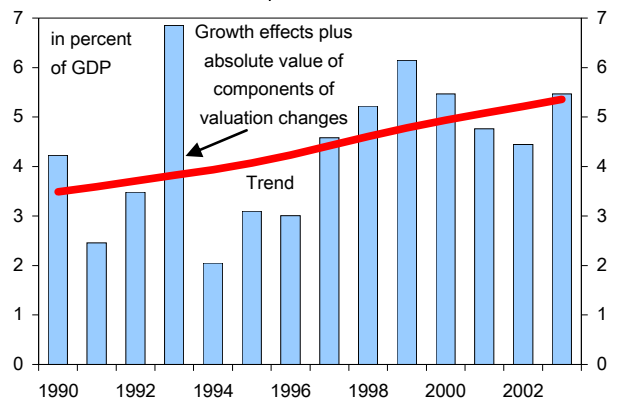
[1]Although cumulative valuation changes resulting from asset prices and exchange rates were negative, other valuation changes were consistently positive throughout the period.

Figure 1. Industrial Countries: Financial Deepening, 1990 – 2003
(In percent of GDP in U.S. dollars)

Debt, equity, and loans outstanding

Debt securities outstanding

Equity market capitalization

Loans outstanding
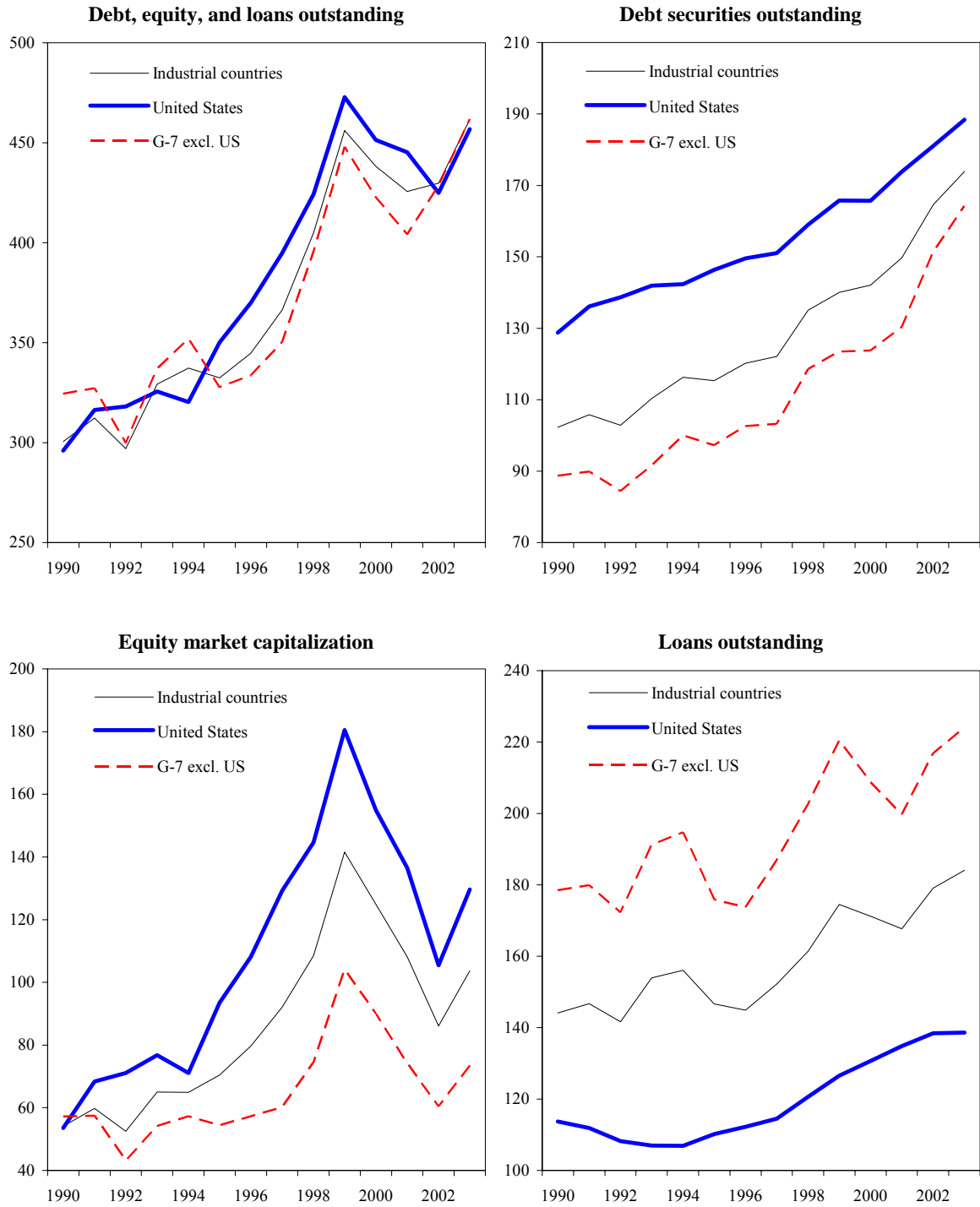
Source: Fund staff calculations.

Figure 2. Internationalization of Assets and Liabilities, 1990 – 2003

Total Portfolio

Debt Securities

Equity and FDI

Loans
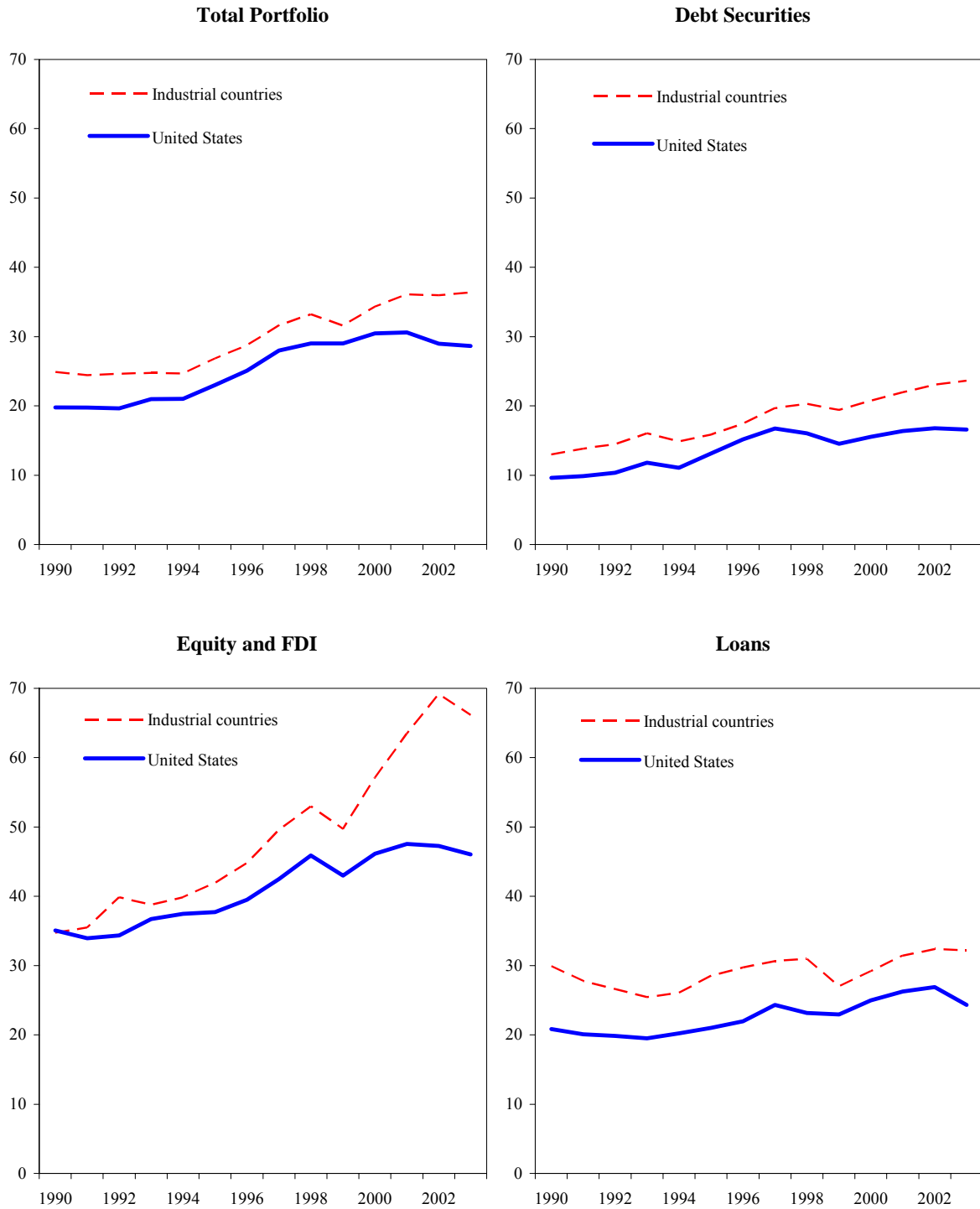
Source: Fund staff calculations.

Figure 3. Internationalization and Country Size, 2003
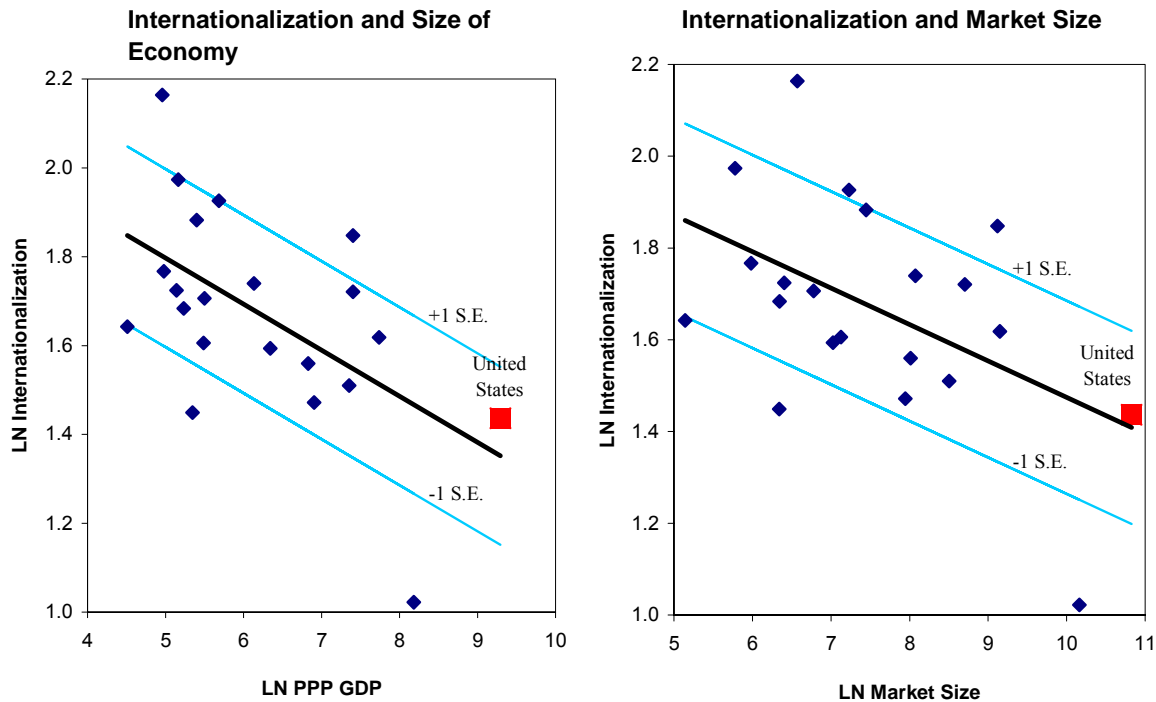
Source: Fund staff calculations.

receive large foreign investments (Ireland), and Norway, whose international holdings grew rapidly as a result of its accumulating oil wealth.

10.	*However, after adjusting for the size of the economy or of outstanding financial instruments, the internationalization of U.S. portfolio holdings is close to what would be predicted*. The benefits of geographic portfolio diversification are lower for investors in an economy with more diverse activities and a greater variety of investment opportunities.[33] Figure 3 shows that—using the size of the economy or depth of financial markets as proxies for economic diversity in simple linear regressions—these factors explain the lower degree of internationalization of the U.S. financial market.[34]

11.	*Notwithstanding a rise in portfolio internationalization, rapid growth in global financial markets has been a larger contributor to the increase in foreign asset holdings*.

---

[33] Errunza and others (1999) show that the benefits of international diversification can be emulated by holding equity in domestically-based multinational corporations. To the extent that this type of firm is more prevalent on U.S. equity markets than those in other countries, this would further reduce U.S. investors' need for geographic portfolio diversification relative to investors of other countries.

[34] The results hold true even in regressions excluding the United States and Japan.

Figure 4. Industrial Countries: Internationalization of Assets and Liabilities, 1990 – 2003
(1990 = 100)

Total Portfolio

Debt Securities

Equity and FDI

Loans
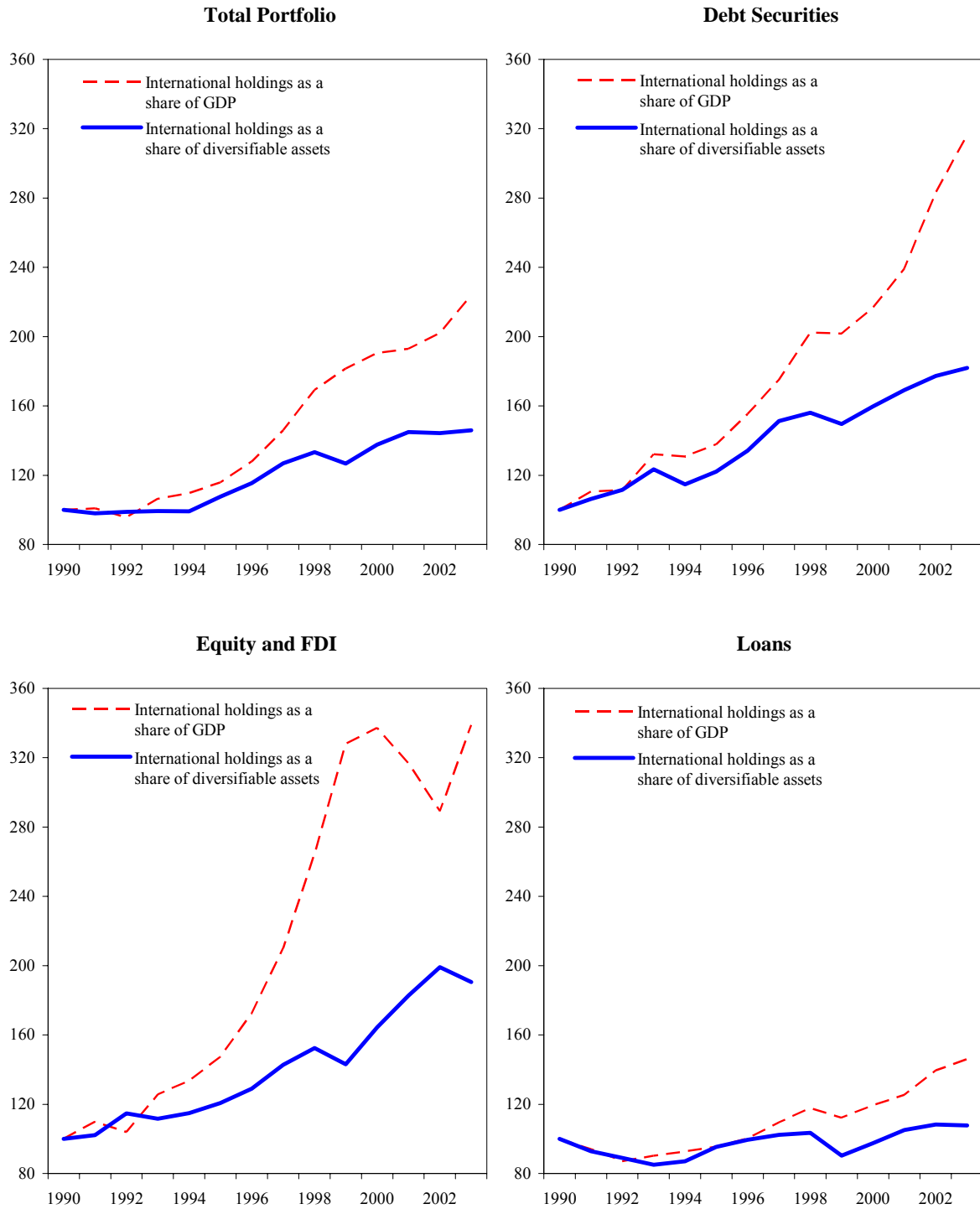
Source: Fund staff calculations.

Figure 5. United States: Foreign Liabilities and Assets, 1990 – 2003
(In percent of GDP)
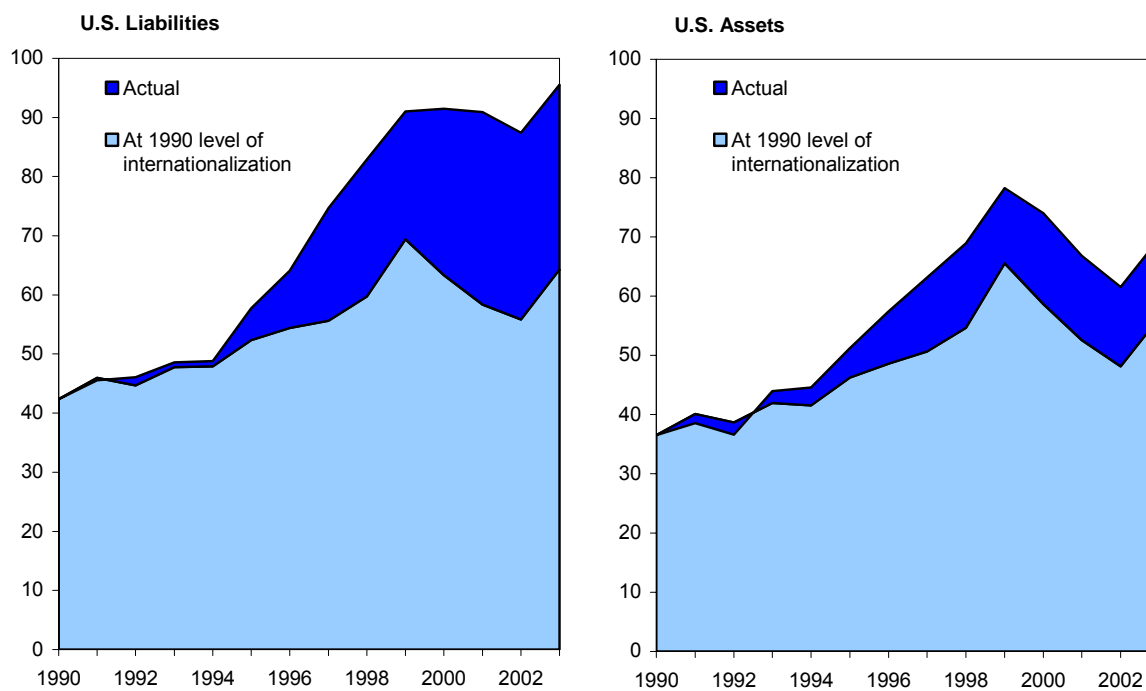
Sources: Bureau of Economic Analysis; and Fund staff calculations.

Figure 4 (on the previous page) shows that holdings of foreign assets more than doubled as a share of GDP since the early 1990s. Portfolio internationalization also increased, but reached only one-and-a-half time the level it had in 1990, implying that growing domestic markets were responsible for a larger share of the growth in foreign holdings than the decline in home bias. The fastest-growing markets, in debt securities and equity, were also the markets becoming more internationalized during the period, perhaps adding to the perception that investors shifted a large proportion of their portfolios abroad.

12.   *However, the United States appears to have particularly benefited from a worldwide decline in the home bias to finance rising liabilities.* Figure 5 decomposes the changes in U.S. holdings of foreign assets and foreign holdings of U.S. assets. On the liabilities side, growth in U.S. markets would have caused foreign holdings to increase from 42 percent of GDP to 64 percent of GDP since 1990. The increased propensity of foreign investors to hold U.S. assets added another 31 percent of GDP to U.S. liabilities, with about half the increase in debt securities. By contrast, the internationalization of U.S. asset portfolios has increased less strongly. Growth in foreign markets would have caused U.S. holdings to increase from 37 percent of GDP to 56 percent of GDP, with a fall in the home bias of U.S. investors contributing an additional 13 percent of GDP, mainly in equity and FDI.

C. The U.S. International Investment Position

13.   ***Global asset portfolios appear not to be significantly overweight in U.S. assets,
relative to the United States' benchmark share in an internationally diversified portfolio***.
The benchmark share is constructed taking into account the assets that investors in each
country would maintain in domestic financial instruments. All other financial instruments are
considered to be "diversifiable", in that they would be owned by foreign investors in a world
of complete geographic diversification. Given the degree of home bias shown in Figure 2,
actual foreign portfolios are much smaller in size than "diversifiable" assets. Figure 6
examines whether, given this home bias, claims on the U.S. occupy a larger share of foreign
portfolios than the benchmark the U.S. share of diversifiable assets is outstanding. By this
metric, non-U.S. portfolios are underweight in U.S. equity/FDI and loans, and marketweight
in U.S. debt securities. U.S. equity and FDI as a share of foreign portfolios peaked during the
stock market boom in the late 1990s but has since fallen from slightly overweight to well
underweight, while the portfolio share of U.S. loans increased steadily until falling back in
the last two years. The share of foreign portfolios dedicated to U.S. debt securities peaked in
1997 and 2001 before declining more recently. These numbers give little indication that
foreign absorption capacity of claims on the U.S. would be constrained in the near future.[35]

14.   ***The U.S. NIIP is comparable to that of many other industrial countries, but
appears unusually large given the tendency for larger countries to have lower absolute
NIIPs*** (Figures 7 and 8). For small open economies, net foreign assets or liabilities can often
be large relative to the size of their domestic financial markets. For example, Australia and
New Zealand report high levels of net indebtedness, amounting to over 30 percent of the
outstanding stock of domestic investments. However, larger countries such as the G-7
generally maintain NIIPs—either positive or negative—closer to balance, given that it is
more difficult for countries with large financial markets to run up a large NIIP relative to
market size. This negative relationship is depicted in the downward sloping line in Figure 8.
The figure suggests that the absolute size of the U.S. NIIP is much larger than expected—
although less so when accounting for foreign reserve holdings. This result holds even if the
United States and Japan are excluded from the regressions.

15.   ***The U.S. NIIP has deteriorated since 1990***. The NIIP has moved from a negative
position of 3 percent of U.S. market value to 9 percent in 2003, and appears poised to fall
further due to continued current account deficits. Most other industrial countries' positions
improved during this period, with only Germany, Greece, and the Netherlands also having a
worsening NIIP.

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[35] This measure may understate the share of U.S. equities that are truly "diversifiable", as Bertaut and Kole
(2004) and Dahlquist and others (2003) find that the share of U.S. equities in the global portfolio available to
most investors is even higher when using float-adjusted market capitalization (equity not held by controlling
shareholders).

Figure 6. Share of U.S. Assets in Foreign Portfolios, 1990 – 2003

Total Portfolio

Debt Securities

Equity and FDI

Loans
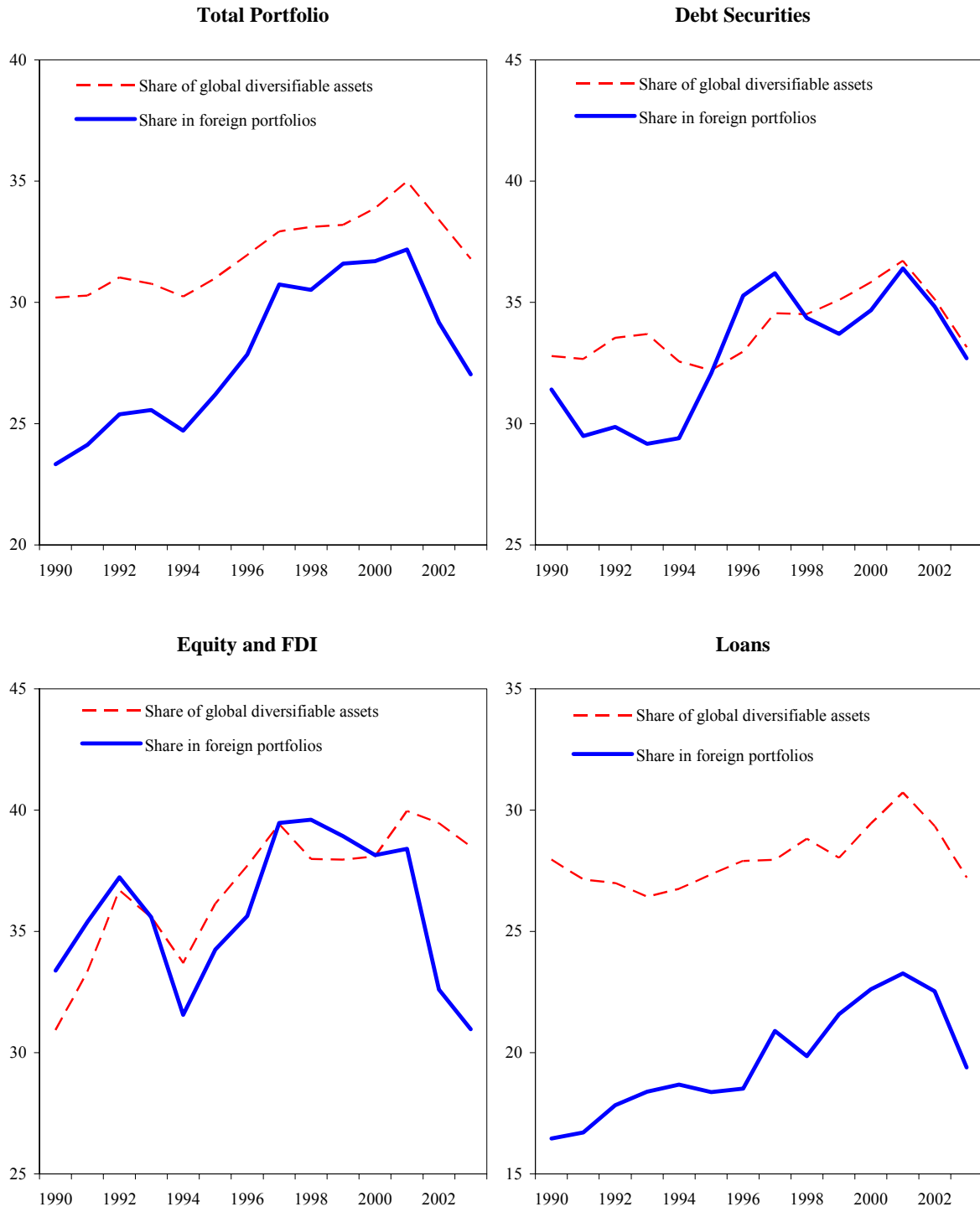
Source: Fund staff calculations.

Figure 7. Industrial Countries, Net International Position by Type of Investment, 2003
(In percent of diversifiable assets)

Net international investment position

Net international debt securities position

Net international equity and FDI position

Net international loan position
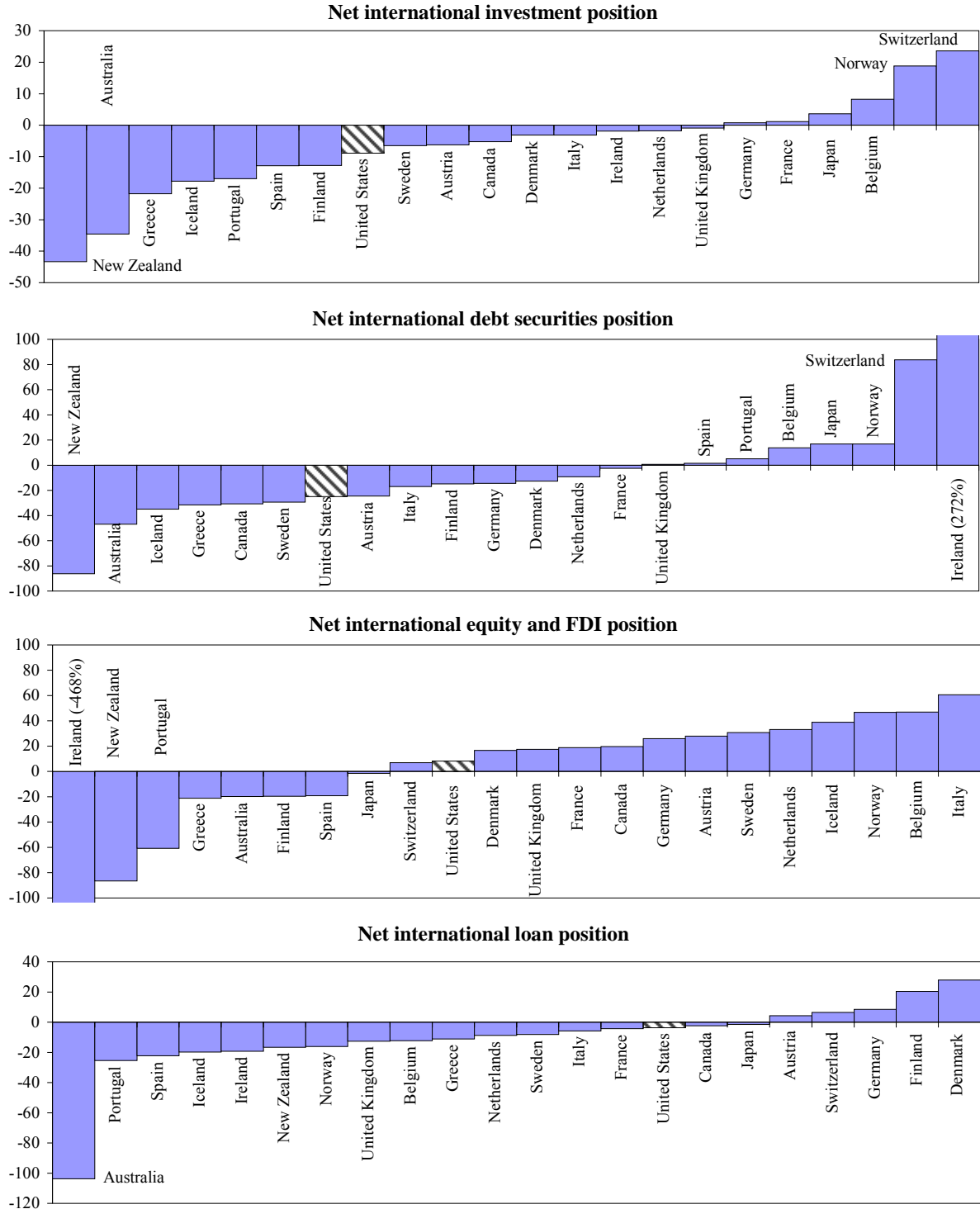
Source: Fund staff calculations.

**Figure 8. Absolute Net International Investment Position
and Country Size, 2003**
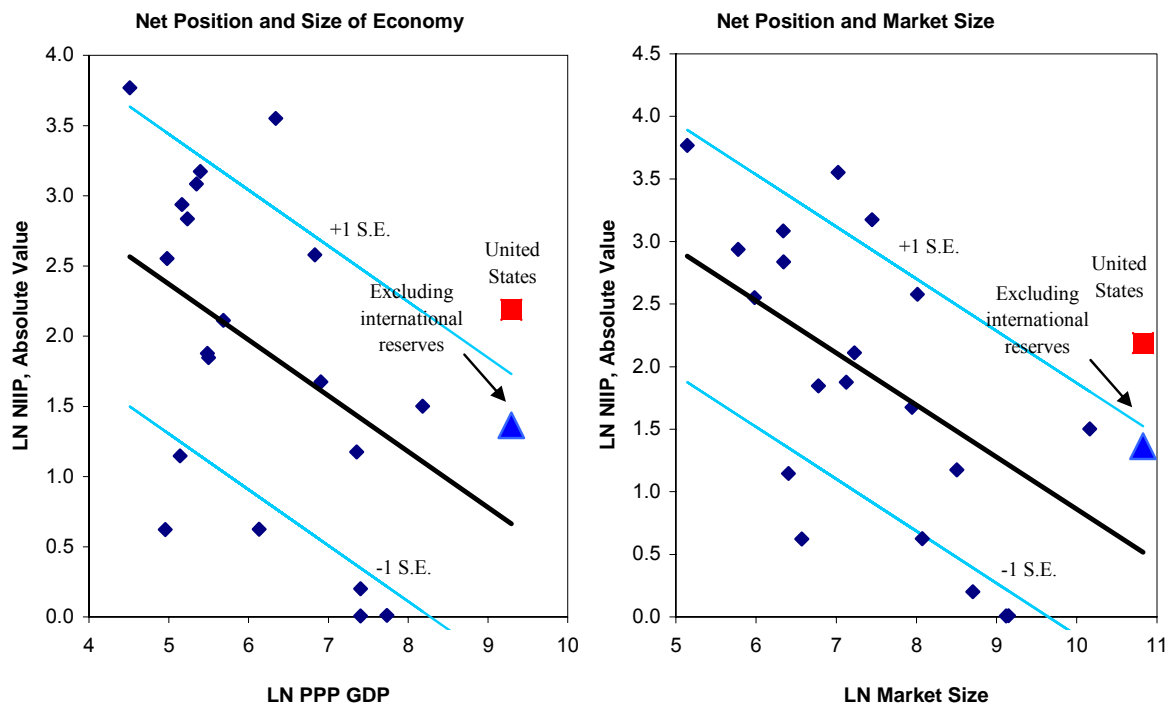
Source: Fund staff calculations.

16.   ***In particular, the U.S. position in debt securities is weaker than in other investment classes, and is deteriorating*** (Figure 9). Both the net equity and FDI position, which is slightly positive, and the net loan position, which is slightly negative, are near the average for industrial countries (see Figure 7). However, the net debt securities position has fallen to 25 percent of the outstanding market from 13 percent in 1990. This is significantly larger than the industrial country average of 11 percent. The decline appears to have been driven mainly by an influx of foreign investors into U.S. debt securities, as the position would have been broadly stable if the degree of home bias had remained at 1990 levels (Figure 10).[36]

17.   ***The U.S. dollar's reserve currency status accounts for some of the negative U.S. debt securities position, but the recent deterioration has mainly been in non-reserve items***. At end-2003, Treasuries held as international reserves accounted for over 20 percent of all Treasuries held by the public, and 8 percent of agency bonds were also held as reserves (up from 11 percent and 1 percent, respectively, in 1990). Excluding reserves, the U.S. had a net debt securities position of -6 percent of the outstanding market in 1990 and -16 percent in

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[36] The only variation in the lines labeled "At 1990 level of internationalization" is due to the changing weights of each asset class in U.S. and global financial stocks.

Figure 9. United States, International Asset and Liabilities Positions, 1990 – 2003
(In percent of diversifiable assets)

Total Portfolio

Debt Securities

Equity and FDI

Loans
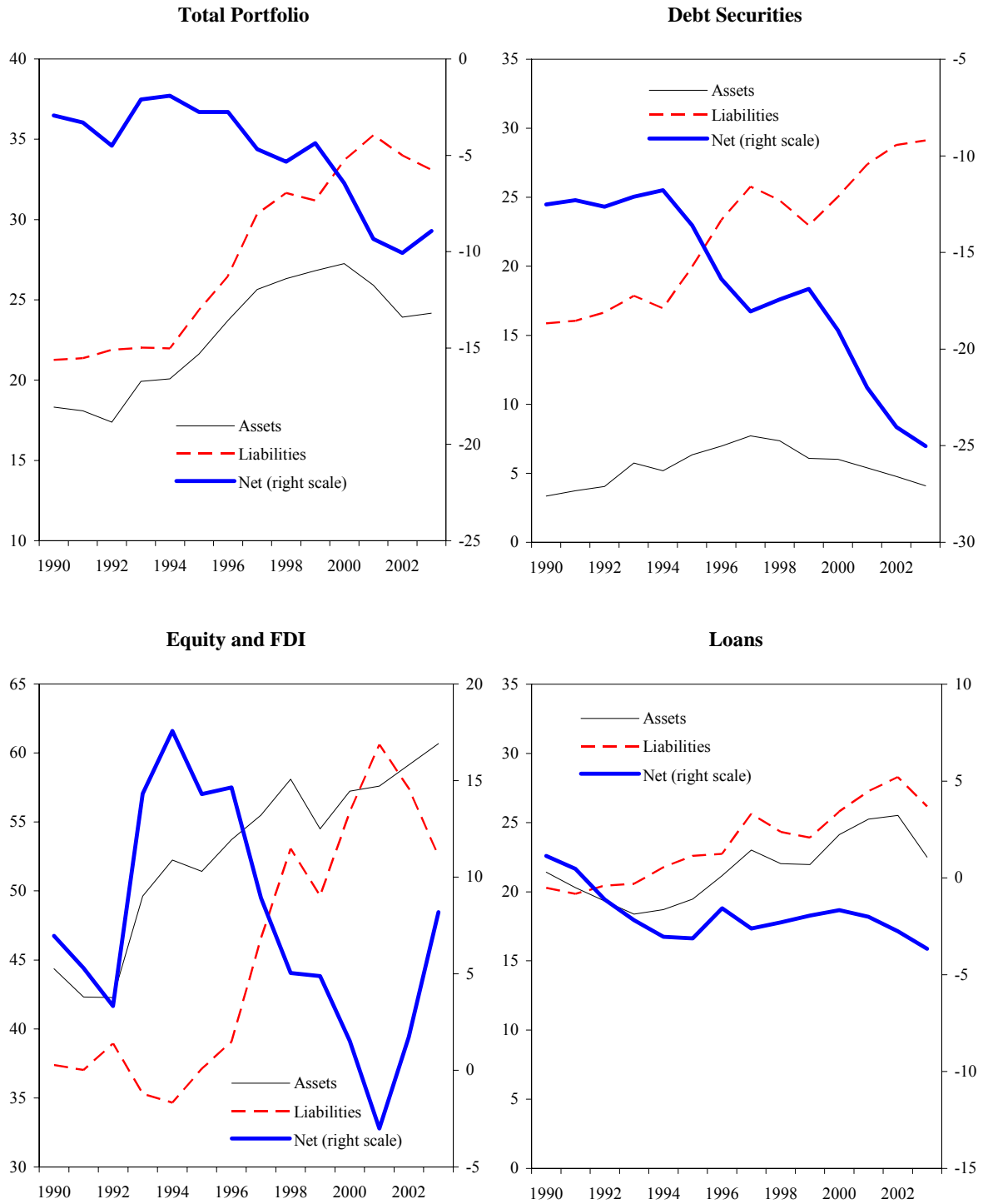
Source: Fund staff calculations.

Figure 10. United States, Net International Positions, 1990 – 2003
(In percent of GDP)

Total Portfolio

Debt Securities

Equity and FDI

Loans
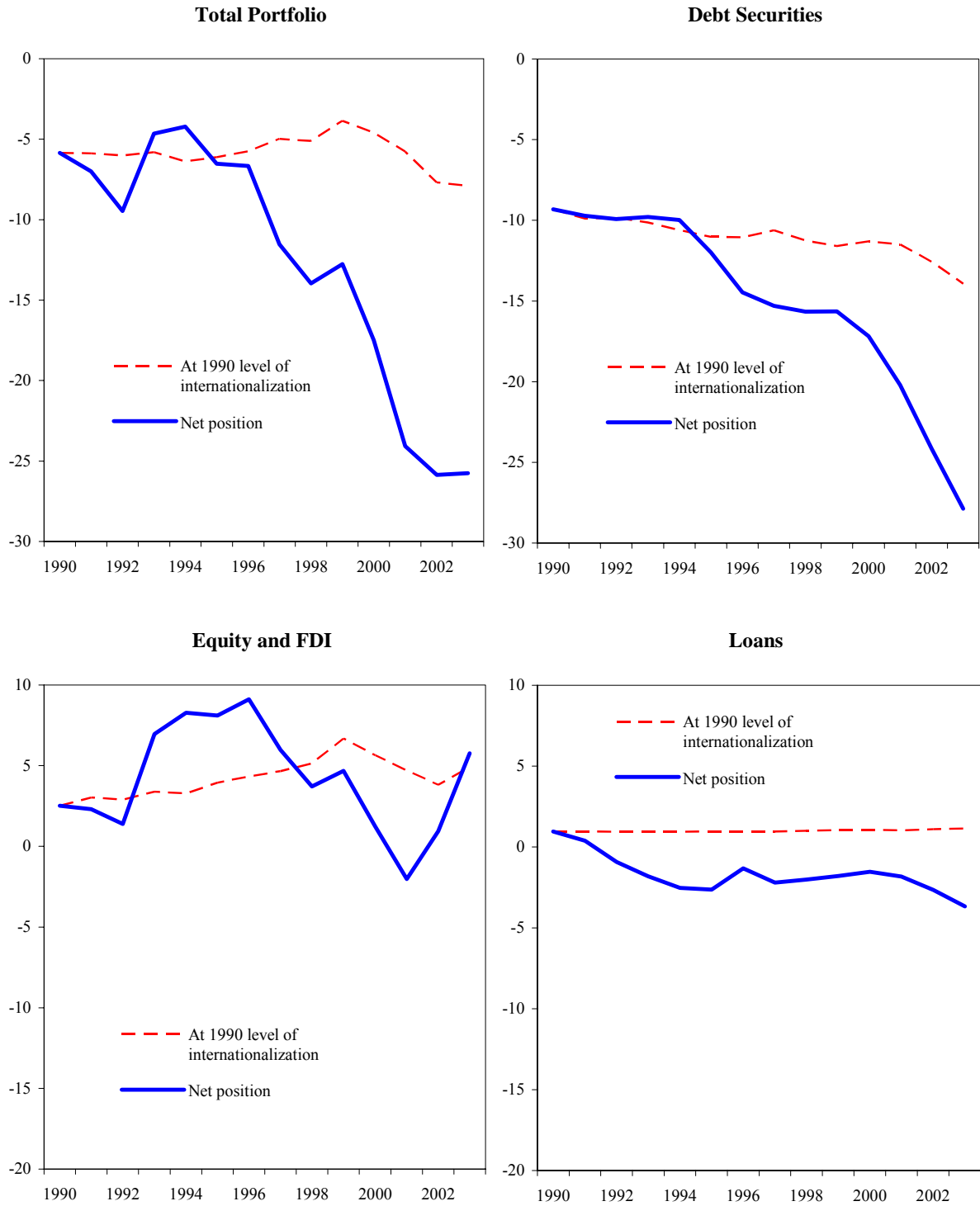
Sources: Bureau of Economic Analysis; and Fund staff calculations.

2003. Debt securities excluding reserves thus accounted for 10 percentage points of the 12 point deterioration in the net debt securities position over the period, while reserves only accounted for 2 percentage points.

D. Conclusions

18.   ***The U.S. has experienced the same trends toward financial deepening and internationalization of portfolios as other industrial countries***. U.S. markets remain less internationalized than other countries, even adjusting for the U.S.'s large share of the global market. The difference can be explained by the United States' greater variety of economic activities—it is not as necessary for U.S. investors to diversify their portfolios by investing abroad as it would be for investors in a country with a smaller assortment of economic activity.

19.   ***Global portfolio data gives mixed signals regarding foreigners' exposure to U.S. assets, and the decline in the U.S. net debt position could be a cause for concern***. On the positive side, an examination of foreign portfolios confirms that they contain about the expected proportion of U.S. assets, and measures for U.S. indebtedness rank near the middle of industrial countries in most asset classes. That said, the U.S. NIIP is weaker than would be expected given the size of the U.S. economy and financial markets, even if international reserves are included in the analysis, and its net debt securities position is particularly large. The overall NIIP and the net debt securities position are also deteriorating rapidly, and the large current account deficit implies that foreign claims on the United States will continue to mount.

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Data

- **Domestic equity market capitalization:** for most countries, from the World Federation of Exchanges, which standardizes across countries and excludes the capitalization of foreign companies listed on an exchange; the value of mutual funds and similar shares; and options, futures, and derivatives. Additional data sources are: Datastream; the IMF's *Global Financial Stability Report*; Meridian's *World Stock Exchange Fact Book*; and Standard and Poor's *Emerging Stock Markets Fact Book*.

- **Debt securities outstanding:** from the *Quarterly Review* of the Bank of International Settlements, Tables 12A and 16A.

- **Domestic stock of loans outstanding:** where available, from the OECD's *National Accounts Volume IIIB*, spliced with data from the IMF's *International Financial Statistics* (IFS) for missing observations in the former dataset. Data for non-OECD members were taken mainly from the IMF's *Money and Banking Database*, which is based on raw data used in the IFS. Additional data were taken from IFS and, for Chile, China, the Czech Republic, Hong Kong SAR, Peru, and Taiwan Province of China, from published national sources. Data were converted to U.S. dollars using exchange rates from IFS.

- **Foreign holdings of financial instruments:** Data on the international holdings of financial instruments were kindly provided by Philip Lane and Gian Maria Milesi-Ferretti (see Lane and Milesi-Ferretti, 2005a). These combine official data on international investment positions with estimates of external assets and liabilities based on balance of payments flows and various other sources, with appropriate valuation adjustments based on equity price fluctuations and exchange rate changes. For a description of the methodology see Lane and Milesi-Ferretti (2001).

Table 1. List of Countries 1/		
Argentina	*Greece*	Philippines
Australia	Hungary	Poland
Austria	*Iceland*	*Portugal*
Belgium	India	Russia
Brazil	Indonesia	Singapore
Canada	*Ireland*	Slovak Republic
Chile	*Italy*	South Africa
China,P.R.: Mainland	*Japan*	*Spain*
China,P.R.:Hong Kong, SAR	Korea	*Sweden*
Colombia	Malaysia	*Switzerland*
Czech Republic	Mexico	Taiwan Province of China
Denmark	*Netherlands*	Thailand
Finland	*New Zealand*	Turkey
France	*Norway*	*United Kingdom*
Germany	Peru	*United States*

1/ Italics indicate countries for which international holdings data were analyzed. Non-italicized countries were only included in the totals for global financial stocks.

V. CONSEQUENCES OF FISCAL CONSOLIDATION FOR THE U.S. CURRENT ACCOUNT[37]

A. Introduction

1.   ***The recent increase in the U.S. current account deficit has put the link between fiscal consolidation and the external accounts into greater focus***. Reducing the U.S. fiscal deficit is a key element in the international strategy for reducing external imbalances—along with structural reforms and greater exchange rate flexibility in other parts of the world. However, there has been some skepticism in policy circles as to whether consolidation will have a major impact on the U.S. external deficit.[38]

2.   ***This paper considers the consequences for the U.S. current account of reducing the general government deficit using the Fund's Global Fiscal Model (GFM)***. GFM is a non-Ricardian model that has been developed to study the implications of alternative fiscal policies, particularly those involving permanent changes in government debt and net financial liabilities.[39] Four types of policies to reduce government deficits are considered—increases in taxes on labor income or corporate income, as well as reductions in either government absorption or transfers.

B. Baseline Simulation and Model Variants

3.   ***The total impact of fiscal consolidation on real activity combines responses from aggregate supply and demand***:

- ***The supply-side effects come through changes in incentives***, such as a reduced desire to work if labor taxes are raised, a reduction in the desired capital stock when corporate taxes are raised, or a reallocation of factors between sectors when government spending is reduced (assuming that government spending is biased towards nontraded domestic goods).

- ***On the demand side, private consumption would fall to the extent that individuals view a smaller fiscal deficit as decreasing their permanent income***. This in turn depends on the degree of households' impatience and the persistence of the consolidation effort. Domestic and foreign investment would benefit from the real interest rate reduction induced by fiscal consolidation, while net exports also respond to the real exchange rate depreciation induced by the contraction in demand for domestic goods.

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[37] Prepared by Michael Kumhof, Douglas Laxton, and Dirk Muir with assistance from Susanna Mursula.

[38] See Bernanke (2005) and Ferguson (2005).

[39] Four regions are included in the version of GFM used in this paper, namely: the United States, the euro area and Japan; Emerging Asia; and a rest-of-the-world block. All are assumed to have floating exchange rates. For an introduction to the structure and properties of the two-country version of GFM, see Botman and others (2003). The Appendix also provides a short description.

4.   *In our baseline simulation, the fiscal balance is improved permanently by 1 percent of GDP*. Initially this occurs through higher labor tax rates, but as government debt and associated interest payments decline compared to the baseline, tax rates are allowed to fall to keep the deficit unchanged. Overall, the long-run government debt to GDP ratio is reduced by 40 percent of GDP.

5.   *In this scenario, a 1 percentage point increase in the ratio of government saving to GDP increases U.S. national saving by an average of ¾ percentage points relative to GDP over the first ten years* (Figure 1, Table 1).[40] This relatively large impact reflects the permanent nature of the consolidation effort, which is fully reflected in forward-looking consumers' income expectations. The resulting increase in world saving gradually reduces the real interest rate, boosting investment in the U.S. and elsewhere. As government debt and perceived private wealth fall, consumption drops by 1.1 percent over the first five years. The short-term decline in real GDP is smaller (0.2 percent), reflecting the beneficial effects of fiscal consolidation on net exports (through induced changes in the real exchange rate) and investment (through induced changes in the real interest rate).

6.   *The current account improves by almost ½ percent of GDP over the first ten years, reflecting large changes in net exports and an improving net foreign asset position*. As consumption falls, the demand for domestic goods moderates, leading to a significant depreciation of the real exchange rate. This boosts exports, and reduces both imports and net foreign interest payments compared to the pre-consolidation scenario. We estimate the current account deficit to improve by 0.44 percentage points on average over the first five years, one-and-a-half times the 0.30 percentage points of GDP increase in domestic investment.

7.   *The long-run impact on the net foreign asset (NFA) position is large and permanent*. The NFA position as a ratio to GDP improves by 29 percentage points, or about 70 percent of the change in the government debt-to-GDP ratio, and saving on interest payments on foreign debt are well over 1 percent of GDP over the long run. As a result, the current account improves by almost ¾ percentage points of GDP over the long run, notwithstanding a renewed decline in the trade balance as the U.S. eventually reaps the benefits of fiscal consolidation in terms of higher growth.

8.   *The long-run effects on U.S. economic performance are significant and positive*. Higher investment boosts U.S. real GDP by over 4 percent in the long run. While real interest rates only fall by some 8 basis points over the first five years, the total long-run decline amounts to 80 basis points. The lower long-run tax rate also stimulates private consumption and labor effort, inducing positive supply-side effects.

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[40] Changes in national saving are calculated as the sum of changes in the government balance and private saving.

Figure 1. Permanent Change in Government Balance of 1 Percentage Point of GDP
Fiscal Instrument: Labor Income Tax
(Deviation from Control)

Current Account Balance to GDP: 5-Year Average (Change)

Investment to GDP: 5-Year Average (Change)

Private Saving to GDP: 5-Year Average (Change)

Real GDP: 5-Year Average (Percent)

Real Interest Rate: 5-Year Average (Change)

Table 1. United States: Permanent Increase in the Government Balance
Through an Increase in Labor Taxes

(deviations from control)

	Five-Year Average	Ten-Year Average	Steady State
United States			
Current account balance/GDP (Percentage points)	0.44	0.49	0.70
General government balance/GDP (Percentage points)	1.00	1.00	1.00
Private savings/GDP (Percentage points)	-0.26	-0.18	0.71
Investment/GDP (Percentage points)	0.30	0.33	1.00
Trade balance/GDP (Percentage points)	0.40	0.39	-0.63
Real GDP (Percent)	-0.21	-0.08	4.29
Consumption (Percent)	-1.14	-1.06	3.60
Investment (Percent)	1.79	2.10	10.91
Real interest rate (Percentage points)	-0.08	-0.11	-0.82
Government debt/GDP (Percentage points)	-2.81	-4.98	-41.00
Net foreign assets/GDP (Percentage points)	1.23	2.37	28.89
Labor effort	-0.06	-0.04	0.31
Real effective exchange rate (Percent)	1.38	1.22	-1.91
Exchange rate with Japan/Euro Area (Percent)	1.66	1.48	-2.06
Exchange rate with Emerging Asia (Percent)	1.25	1.11	-2.16
Exchange rate with Rest of the World (Percent)	1.31	1.16	-1.73
Japan/Euro Area			
Current account balance/GDP (Percentage points)	-0.17	-0.19	-0.23
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	-0.05	-0.01	0.82
Investment/GDP (Percentage points)	0.12	0.17	1.04
Trade balance/GDP (Percentage points)	-0.15	-0.15	0.25
Real GDP (Percent)	0.15	0.23	4.52
Consumption (Percent)	0.12	0.12	2.19
Investment (Percent)	0.98	1.44	11.48
Real interest rate (Percentage points)	0.00	-0.03	-0.82
Government debt/GDP (Percentage points)	0.34	0.39	0.00
Net foreign assets/GDP (Percentage points)	-0.47	-0.92	-11.49
Labor effort	0.00	0.02	0.60
Real effective exchange rate (Percent)	-0.58	-0.53	0.54
Exchange rate with United States (Percent)	-1.63	-1.46	2.10
Exchange rate with Emerging Asia (Percent)	-0.41	-0.37	-0.10
Exchange rate with Rest of the World (Percent)	-0.34	-0.32	0.34

Table 1. United States: Permanent Increase in the Government Balance
Through an Increase in Labor Taxes
(Continued)

(deviations from control)

	Five-Year Average	Ten-Year Average	Steady State
Emerging Asia			
Current account balance/GDP (Percentage points)	-0.17	-0.19	-0.33
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	0.08	0.13	1.11
Investment/GDP (Percentage points)	0.25	0.32	1.44
Trade balance/GDP (Percentage points)	-0.15	-0.15	0.29
Real GDP (Percent)	0.07	0.19	5.85
Consumption (Percent)	-0.09	-0.09	2.99
Investment (Percent)	1.19	1.64	12.23
Real interest rate (Percentage points)	-0.01	-0.05	-0.82
Government debt/GDP (Percentage points)	0.09	0.10	0.00
Net foreign assets/GDP (Percentage points)	-0.48	-0.93	-13.51
Labor effort	0.02	0.03	0.38
Real effective exchange rate (Percent)	-0.10	-0.08	0.71
Exchange rate with United States (Percent)	-1.23	-1.09	2.20
Exchange rate with Japan/Euro Area (Percent)	0.41	0.37	0.10
Exchange rate with Rest of the World (Percent)	0.07	0.05	0.44
Rest of the World			
Current account balance/GDP (Percentage points)	-0.21	-0.23	-0.26
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	-0.05	-0.01	0.83
Investment/GDP (Percentage points)	0.16	0.22	1.10
Trade balance/GDP (Percentage points)	-0.19	-0.18	0.29
Real GDP (Percent)	0.11	0.20	4.63
Consumption (Percent)	0.12	0.11	2.35
Investment (Percent)	1.07	1.53	11.14
Real interest rate (Percentage points)	0.00	-0.04	-0.82
Government debt/GDP (Percentage points)	0.18	0.20	0.00
Net foreign assets/GDP (Percentage points)	-0.59	-1.12	-13.48
Labor effort	0.00	0.01	0.31
Real effective exchange rate (Percent)	-0.27	-0.23	0.36
Exchange rate with United States (Percent)	-1.30	-1.15	1.76
Exchange rate with Japan/Euro Area (Percent)	0.34	0.32	-0.34
Exchange rate with Emerging Asia (Percent)	-0.07	-0.05	-0.44

Source: Fund staff calculations.

9.   ***There are also considerable international spillovers as U.S. consolidation gradually lowers the world real interest rate***. Investment responses abroad are similar to those in the United States. The current account responses in other regions mirror U.S. developments, with an average deterioration of about ¾ percent of GDP. Consumption responses abroad are muted but positive, given the absence of fiscal contraction in the rest of the world. Overall, the rest of the world and the U.S. experience similar increases in real GDP.

10.   ***The current account improvement is significantly smaller when we limit the duration of the consolidation to five or ten years***. We considered simulations where deficits were lowered by 1 percentage point relative to GDP for only five and ten years, respectively, and then allowed to return to baseline. In these simulations, long-run debt was only reduced by 5 and 10 percentage points of GDP, respectively:

•   In the five-year consolidation experiment, households perceive only a limited reduction in their wealth (Table 2). This leads to an improvement of the current account of 0.2 percent of GDP on average over these five years, similar to that reported in Erceg and others (2005).[41]

•   The current account improvement for a ten-year change (not reported) is 0.3 percent. Hence, the length of the assumed consolidation is a key parameter determining the impact on both national saving and the current account.

11.   ***If global financial markets were less integrated than assumed in the baseline scenario, international spillovers would be smaller and longer-term benefits of fiscal consolidation would mostly accrue to the United States*** (Table 3, Figure 1). To model limited financial integration, we assume that a 1 percent increase in the ratio of net foreign assets to exports lowers the real interest rate on a country's debt by 10 basis points.[42] This captures the idea that interest rates are not equalized across countries; rather, they include risk premia for more indebted countries. As a result, fiscal consolidation in the United States lowers U.S. real interest rates more than in the rest of the world, and positive long-run effects are correspondingly larger than in other countries. The improvement in the U.S. current account is now smaller—only around 0.15 percent of GDP over the first five years—whereas the rise in U.S. investment is more than ½ percent of GDP larger. In the short run, the larger boost to U.S. investment also acts to reduce and shorten the contraction in U.S. real output.

C. Using Alternative Fiscal Instruments

12.   ***Replacing the baseline permanent labor income tax increase with a corporate tax increase of equal magnitude has qualitatively similar effects on the current account, but***

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[41] They report estimates of the change in the trade balance rather than current account, which will be slightly smaller because interest savings are excluded. More importantly, their simulations do not consider an experiment where government debt is reduced permanently.

[42] This is somewhat below the estimate reported in Lane and Milesi-Ferretti (2001), which is based on pooling data from industrial countries. Using their coefficient produced implausible results.
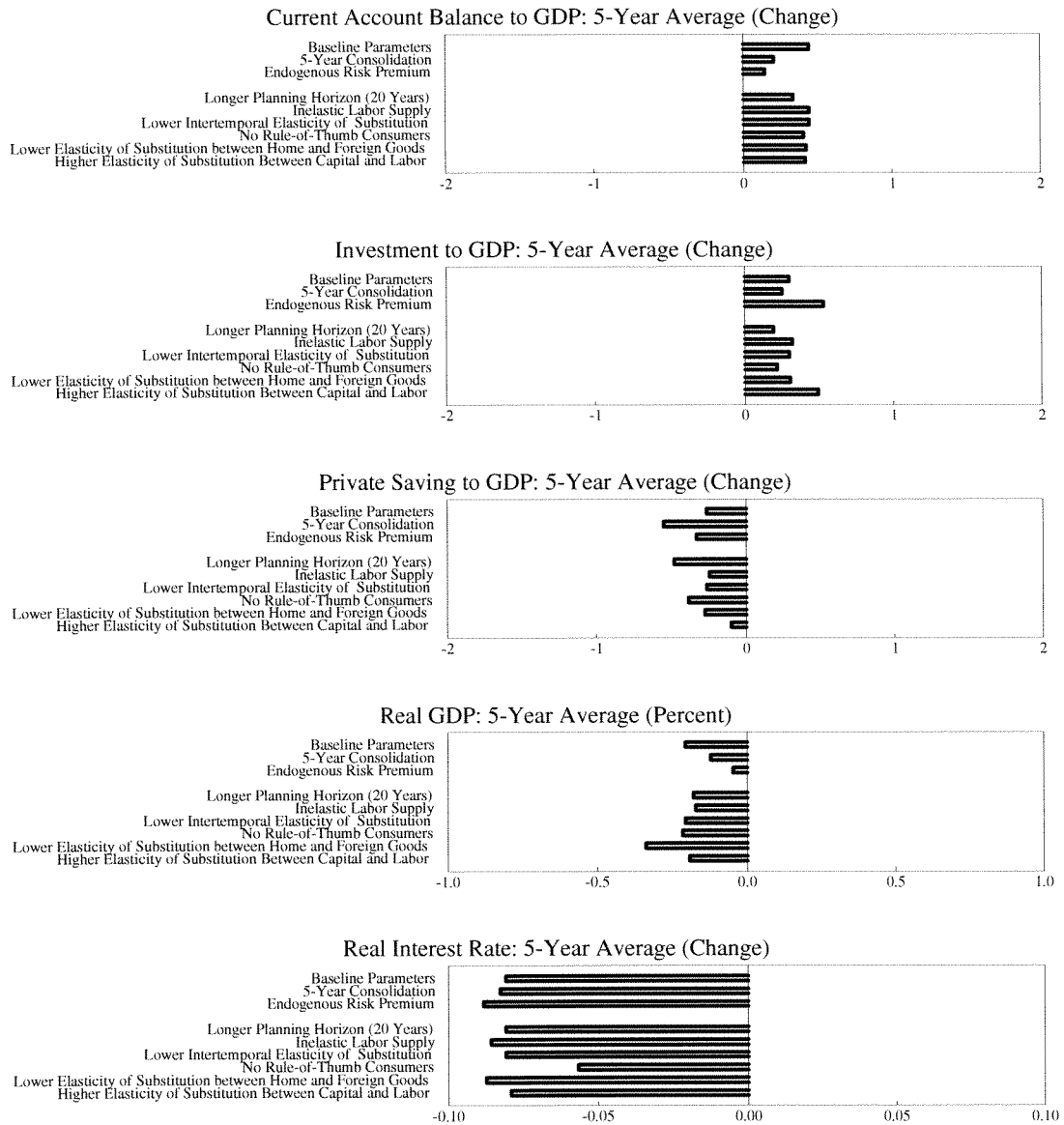
Table 2. United States: Five-Year Increase in the Government Balance
Through an Increase in Labor Taxes

(deviations from control)

	Five-Year Average	Ten-Year Average	Steady State
United States			
Current account balance/GDP (Percentage points)	0.20	0.18	0.09
General government balance/GDP (Percentage points)	1.00	0.56	0.13
Private savings/GDP (Percentage points)	-0.55	-0.19	0.08
Investment/GDP (Percentage points)	0.25	0.19	0.12
Trade balance/GDP (Percentage points)	0.18	0.14	-0.11
Real GDP (Percent)	-0.12	0.03	0.55
Consumption (Percent)	-0.71	-0.43	0.51
Investment (Percent)	1.55	1.30	1.31
Real interest rate (Percentage points)	-0.08	-0.08	-0.11
Government debt/GDP (Percentage points)	-2.75	-3.72	-5.12
Net foreign assets/GDP (Percentage points)	0.58	0.98	3.66
Labor effort	-0.10	-0.02	0.04
Real effective exchange rate (Percent)	0.62	0.46	-0.30
Exchange rate with Japan/Euro Area (Percent)	0.73	0.55	-0.34
Exchange rate with Emerging Asia (Percent)	0.58	0.43	-0.33
Exchange rate with Rest of the World (Percent)	0.60	0.44	-0.28
Japan/Euro Area			
Current account balance/GDP (Percentage points)	-0.07	-0.07	-0.03
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	-0.01	0.00	0.10
Investment/GDP (Percentage points)	0.06	0.07	0.13
Trade balance/GDP (Percentage points)	-0.06	-0.05	0.04
Real GDP (Percent)	0.06	0.09	0.55
Consumption (Percent)	0.04	0.04	0.26
Investment (Percent)	0.44	0.55	1.36
Real interest rate (Percentage points)	-0.01	-0.02	-0.11
Government debt/GDP (Percentage points)	0.10	0.11	0.00
Net foreign assets/GDP (Percentage points)	-0.19	-0.34	-1.44
Labor effort	0.00	0.01	0.08
Real effective exchange rate (Percent)	-0.24	-0.19	0.10
Exchange rate with United States (Percent)	-0.72	-0.55	0.34
Exchange rate with Emerging Asia (Percent)	-0.15	-0.12	0.00
Exchange rate with Rest of the World (Percent)	-0.13	-0.11	0.06

Table 2. United States: Five-Year Increase in the Government Balance
Through an Increase in Labor Taxes
(Continued)

(deviations from control)

	Five-Year Average	Ten-Year Average	Steady State
Emerging Asia			
Current account balance/GDP (Percentage points)	-0.10	-0.09	-0.04
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	0.02	0.04	0.13
Investment/GDP (Percentage points)	0.13	0.13	0.17
Trade balance/GDP (Percentage points)	-0.09	-0.07	0.05
Real GDP (Percent)	0.05	0.09	0.71
Consumption (Percent)	-0.02	-0.02	0.36
Investment (Percent)	0.62	0.69	1.45
Real interest rate (Percentage points)	-0.01	-0.02	-0.11
Government debt/GDP (Percentage points)	0.03	0.03	0.00
Net foreign assets/GDP (Percentage points)	-0.30	-0.49	-1.70
Labor effort	0.01	0.01	0.05
Real effective exchange rate (Percent)	-0.07	-0.04	0.10
Exchange rate with United States (Percent)	-0.58	-0.42	0.33
Exchange rate with Japan/Euro Area (Percent)	0.15	0.12	0.00
Exchange rate with Rest of the World (Percent)	0.01	0.01	0.06
Rest of the World			
Current account balance/GDP (Percentage points)	-0.10	-0.09	-0.03
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	-0.02	0.00	0.10
Investment/GDP (Percentage points)	0.09	0.09	0.13
Trade balance/GDP (Percentage points)	-0.09	-0.07	0.05
Real GDP (Percent)	0.06	0.09	0.56
Consumption (Percent)	0.04	0.04	0.28
Investment (Percent)	0.58	0.65	1.32
Real interest rate (Percentage points)	-0.01	-0.02	-0.11
Government debt/GDP (Percentage points)	0.06	0.06	0.00
Net foreign assets/GDP (Percentage points)	-0.30	-0.49	-1.68
Labor effort	0.00	0.01	0.04
Real effective exchange rate (Percent)	-0.13	-0.09	0.06
Exchange rate with United States (Percent)	-0.59	-0.44	0.28
Exchange rate with Japan/Euro Area (Percent)	0.13	0.11	-0.06
Exchange rate with Emerging Asia (Percent)	-0.01	-0.01	-0.06

Source: Fund staff calculations.

Table 3. United States: Permanent Increase in the Government Balance
Through an Increase in Labor Taxes, with Imperfect Capital Mobility

(deviations from control)

	Five-Year Average	Ten-Year Average	Steady State
United States			
Current account balance/GDP (Percentage points)	0.14	0.15	0.19
General government balance/GDP (Percentage points)	1.00	1.00	1.00
Private savings/GDP (Percentage points)	-0.33	-0.19	2.23
Investment/GDP (Percentage points)	0.53	0.66	3.03
Trade balance/GDP (Percentage points)	0.13	0.12	-0.22
Real GDP (Percent)	-0.05	0.20	9.65
Consumption (Percent)	-0.98	-0.92	5.13
Investment (Percent)	3.53	4.68	30.71
Real interest rate (Percentage points)	-0.09	-0.18	-2.12
Government debt/GDP (Percentage points)	-2.35	-4.44	-41.00
Net foreign assets/GDP (Percentage points)	0.40	0.74	7.87
Labor effort	-0.06	-0.01	0.66
Real effective exchange rate (Percent)	0.45	0.42	1.54
Exchange rate with Japan/Euro Area (Percent)	0.52	0.49	1.78
Exchange rate with Emerging Asia (Percent)	0.42	0.40	1.38
Exchange rate with Rest of the World (Percent)	0.43	0.40	1.50
Japan/Euro Area			
Current account balance/GDP (Percentage points)	-0.05	-0.05	-0.05
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	-0.01	-0.01	0.18
Investment/GDP (Percentage points)	0.03	0.04	0.24
Trade balance/GDP (Percentage points)	-0.04	-0.04	0.08
Real GDP (Percent)	0.04	0.07	1.35
Consumption (Percent)	0.03	0.04	0.72
Investment (Percent)	0.26	0.35	2.88
Real interest rate (Percentage points)	0.00	-0.01	-0.20
Government debt/GDP (Percentage points)	0.08	0.08	0.00
Net foreign assets/GDP (Percentage points)	-0.13	-0.24	-2.72
Labor effort	0.00	0.00	0.14
Real effective exchange rate (Percent)	-0.17	-0.16	-0.57
Exchange rate with United States (Percent)	-0.51	-0.49	-1.75
Exchange rate with Emerging Asia (Percent)	-0.09	-0.09	-0.40
Exchange rate with Rest of the World (Percent)	-0.09	-0.09	-0.28

Table 3. United States: Permanent Increase in the Government Balance
Through an Increase in Labor Taxes, with Imperfect Capital Mobility
(Continued)

(deviations from control)

	Five-Year Average	Ten-Year Average	Steady State
Emerging Asia			
Current account balance/GDP (Percentage points)	-0.08	-0.09	-0.12
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	0.02	0.04	0.38
Investment/GDP (Percentage points)	0.10	0.13	0.50
Trade balance/GDP (Percentage points)	-0.07	-0.07	0.13
Real GDP (Percent)	0.04	0.09	2.46
Consumption (Percent)	-0.02	-0.02	1.42
Investment (Percent)	0.51	0.67	4.59
Real interest rate (Percentage points)	0.00	-0.02	-0.30
Government debt/GDP (Percentage points)	0.04	0.04	0.00
Net foreign assets/GDP (Percentage points)	-0.23	-0.43	-4.89
Labor effort	0.01	0.01	0.14
Real effective exchange rate (Percent)	-0.06	-0.05	-0.11
Exchange rate with United States (Percent)	-0.42	-0.40	-1.36
Exchange rate with Japan/Euro Area (Percent)	0.09	0.09	0.40
Exchange rate with Rest of the World (Percent)	0.00	0.00	0.11
Rest of the World			
Current account balance/GDP (Percentage points)	-0.07	-0.07	-0.08
General government balance/GDP (Percentage points)	0.00	0.00	0.00
Private savings/GDP (Percentage points)	-0.02	-0.01	0.24
Investment/GDP (Percentage points)	0.05	0.06	0.32
Trade balance/GDP (Percentage points)	-0.07	-0.06	0.11
Real GDP (Percent)	0.04	0.07	1.94
Consumption (Percent)	0.05	0.05	1.16
Investment (Percent)	0.33	0.45	3.81
Real interest rate (Percentage points)	0.00	-0.01	-0.27
Government debt/GDP (Percentage points)	0.05	0.06	0.00
Net foreign assets/GDP (Percentage points)	-0.20	-0.38	-4.18
Labor effort	0.00	0.00	0.10
Real effective exchange rate (Percent)	-0.10	-0.09	-0.37
Exchange rate with United States (Percent)	-0.42	-0.40	-1.47
Exchange rate with Japan/Euro Area (Percent)	0.09	0.09	0.28
Exchange rate with Emerging Asia (Percent)	0.00	0.00	-0.11

Source: Fund staff calculations.

domestic gains are larger (Figure 2). The long-run boost to U.S. real GDP is almost 7 percent, with important differences in the composition of GDP. A higher corporate tax rate reduces the post-tax return to capital, leading to a short-run contraction in investment. However, this contributes to a larger drop in the real interest rate and stronger long-run stimulative effects from consolidation. As the drop in net foreign assets is also smaller, the current account improves more—by almost 1 percent of GDP—over the long run. Given the stronger effect on real interest rates, positive spillover effects to the rest of the world are also somewhat larger. Long-run GDP increases are at least 6 percent in all regions of the world.

13.   *Fiscal consolidation by means of lower government absorption is marginally more beneficial to the current account than a labor tax increase with equal effect* (Figure 3).[43] In this case, the demand contraction is due directly to the spending cut and consumption initially reacts much less to the policy change. The larger increase in national saving (0.9 percent of GDP) is reflected in higher investment and a lower real interest rate. Although this increases GDP over the long run, the reduction in government demand dominates in the short run and the output contraction is somewhat larger. Lower real interest rates imply stronger spillover effects to the rest of the world. Increased savings flow to domestic and foreign investment roughly in proportion to the relative size of the domestic economy compared to the rest of the world.

14.   *Finally, a decrease in fiscal lump-sum transfers to households works through very similar channels, and has similar effects to the increase in labor income taxes* (simulation not reported for the sake of brevity). As in the labor tax scenario, it principally affects private consumption through a wealth effect, but in this case the policy does not distort the labor supply or capital accumulation decision and is therefore marginally less contractionary in the short run.

D. Sensitivity of the Results to Key Parameters

15.   *The robustness of the results was examined by changing a number of key parameters* (Figures 1 through 3). As these parameters mostly influence the impact of domestic distortions, changing their values can generate significant shifts in the impact of tax or expenditure changes on domestic saving and investment. However, these parameter changes have little impact on the global interest rate. Therefore, they only trigger small changes in the current account response:

- *With lower household impatience, the real effects of fiscal consolidation are only a little smaller*. Extremely and unrealistically long planning horizons would be required to approach the pure Ricardian case. Alternative simulations included households' planning horizon extended to 20 years instead of 10 years, with tax policy therefore having smaller effects on perceived wealth. Demand effects are less strong as a

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[43] An important proviso is that we assume that government absorption does not have any benefits to either households or firms. In other words, government absorption is not assumed to directly affect the welfare of consumers or the productive capacity of the private sector.

Figure 2. Permanent Change in Government Balance of 1 Percentage Point of GDP
Fiscal Instrument: Corporate Income Tax
(Deviation from Control)

Current Account Balance to GDP: 5-Year Average (Change)

Investment to GDP: 5-Year Average (Change)

Private Saving to GDP: 5-Year Average (Change)

Real GDP: 5-Year Average (Percent)

Real Interest Rate: 5-Year Average (Change)
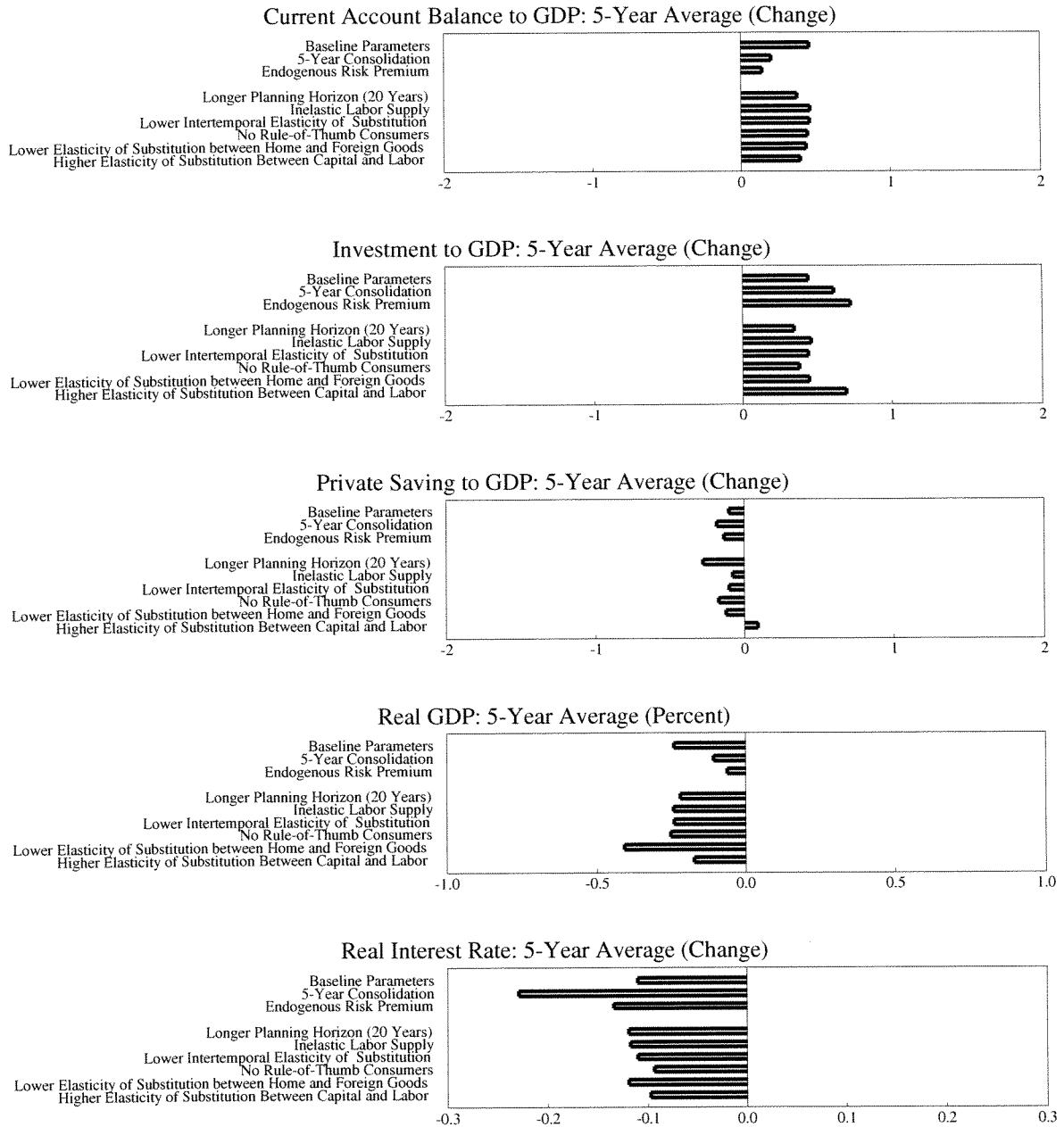
Figure 3. Permanent Change in Government Balance of 1 Percentage Point of GDP
Fiscal Instrument: Government Consumption
(Deviation from Control)

Current Account Balance to GDP: 5-Year Average (Change)

Investment to GDP: 5-Year Average (Change)

Private Saving to GDP: 5-Year Average (Change)

Real GDP: 5-Year Average (Percent)

Real Interest Rate: 5-Year Average (Change)
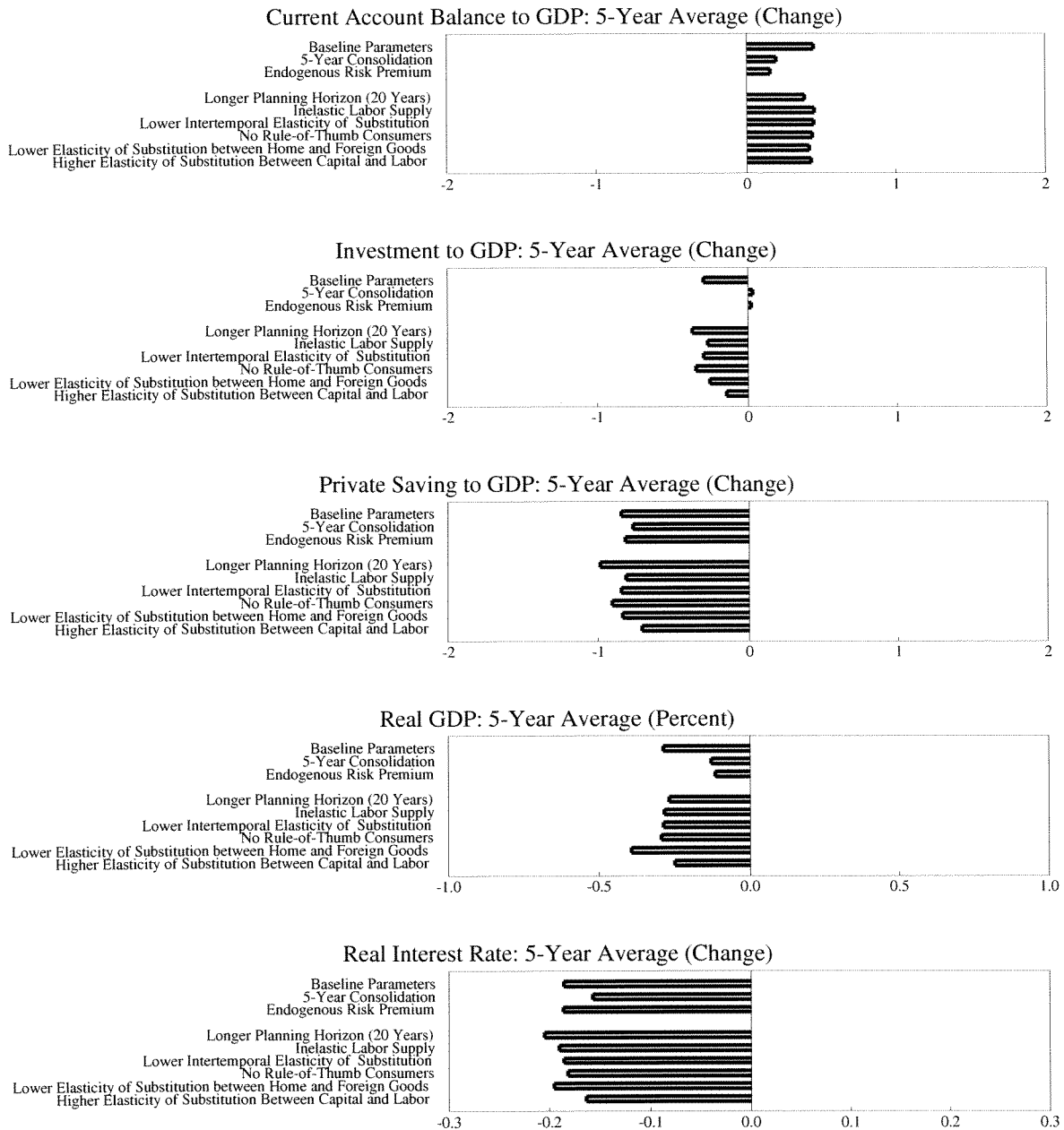
result, and supply and the capital intensity of production respond somewhat less, which in turn reduces the effects of fiscal consolidation on real interest rates.

- ***A less elastic labor supply marginally worsens the short-run output contraction from fiscal consolidation, but leads to a stronger long-run increase in real GDP***. This implies that supply is relatively inelastic in the short run, but responds to most of the demand effects of fiscal consolidation through an increase in investment rather than labor in the long run. The result is a sharper fall in the real interest rate and a somewhat stronger stimulus to U.S. GDP in the long run.

- ***A lower intertemporal rate of substitution for consumption is associated with almost unchanged short-term pain, but much more beneficial long-run effects***. The effects of fiscal consolidation on consumption and real interest rates are somewhat more pronounced over time. Lower debt service payments allow the government to reduce taxes further in the long run, real interest rates remain lower, and the economy is more stimulated as a result.

- ***A lower elasticity of substitution between home and foreign goods somewhat worsens the short-run effects of fiscal consolidation on GDP, with a small improvement in the long run***. External adjustment now requires a larger real exchange rate depreciation. As a result, the short-run improvement in net exports is smaller, giving a smaller boost to GDP.

- ***By contrast, a higher elasticity of substitution between capital and labor has a more positive effect on GDP***. The drop in real interest rates brought on by the fiscal consolidation now leads to a stronger investment response.

E. Conclusion

28.   ***A permanent reduction in U.S. government deficits in a world of integrated capital markets would produce a significant reduction in current account imbalances and positive spillover effects to the rest of the world by increasing world saving and reducing real interest rates***. However, significantly smaller effects occur when the reduction in the fiscal deficit is short-lived or when international capital markets are imperfectly integrated. This illustrates the importance of policies that are designed to achieve a credible and permanent reduction in government debt, and the importance of assumptions about the degree to which U.S. real interest rates are linked with those in other countries. If U.S. real interest rates fall by more than those in the rest of the world, the benefits of fiscal consolidation show up predominantly as a rise in U.S. investment and less in the current account balance.

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A Brief Summary of GFM

1.   *A reduction in government debt in a large country such as the United States raises the world supply of savings, reduces the world real interest rate, and raises the world capital stock*. The magnitude of the effects on foreign investment and the current account mainly depends on the degree to which government debt is considered private wealth by consumers and on the degree of integration of global capital markets.[44]

- *In the Ricardian extreme, consumers fully take into account future tax liabilities imposed on future generations*. The only mechanism for a government debt reduction to crowd in economic activity is through reducing supply-side distortions.

- *At the other extreme, consumers may respond fully to changes in their after tax income*. For example, "rule of thumb" consumers do not use capital markets to smooth consumption.

- *GFM assumes an intermediate case, in which some fraction of government debt is considered wealth*. Fiscal policy affects spending through three channels:

  a.   Forward-looking consumers are assumed to be impatient and discount the future at a higher rate than implied by the government budget constraint. They therefore undervalue future tax liabilities.

  b.   A certain proportion of wages accrues to "rule-of-thumb" individuals who vary their consumption one-for-one with their post-tax income.

  c.   Tax rates create distortions in relative prices and, hence, in the allocation of resources.

2.   *GFM is a theory-based model in which consumers maximize utility and producers maximize profits*. Consumption and production are characterized by constant elasticity of substitution utility and production functions. There are two factors of production, labor and capital, which can be moved across sectors to produce traded or nontraded goods. Investment is driven by a Tobin's q-relationship, with firms responding sluggishly to differences between the discounted value of the marginal product of capital and the replacement value of the capital stock. In the standard version of the model, we assume perfect international capital mobility, but we also allow for the possibility (in an alternative specification) that real interest rates are not equalized across countries even in the long run. Wages and prices are assumed to be perfectly flexible, which reduces the short-term aggregate demand impact of fiscal policies. Accordingly, the discussion will focus on medium- and long-term results. This paper uses a four-region version of the model, the regions being the U.S., the Euro area plus Japan, Emerging Asia, and the rest of the world.

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[44] It has been suggested that increases in government debt result in changes in risk premia and permanent real interest rate differentials (Lane and Milesi-Ferretti, 2001).

3.   *A key assumption of GFM is that fiscal policy ensures the sustainability of changes in the government debt-to-GDP ratio*. The debt ratio is stabilized by adjusting tax rates to generate sufficient revenue. This rules out partial default on government debt, and it also rules out fiscal dominance over monetary policy, implying that inflation will not be used as a tool of discretionary fiscal revenue generation.

4.   *The model was calibrated to reflect the macroeconomic features of the four regions*. Given the size of the U.S. economy, its policies have a significant impact on world real interest rates. The initial shares in GDP of consumption, investment, government spending, exports, and imports correspond to recent historical averages in each of the four regions. Exports and imports are, in addition, consistent with a trade matrix between the four regions based on recent historical data. In the current version of the model, the available fiscal instruments comprise labor income taxes (our baseline experiments are based on this), capital income taxes, lump-sum transfers, and government spending.[45]

5.   *For a large country such as the United States, the key transmission channel of a fiscal consolidation is the induced change in the world real interest rate*.[46] A fiscal consolidation increases national saving, as there is an incomplete private-sector offset to an improvement in the fiscal deficit. To help re-equilibrate savings and investment, the domestic interest rate falls. With perfect international financial integration, the reduction in U.S. and foreign real interest rates is the same in the long run and investment opportunities expand by similar percentages. Ignoring supply-side effects, the portion of domestic excess saving that goes to domestic investment depends on the size of the domestic economy in the world— about one third in the case of the United States. The remainder finances foreign investment and is reflected in a significant improvement in the current account. If capital markets are less than fully integrated, the fall in domestic real interest rates is larger than those elsewhere and the benefit to foreign investment and the current account is smaller.

6.   *A number of key behavioral parameters are set equal across the four economies*. These include the key coefficients for household utility and firm production functions (except for small data-derived variations in the labor and import shares of production). Wealth effects of tax policies are ensured by assuming an average 10-year planning horizon for households in each region, as well as a 25 percent share of rule-of-thumb consumers (50 percent for Emerging Asia) who consume their after-tax income each period.

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[45] Rather than try to model the complexities of actual tax systems, it is assumed that taxes are levied on the relevant base as a single marginal rate, so there is no difference between average and marginal tax rates.

[46] Thus far, real interest rates have not been significantly higher in the United States than elsewhere in response to large current account deficits, but we anticipate that this would likely happen if we were to see concerns about a large and abrupt depreciation of the U.S. dollar that might be caused by a loss in appetite for U.S. assets (Faruqee and others, 2005).

PART III: POLICY ISSUES

VI.   SHOULD THE FED ADOPT AN EXPLICIT INFLATION OBJECTIVE?[47]

A.   Introduction and Summary

1.   ***This paper considers whether the Federal Reserve should adopt an explicit inflation objective and, if so, what this might involve***. The Fed has established a highly successful record in maintaining price stability and has steadily enhanced the transparency of monetary policy in recent years. At the same time, it is one of the few remaining central banks among industrial countries that do not have a quantitative price objective.

2.   ***The potential benefits of a numerical price-stability objective are a recurrent issue of debate by the Fed and private researchers***. The Federal Open Market Committee (FOMC) has discussed the application of inflation targets in the United States—most recently in February 2005—and Fed Governors have also raised the subject in their speeches. Most academic research has come out in favor of an explicit inflation objective.[48]

3.   ***This paper takes the view that the adoption of an explicit inflation objective could enhance the effectiveness of monetary policy***. An explicit inflation objective would help anchor long-term inflation expectations by reducing uncertainty regarding the Fed's longer-term policy objective while further enhancing the transparency of its near-term policy stance. At the same time, the international experience does not suggest that this would significantly impair the Fed's flexibility with respect to its other policy objectives.

B.   The Fed's Monetary Policy Framework

Legal mandate and accountability

4.   ***According to the 1977 Federal Reserve Act, the objectives of the Fed are to promote maximum employment, stable prices, and moderate long-term interest rates***. The last objective is widely interpreted as intended to support the first two goals, giving the Federal Reserve a "dual mandate" of maximum employment and stable prices (Ferguson, 2005). However, over the past decade Fed officials have often explained that reaching the employment objective is only possible if price stability is maintained, in effect elevating price stability as the principal policy priority. In addition, the Fed, like other central banks, sometimes takes financial stability considerations into account when circumstances warrant.

5.   ***Accountability for the Fed is informal in the context of a high degree of independence***. The Chairman is mandated to testify on Capitol Hill twice a year. However, the Fed enjoys substantial latitude both in how it interprets its mandate, and in its

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[47] Prepared by Turgut Kisinbay, Scott Roger, and Mark Stone (all MFD).

[48] See Bernanke and others (1999), Cecchetti and O'Sullivan (forthc.), Goodfriend (2003), Mishkin (1999), Stone (2003), Truman (2003), and Friedman (2004). Fed speeches include Bernanke (2003a), Ferguson (2003), Gramlich (2005), Greenspan (2004), Kohn (2003a,b), Meyer (2001), Santomero (2004), and Yellen (2005).

accountability to the public, partly because the latter is more difficult to formalize in the United States than in many other countries. An important difference between the Fed and central banks operating in parliamentary systems is that the checks and balances of the U.S. system mean that the Fed does not deal with a party in control that speaks with one voice (Kohn, 2003a).

Communication

6.   ***Press statements and FOMC minutes are the Fed's main short-term communication channels***. A statement is issued immediately following each of the eight FOMC meetings per year. Recently, the statement has included a short explanation of any decisions that were taken, a view on inflation, a succinct assessment of the balance of risks, and a view regarding the likely direction of future FOMC actions. In addition, a fairly detailed minute of each meeting (around 3,500 words) is released with a three-week lag, which also attracts considerable market attention.

7.   ***The twice-yearly Monetary Policy Report (MPR) to Congress reviews economic and monetary policy developments***. The MPR includes a detailed discussion of the rationale for and reaction to the policy decisions made at the most recent FOMC meetings. It also includes the range and "central tendency" of FOMC members' two-year forecasts of nominal and real GDP, the personal consumption expenditure deflator excluding food and energy (core PCE), and the unemployment rate.

8.   ***Communication is further enhanced through speeches and testimonies by FOMC members***. These speeches—that occur frequently compared with most other central banks— convey a diversity of views on both monetary policy and other issues, such as demographic challenges, fiscal developments, or financial market issues.[49] They provide a flavor of the Fed's internal discussions on a broad range of topics, and serve as a useful basis for the analysis of monetary policy decisions.

9.   ***The Fed has increased policy transparency in recent years*** (Table 1). Explanations of policy views and intentions have become more regular and frequent, more information is conveyed on the views of FOMC members, and publication lags for FOMC minutes have been shortened.

Comparisons with other industrial countries

10.   ***All but one industrial country central banks have either an explicit or implicit price stability anchor***. Counting the ECB as the central bank for the euro area, the monetary regimes of the 12 industrial country central banks are as follows:

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[49] During the first five months of 2005, FOMC members gave about 70 speeches according to websites of the Federal Reserve System.

Table 1: Recent Changes in FOMC Transparency	
Date	Action
1992 to 2000	Gradually shifted policy actions to regularly scheduled meeting dates.
1993-March	Began releasing minutes of FOMC meetings (with lag).
1993-November	Began releasing transcripts of FOMC meetings (with 5 year lag).
1994-March	Began explicitly announcing changes in federal funds rate target and rationale for policy action.
1994-August	Began describing state of economy and more detailed rationale for policy action after FOMC decisions--August 1994
1994 to 2003	Gradually shifted to longer, more descriptive press releases after FOMC decisions.
2002-March	Began releasing votes of individual Committee members and preferred policy choices of any dissenters.
2005-January	Shortened lag of release of minutes of regularly scheduled meetings to three weeks after the date of the policy decision.

Sources: Swanson (2004); and Board of Governers of Federal Reserve website.

- Central banks in Australia, Canada, Iceland, New Zealand, Norway, Sweden, and the United Kingdom practice full-fledged inflation targeting (FFIT), defined as an institutionalized commitment to a quantitative inflation target, accompanied by a high degree of transparency and often formal accountability (Bernanke and others, 1999; Truman, 2003).[50]

- Price stability frameworks in the Euro area, Japan, Switzerland, and the United States are less explicitly defined than in FFIT countries (Carare and Stone, forthcoming). The ECB and the Swiss National Bank operate under explicit inflation objectives, but do not have the formal commitment modalities of FFIT countries. Japan, a special case, currently has an anti-deflation objective. All of these countries have what can be termed an "implicit" price stability anchor.[51]

- Finally, Denmark has an exchange rate peg.

11.   ***In many respects, the Fed is highly transparent*** (Table 2). However, as the United States is one of the few industrial countries that does not quantify its inflation objective, the

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[50] FFIT countries all publish detailed inflation reports. Most of them are formally accountable through requirements to publicly explain breaches of the inflation target, formal relations of the decision-making body with the government, and in some cases the possibility of a government override (Roger and Stone, 2005).

[51] Implicit price stability anchor countries tend to be larger and have more developed financial systems compared to FFIT countries, and they have a history of lower and more stable inflation (Stone, 2003). The Fund's detailed Monetary and Financial Policy Transparency Code assessments give implicit price stability anchors relatively high scores for transparency, but less than for FFIT countries (Roger and Stone, 2005).

Table 2. Transparency Practices of Industrial Country Central Banks				
Country	Decision making body	Frequency of Meetings	Votes Disclosed?	Lag of disclosure of minutes
Australia	Reserve Bank Board	11 times a year	no	Not disclosed
Canada	Governing Council	8 times a year	no	Not disclosed
European Central Bank	Governing Council	Monthly	no	Not disclosed
Iceland	Board of Governors	Once a month on average	no	Not disclosed
Japan	Policy Board	Monthly	yes	1 or 2 months
New Zealand	Reserve Bank Governor	8 times a year	n.a.	Not disclosed
Norway	Executive Board	every six week	no	Not disclosed
Sweden	Executive Board	8 times a year	yes	2 weeks
Switzerland	Governing Board	Quarterly	no	Not disclosed
United Kingdom	MPC	Monthly	yes	2 weeks
United States	FOMC	8 times a year	yes	3 weeks

forward-looking policy discussion is less detailed than in other countries, almost all of which publish an inflation report (Wyplosz and others, 2003). The Fed also has fewer formal institutional elements in support of monetary policy accountability compared with other industrial countries (Table 3).

C. Adopting an Explicit Inflation Objective: The Pros and Cons

12. ***Given the Fed's successful track record, there are relatively few imperatives for changing its monetary policy framework***. For example, Greenspan (2004) has argued that a rules-based policy such as a strict inflation target would be an imperfect substitute for the risk-management paradigm the Fed has followed in recent years. In his view, some FFIT regimes have not yet had to balance risks to inflation and growth of a sufficient magnitude in order to constitute a real "test." Kohn (2003a) believes that even flexible inflation targeting is "ill-adapted" to the Fed's risk management paradigm. While he acknowledges that a flexible inflation targeting framework leaves room for deviations from the inflation target, he is skeptical that deviations can occur in practice.

13. ***However, others have argued that an explicit inflation objective should be seen as a refinement of the existing framework, aimed at enhancing transparency***. Academic research suggests that improvements in transparency on the part of the Fed has made monetary policy more predictable (Swanson, 2004; Lange and others, forthcoming), improving economic decision-making and thus benefiting the real economy. Building on these results, a number of commentators argue that clarifying the Fed's inflation objectives would further enhance transparency.

Anchoring inflation expectations

14. ***Despite the Fed's clear commitment to price stability, Fed officials have offered different interpretations of what this means***. Chairman Greenspan has said that "price stability is best thought of as an environment in which inflation is so low and stable over time

Table 3. Industrial Countries, Accountability Aspects of Monetary Framework

Country	Target Set	Relation of Decision Making Body with Government	Government Override Provision	Conflict Made Public	Accountability for Ttarget Breach
United States	None	The FRB is not subject to formal oversight but the Chairman is subject to public questioning by members of Congress during his semi-annual appearance.	None	No	N/A
Australia	Jointly through an agreement between Treasurer and Governor - designate	Required to inform government from time to time on monetary and banking policies which is done through monthly meetings between Gov/Dy Gov and Treasurer, plus annual report to Treasury and Parliament. Govt reserves right to comment on monetary policy but will not make announcement of policy adjustment or stances	Yes. After board presents a statement expressing difference of opinion and government accepts responsibility.	Yes	None
Canada	Jointly through an agreement for five years	Minister and Governor will consult regularly on monetary policy and on its relation to general economic policy.	Yes, government directive	Yes (Canada Gazette)	Explanation in monetary policy report on reasons for breach, measures and timeframe to meet target.
Iceland	Joint central bank sets target but with the consent of the Prime Minister provisioned for in the central bank act. Target breaches to be explained to the government publicly.	Internal rules on preparation of, arguments for and presentation of monetary policy decisions by Board of Governors is approved by the Supervisory board (7 member board of political appointees with proportional representation). Supervisory board also looks at bank organization, operating budget, internal audit; accountable to PM (not minister), governors can attend supervisory board meetings but must leave if the board so decides.	No	No	Public report to government explaining the target breach and measures to meet target.
New Zealand	Jointly, through a Policy Targets Agreement which is set for governor's term for 5 years which can be revised by mutual consent	Shall consult and give advice to the government; submit policy statements to the minister and Parliament periodically (not exceeding six months). Governor's performance is reviewed by the Board of Directors. Minister has power to fix exchange rates and if this is inconsistent with the policy targets, governor may advise in writing for new policy targets. If the direction on foreign exchange is inconsistent with the monetary policy objective, the governor can advise, in writing, that direction will not be effected.	Yes; the Governor-General, on the advice of the Minister, can direct the Bank to formulate and implement monetary policy for any economic objective, other than price stability.	Yes (in gazette and House of Representatives)	Explanation through a policy statement reasons for deviation from medium term target, and measures to remain consistent with target.

Table 3. Industrial Countries, Accountability Aspects of Monetary Framework (concluded)

Country	Target Set	Relation of Decision Making Body with Government	Government Override Provision	Conflict Made Public	Accountability for Ttarget Breach
Norway	Government (stipulated in the regulation and submitted to Storting)	Bank is owned by the state; before the Bank makes a decision of special importance, the matter is submitted to the ministry. Governor and Deputy Governor obliged to attend Supervisory Council meetings. Budget approved by Supervisory Council (15 member committee elected by Storting) and forwarded to the ministry; Supervisory Council issues a statement on the minutes of the Exec. Board meeting, which is forwarded to the ministry, King and Storting.	Yes. The Council of State may adopt resolutions regarding the operations of the Bank in the form of general rules or instructions. The Bank shall be given the opportunity to state its opinion before such resolutions are passed.	No. But Storting is notified of the decision.	None
Sweden	Riksbank but must inform the government (minister) in advance	May not seek or take instructions for fulfilling monetary policy duties but shall inform government well in advance; (Chair and Vice-chair of Governing Council may participate in Executive board meeting but not vote; can propose to government for statutory amendment of government decision.	No	No	None

Source: Tuladhar, 2003.

that it does not materially enter into the decisions of households and firms" (Greenspan, 2001). Other FOMC members have provided their own definitions of price stability: for example, Lacker (2005) argues in favor of a 2 percent CPI target with a 2 percent band; Santomero (2004) proposes a 1 to 3 percent inflation rate target for the 12-month moving average of the core PCE; and Bernanke (2003b) does not explicitly specify a target, but he argues that research suggests it is likely to be around 2 percent.

15.   *A clearer price objective may be especially important at low levels of inflation*. Bernanke (2003b) argues that in a high-inflation environment, the Fed would clearly prefer to reduce inflation, and expectations would be for monetary policy to tighten. However, in a low-inflation environment the public could not be sure that the Fed would not change its view of the level of long-term price stability consistent with full employment. Defining price stability could therefore reduce economic and financial uncertainty, potentially shifting long-term interest rates to a lower level. Indeed, with the advent of deflation fears during 2003, it was argued by a number of analysts that an explicit inflation objective could have helped the Fed reassure the public and financial markets that it stood ready to take measures to maintain a positive rate of inflation.

16.   *An explicit inflation objective would reduce these uncertainties*. The stabilizing impact of a long-term definition of price stability could also be enhanced by prospective uncertainties regarding the monetary policy setting. For example, Goodfriend (2003) and Stone (2003) take the view that an inflation target could help resolve uncertainty regarding the prospective change in chairmanship at the Fed.

17.   *An explicit inflation objective may also reduce the volatility of inflation expectations in the United States—which appears higher than in FFIT countries*. As discussed in Box 3 of the accompanying *Staff Report*, the volatility of inflation forecasts in the United States—measured by the standard deviation of CPI inflation forecasts surveyed by Consensus Forecasts—has dropped over the past 15 years. However, the decline has been smaller than in Canada and the United Kingdom, the two G-7 countries that have adopted FFIT. Similarly, volatility measures for benchmark government bond yields and inflation-indexed bond yields are higher for the United States than the two other countries.[52]

Inflation measures

18.   *Concerns have been raised about tying a central bank to a particular definition of the inflation index* (Ferguson, 2004). The most relevant inflation index is typically influenced by technological and other advances, as illustrated by the Fed's shift in focus from a fixed weight CPI to a chain-weighted core PCE deflator. The concern would be that—once the inflation objective was defined explicitly—a change in the index would adversely affect

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[52] The box calculated the 12-month moving average of the monthly standard deviation of daily 10-year government bond yields.

credibility. However, the experience in other countries (e.g., Canada) suggests that redefinitions of indices do not present major problems.

Flexibility

19.	***Some FOMC members argue that an explicit inflation objective could hinder the Fed in pursuing its other policy objectives*** (Ferguson 2003, 2004; Kohn 2003a, 2004). Compared with price stability, the Fed's other objectives—maintaining full employment and moderate long-term interest rates—may be harder to quantify or define. For this reason, it is sometimes argued that an explicit inflation objective would cause the Fed to place an undue emphasis on price stability versus its other objectives.

20.	***However, there is no clear evidence that a formal inflation target has reduced flexibility for other countries***. In particular, FFIT central banks also pay close attention to output and employment stabilization. Indeed, industrial FFIT countries miss their inflation range a surprisingly high 35 percent of the time, and no FFIT country has so far dropped its regime, notwithstanding some episodes of large and prolonged misses (Roger and Stone, 2005). Corbo and others (2001), de Simone (2002), and Hu (2003) found that even FFIT does not seem to entail much cost in terms of output volatility. As Bernanke (2003a) argues, "the general approach of inflation targeting is fully consistent with any set of relative societal weights on inflation and unemployment; the approach can be applied equally well by inflation 'hawks,' 'growth hawks,' and anyone in between." Moreover, a credible explicit inflation objective could actually enhance flexibility with respect to other targets because, for example, the impact on inflation expectations and price stability of policy changes aimed at output stability could be weaker (Yellen, 2005).

Accountability

21.	***A clearer policy objective should enhance accountability, making it more difficult for monetary policy to deviate from a target-consistent path***. Santomero (2004) has argued that an explicit inflation objective would make it easier for the public to monitor the Fed's performance, increasing incentives for monetary policy to adhere to the objective. An explicit objective could also improve accountability by focusing congressional testimony of the Chairman on monetary policy and price stability, and less on tangential issues (Gramlich, 2005). Announcement of an explicit inflation objective could increase "democratic accountability" by requiring the Fed to be clearer and more open about its decision-making process (Blinder and others, 2001).

22.	***By contrast, Ferguson (2003) argues that a flexible inflation target policy could lead to a loss in accountability and ultimately credibility***. The central bank could adopt only the language of a more formal inflation target without any of the constraints and, in doing so, would become less transparent and accountable.

Central bank independence

23.   ***Some FOMC members have warned that adopting an explicit inflation objective could compromise the Fed's independence***. Kohn (2003a) argues that Congress could involve itself in either defining policy objectives or determining accountability arrangements in ways that might undermine Fed independence. Similarly, Gramlich (2005) warns that, while the Fed's dual legal mandate is well entrenched, introducing an explicit price objective could possibly trigger a Congressional debate on the formalization of the employment objective.

Communication policy

24.   ***The Fed's reliance on the precise wording of policy statements to convey its forward-looking views has the potential for confusing financial markets***. For example, the statement of the May 2003 FOMC meeting cautioned that inflation could fall below 1 percent, surprising markets and leading to a sharp fall in long-term interest rates (Lacker, 2005). Bernanke (2003b) argues that announcing a numerical objective "would help to reduce the reliance of the Fed on complex and easily misinterpreted qualitative language in its communications with the public."

25.   ***The experience of FFIT countries indicates that an explicit inflation objective could reduce the potential for miscommunication***. FFIT central banks disclose in detail their policy framework, and publish their forecasts and detailed assessments of the economic outlook and the implications for policy looking ahead. Under this approach, there is less weight on the precise wording of the text of policy statements.

26.   ***However, some argue that an explicit inflation objective could reduce transparency***. Friedman (2004) suggests that an explicit inflation objective would obscure the weights accorded by the Fed to output and financial stability. Similarly, Kohn (2003a) argues that FFIT is less transparent than the current Fed policy, because it emphasizes the observable inflation objective, downplaying other "messy stuff that does not fit into the IT framework well." He suggests that other goals—such as economic and financial stability—are not sufficiently covered in FFIT central bank communications although they are in fact factored into policy decisions. Ferguson (2003) says that a flexible version of inflation targeting may lead to greater uncertainty about policy: should a deviation from the target occur, there could be uncertainty about how quickly the central bank would want to take inflation back to the target path.

D. Implementing an Explicit Inflation Objective

27.   ***The technical details of the target would need to be specified***. The Fed would need to decide on: (i) what long-term average rate of change in prices to aim for; (ii) whether to specify the target in terms of a point, a range, or a point and a range, and (iii) how wide to set the range. International experience suggests that, for practical purposes, inflation targets anywhere in the range of 1-3 percent are uncontroversial. Although international practices

vary on the issue of point versus range targets, no clear-cut advantages have emerged for one or the other (Roger and Stone, 2005).

28.   ***The Fed would also have to choose a price index on which to base its objective***. All FFIT and implicit price stability anchor countries have opted to define the inflation target in terms of the CPI or the CPI excluding particular items such as fresh food and fuel. This reflects the assessment that the CPI is the most widely known measure of inflation and, therefore, plays a central role in forming expectations. At the same time, all inflation targeters routinely discuss a variety of analytical measures of "core" inflation, as well as wages and costs, tradable and non-tradable prices, etc., in their inflation reports.

29.   ***The central bank may well choose to focus on a different inflation measure internally***. Typically, a central bank would closely track a measure of inflation more reliably related to the evolution of the output gap than the CPI, but still linked to the CPI over time. The Fed has already undertaken considerable work on measurement issues in the headline and core CPI and PCE indices and would continue to have considerable scope for taking a range of other price and cost factors into account.

30.   ***Policy formulation and decision-making would also be affected by announcing an explicit inflation objective***. The need to communicate policy with reference to the inflation target tends to establish the achievement of the inflation target as the benchmark for internal forecasting and policy judgments. The inflation target therefore provides a systematic starting point for policy discussions.

31.   ***Policy communication would need to be adjusted slightly to explain monetary policy actions in terms of the inflation objective***. FOMC policy discussions would likely be conducted in an even more forward-looking way, which should be reflected in press statements and transcripts.

32.   ***Inflation reports published by FFIT countries offer some insights into how the Fed's Monetary Policy Report could change*** (Schmidt-Hebbel and Tapia, 2002; Wyplosz and others, 2003; Leeper, 2003).[53] These reports provide detailed backward-looking accounts of recent economic and financial developments and their effects on the behavior of inflation relative to the target. Inflation reports also contain a forward-looking discussion of inflation trends over the policy horizon, as well as a discussion of the attendant risks and uncertainties. All but one industrial country publish an inflation report on a quarterly basis, reflecting the quarterly publication of national accounts data, which serves as the starting point for forecast updates (Laxton and Scott, 2001; Table 4).

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[53] Two of the central banks with implicit price stability objectives publish reports that resemble the inflation reports of FFIT countries. The Swiss National Bank discusses inflation, including a forecast, in its *Quarterly Bulletin* but coverage is less complete than in FFIT countries (Wyplosz and others, 2003). The ECB extensively discusses inflation developments in its Monthly Bulletin.

33.   ***The Fed might also report key assumptions underlying its inflation forecast***. All inflation-targeting central banks publish an inflation forecast, either in a more limited form (using a fan chart), or based on unchanged interest rate assumptions or on market interest rate forecasts (Table 4). Very few central banks (Colombia, Czech Republic, and New Zealand) publish forecasts that include endogenous policy settings. Mishkin (2004) argues that this may be going too far on the grounds that markets might not understand the fact that these forecasts are highly conditional on the assumptions made—and therefore subject to frequent revision. On the other hand, endogenous policy forecasts can be extremely effective in explaining the central bank's perception of trade-offs between rapid action and more gradual responses to various kinds of shocks.

Table 4. Inflation Reports		
Country	Number of Reports Per Year	Fan Chart
Australia	4	No
Brazil	4	Yes
Canada	4	No
Chile	3	Yes
Colombia	4	Yes
Czech Republic	4	No
Hungary	4	Yes
Iceland	4	No
Israel	2	Yes
Korea	2	Yes
Mexico	4	No
New Zealand	4	No
Norway	3	Yes
Peru	3	Yes
Philippines	4	Yes
Poland	4	Yes
South Africa	2	Yes
Sweden	4	Yes
Thailand	4	Yes
United Kingdom	4	Yes

Source: Roger and Stone, 2005.

E.   Conclusion

34.   ***On balance, the case for an explicit inflation objective appears to outweigh the possible drawbacks***. An explicit inflation objective would almost certainly attaining price stability, and less volatile interest rates arising from greater transparency and accountability could foster higher employment. In addition to the axiom "if it ain't broke, why fix it?" counterarguments include the potential loss of policy flexibility and independence, but the strong record of other inflation targeting countries and the degree of credibility that the Fed enjoys suggest that the potential downside may be limited.

35.   ***Adopting an explicit inflation objective would not necessitate significant changes to monetary operations or the monetary framework*** (Bernanke 2003a,b; Gramlich, 2000). Unlike inflation-targeting central banks, the Fed need not be required to meet its objective within a given time horizon. Operating procedures for policy implementation would also remain largely unchanged, and most of the monitoring and analysis of economic and financial developments would not be altered. On the other hand, choices would have to be made regarding the objective itself and what inflation index to employ, and some changes in internal practices might be required.

36.   ***The Fed's communication policy would also need to be adjusted to the new policy environment***. This could affect the frequency of publication of the MPR, and the presentation of the forecast of the FOMC. Moreover, external statements would likely need

to become more forward-looking and focus on the Fed's policy in the context of attaining the price stability objective.

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VII.   DIAGNOSING THE HIGH COST OF U.S. MEDICAL CARE[54]

1.   ***The high cost of medical care in the United States is an important policy challenge***. This has been underscored in recent federal budgets, which have emphasized the need to contain health care costs and improve the accessibility to health insurance. Indeed, total U.S. outlays on health care are currently double the OECD average as a percent of GDP, and do not appear to have yielded a commensurate gain in average health outcomes (Figure 1).

Figure 1. Total health care spending

percent of GDP

OECD average
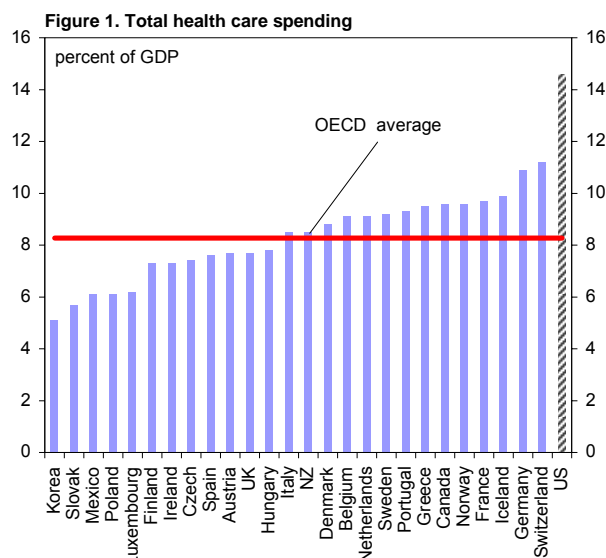
Source: OECD.

2.   ***This paper compares U.S. and other OECD health care spending and outcomes***. The analysis suggests that the U.S. experience reflects several factors. These include the high level of U.S. income per capita; income inequality; as well as the structure of the health care system, which is fragmented and provides uneven access to insurance while giving rapid services for those that can afford them.

A.   Background

3.   ***In the United States, health care services are mainly provided by the private sector***. Although some health care is provided by public agencies—e.g., the Veterans Administration and the military—the vast majority of doctors and hospitals are in the private sector. This contrasts with many other OECD countries in which health care services are delivered by public agencies or by private providers that are publicly contracted.

4.   ***Public health care insurance covers only about 25 percent of the U.S. population***. This mainly reflects the Medicare system, which covers the elderly and disabled. Again, this contrasts with most other OECD countries, in which universal health insurance coverage is the norm, leaving the average ratio of public insurance coverage at 93 percent.

5.   ***U.S. outlays for health care as a ratio of GDP is well above the OECD average***. In 2002, this ratio was 15 percent, double the OECD average. The second highest ratio was 11 percent for Switzerland—the only other OECD country where the private sector plays a dominant role in the health system.

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6.   ***Despite the relatively low level of public health insurance, roughly half of total U.S. health outlays are financed by the public sector***. Public health spending in the United States as a share of GDP is roughly at the OECD average (Figure 2). Two-thirds of these outlays are by the Medicare and Medicaid systems (Medicaid is a joint state-federal program that provides means-tested health and long-term care for the poor). The remaining third of public health outlays include those by programs for government employees and veterans.

Figure 2. Public health care spending in 2002

percent of GDP

OECD average

Source: OECD.
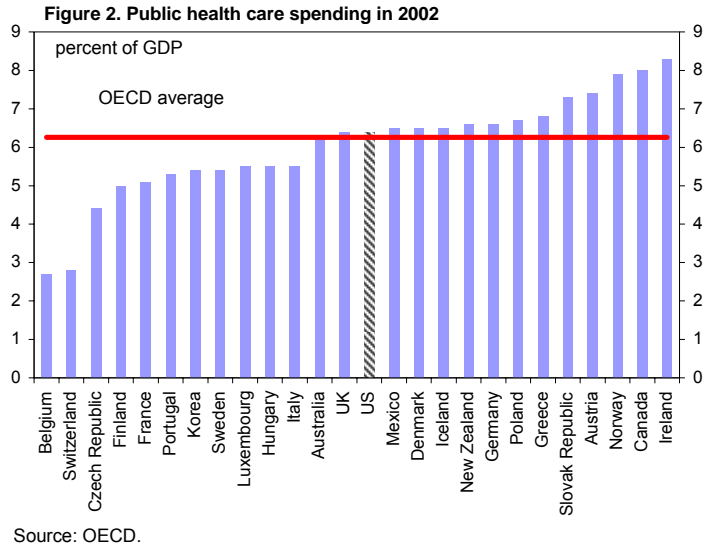
7.   ***More than three quarters of private health outlays for health services in the United States are financed via private health insurance***. Private insurance—provided through employer-sponsored schemes, which receive a substantial tax advantage—finances more than seventy percent of all private spending on health. As a result, out-of-pocket payments by individuals as a share of total health spending in the United States are about 4 percentage points below the OECD average of 18.7 percent.[55]

8.   ***U.S. health care spending by the public and private sectors has been growing more rapidly than in other OECD countries***. The U.S. share of GDP devoted to health care increased from 9 percent in 1980 to almost 15 percent in 2002, despite a moderation of growth in the 1990s with the introduction of managed care systems. Since 2000, the growth of health spending per capita and in real terms was 6 percent, 1¼ percentage point above the OECD median (Table 1).[56] Key drivers have been spending on ambulatory care and (since the 1990s) pharmaceuticals (Table 2).

9.   ***A number of initiatives have been undertaken to contain rapidly growing health care costs***. As discussed in the accompanying *Staff Report*, the 2003 Medicare Modernization

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[55] The purpose and scope of private health insurance varies significantly in other OECD countries (Docteur and Oxley, 2003). In particular, it is largely used to supplement publicly provided care in Belgium, Canada, Denmark, France, Germany, the Netherlands, and New Zealand, while in Australia, Ireland, Spain, and the United Kingdom it is largely used to widen the choice of providers or the speed of the delivery of care. Private health insurance is uncommon in Hungary, Japan, Korea, Mexico and most Nordic countries.

[56] While empirical evidence is limited, managed care appears to have yielded one-time cost savings distributed over a several years, but to have had limited effects on the long-term growth health spending (see, for example, Aaron and Schwartz, 1993).

Table 1. Health Spending in OECD Countries, 1990-2002

Country	Total Expenditure on Health				Public Expenditure on Health				GDP		
	Annual Growth Rate[1]		PPP $US 2002	In Percent of U.S. Spending	Annual Growth Rate[1]		PPP $US 2002	In Percent of U.S. Spending	Annual Growth Rate[1]		PPP $US 2002
	1990–2000	2000–2002			1990–2000	2000–2002			1990–2000	2002–2002	
Australia	4.6	...	2,504	48	6.1	3.5	1,708	72	2.7	1.9	28,168
Austria	3.2	0.5	2,220	42	2.5	0.7	1,551	66	2.1	0.8	28,842
Belgium	4.2	1.9	2,515	48	n/a	2.4	1,790	76	2.0	0.3	27,652
Canada	1.9	5.6	2,931	56	1.2	5.2	2,048	87	2.0	1.5	30,429
Czech Republic	4.6	4.8	1,118	21	3.7	4.8	1,022	43	0.2	2.9	15,098
Denmark	1.9	3.8	2,580	49	1.9	4.2	2,142	91	2.1	0.9	29,228
Finland	-0.1	6.2	1,943	37	-0.8	6.6	1,470	62	1.6	1.4	26,616
France	2.6	3.4	2,736	52	2.5	3.6	2,080	88	1.6	1.2	28,094
Germany	2.8	1.8	2,817	53	3.2	1.7	2,212	94	0.2	0.3	25,843
Greece	5.9	2.9	1,814	34	6.6	1.9	960	41	2.1	3.8	19,041
Hungary	...	8.8	1,079	20	...	8.3	757	32	...	4.0	13,891
Iceland	3.5	3.9	2,807	53	3.1	4.2	2,357	100	1.8	0.0	28,404
Ireland	9.3	12.7	2,367	45	9.6	14.4	1,779	75	8.6	4.9	32,571
Italy	1.7	3.0	2,166	41	0.8	4.5	1,639	69	1.5	0.9	25,569
Japan	4.3	3.6	2,077	39	5.0	4.1	1,696	72	1.3	-0.1	26,860
Korea	9.2	16.8	931	18	14.5	33.5	506	21	6.6	4.1	17,016
Luxembourg	3.4	6.7	3,065	58	3.0	4.0	2,618	111	4.9	0.3	49,207
Mexico	3.7	4.2	553	10	5.8	2.3	249	11	1.9	-0.9	9,026
Netherlands	2.7	5.9	2,643	50	...	...	...	...	2.5	0.0	28,983
New Zealand	3.1	6.9	1,857	35	2.4	6.8	1,447	61	1.5	2.9	21,943
Norway	3.5	7.7	3,083	59	3.8	7.8	2,628	111	3.6	1.0	35,531
Poland	6.2	4.9	654	12	2.4	6.8	474	20	4.1	1.5	10,804
Portugal	8.9	0.9	1,702	32	10.0	1.6	1,201	51	2.7	0.4	18,376
Slovak Republic	...	5.9	698	13	...	5.7	621	26	...	4.3	12,256
Spain	3.9	2.0	1,646	31	2.7	1.9	1,176	50	2.5	0.9	21,592
Sweden	1.8	6.0	2,517	48	1.2	6.3	2,148	91	1.7	1.2	27,255
Switzerland	3.1	3.6	3,445	65	3.9	5.8	1,994	84	0.4	-0.1	30,725
Turkey	11.5	...	...	...	12.2	...	...	...	1.8	-1.5	6,448
United Kingdom	4.9	4.7	2,160	41	4.4	6.4	1,801	76	2.3	1.6	27,959
United States	3.4	6.0	5,267	100	5.0	6.6	2,364	100	2.1	0.3	36,006
OECD median	3.5	4.8	2,220	42	3.5	4.7	1,702	72	2.1	1.0	27,058

Source: OECD Health Database 2004, 2nd edition

[1] Capita, national currency units at 95 GDP price level

Table 2. Contribution of Different Spending Components to
Total Health Care Costs, 1980–2002
(Level and exchange in percentage points of total health expenditures)

	Hospital Care			Ambulatory Care			Pharmaceuticals		
	2002	1980–1990	1990–2000	2002	1980–1990	1990–2000	2002	1980–1990	1990–2000
United States	28.0	-8.0	-8.5	44	7.1	4.9	12.7	0.1	2.7
OECD point average[1]	37.9	-3.5	-3.7	28.8	1.6	-1.5	16.2	0.8	0.6

Source: OECD Health Data 2004, 2nd edition.

[1] 1990–2000 average.

Act (MMA) introduced a number of measures aimed at reducing costs and enhancing efficiency, as well as a new prescription drug benefit to the Medicare coverage, estimated to cost $593 billion over the 2004-2013 period (CBO, 2005). More recently, the Administration has proposed tax preferences for purchases of health insurance by low-income workers, as well as tort reform to curb defensive medicine. The last proposal for major reform of the health care system was undertaken by the Administration in 1994, which aimed at providing universal health insurance coverage while using a combination of market competition and government regulation to contain costs (Nedde, 1995). However, these proposals proved unpopular and were not adopted, indicating that a far-reaching health care reform might be also difficult to implement in the future.

10.   ***The supply of health services in the United States is comparable to the OECD average***. The number of physicians, hospital beds, nurses, and indicators of acute care per capita in the United States is around the OECD average, as is the number of high-tech equipment such as magnetic resonance imaging (MRI) and computed tomography (CT) scanners. Although the supply of high-tech medical equipment was considerably higher in the United States a decade ago, other countries appear to have reached comparable levels (Table 3).

11.   ***Overall health indicators for the United States have improved, but remain around the OECD average*** (Figure 3).

Figure 3. There is scope for increasing efficiency in health care spending.
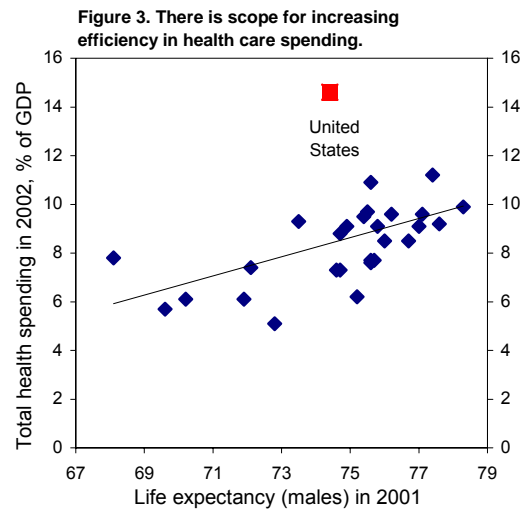
Sources: CBO and OECD.

Table 3. Use of Medical Technology in OECD Country
Health Care Systems, 1990–2001

(In numbers of units, per million population)

Countries	Radiation Therapy Equipment		Magnetic Resonance Imaging Units		Computer Tomography Scanners (CTs)	
	1995	2001	1995	2001	1995	2001
Australia	4.4	5.1	2.9	...	20.8	...
Austria	...	4.6	...	11.7	...	26.7
Belgium	6.1	...	3.3	...	...	...
Canada	6.9	...	1.3	4.2	8.0	9.7
Czech Republic	4.9	9.3	1.0	1.9	6.7	11.4
Denmark	...	5.4	...	...	7.3	13.2
Finland	8.6	8.7	4.3	11	11.7	13.7
France	6.2	...	2.1	2.4	9.2	9
Germany	9.2	10.6	2.3	5.5	9.0	13.3
Greece	5.8	...	...	...	...	...
Hungary	3.2	...	1.0	2	4.6	6.4
Iceland	15	14	7.5	14	18.7	17.5
Ireland	...	...	...	...	...	...
Italy	...	3.8	...	8.6	...	21.9
Japan	...	...	...	...	...	...
Korea	4.1	4.8	3.9	6.8	15.5	27.3
Luxembourg	...	4.5	2.4	4.5	24.4	24.9
Mexico	...	1.3	...	1.1	...	2.5
Netherlands	7.1	...	3.9	...	...	...
New Zealand	...	...	...	...	...	10.6
Norway	...	...	...	...	...	...
Poland	...	...	0.1	...	0.3	...
Portugal	...	...	...	...	...	...
Slovak Republic	7.6	11	0.4	1.3	4.8	8.6
Spain	3.3	3.7	2.7	5.6	8.3	12.3
Sweden	...	...	6.8	...	...	...
Switzerland	...	9.7	...	12.9	...	17.6
Turkey	...	1.8	...	...	...	...
United Kingdom	...	4.8	3.4	...	...	...
United States	4.4	4	7.2	8.2	14.1	12.8
Unweighted average	**6.5**	**6.3**	**3.1**	**6.4**	**10.9**	**14.4**

Source: OECD Health Data 2004, 2nd edition.

Life expectancy—a key overall indicator of health—was marginally below the average for other OECD countries in 2001-2002, although life expectancy of the elderly (i.e., those at age 65) is slightly higher (Table 4). Infant mortality was also slightly below the OECD average, but considerably worse than in a number of other industrial nations, such as Sweden, Spain, and Germany.

Table 4. Life Expectancy in 2002			
(In years)			
	At birth		At 65
	Females	Males	Males
United States	79.8	74.4	16.4
OECD average	81.1	75.6	15.9

Source: OECD Health Database 2004, 2nd edition.

B. Analysis of High U.S. Health Care Costs

12. ***This section draws on the existing literature to identify possible drivers of high costs in the health system***. The analysis is based on cross-country regressions and U.S. surveys of health spending and outcomes, and suggests the importance of a range of factors including higher incomes per capita, income inequality, insurance inequality, wider distribution of market power and prices, administrative complexity and costs, and limited demand rationing.

Income Levels

13. ***Higher income is an important factor for health care spending across countries***. Studies consistently find that GDP per capita explains about 90 percent of the observed variation in health spending across OECD countries (e.g., Gerdtham and Johnsson, 2000, and Pritchett and Summers, 1997). Table 5 presents regression results that confirm this finding—GDP per capita is a significant determinant of total health care spending, even in regressions excluding the United States, or when other explanatory factors are included, such as demographic profiles.

14. ***Higher income and public health spending are also associated with better health outcomes across countries***. Studies have typically found that higher real income per capita and public health spending tend to increase

Table 5. Determinants of Health Spending in OECD Countries, 1999–2002[1]		
	Coefficient[2]	P>|t|
Whole sample		
GDP per capita	0.006 *	0.059
Share of population over 65	0.155	0.220
Constant	4.941 *	0.012
R-squared = 0.21		
Adj R-squared = 0.15		
Excluding United States		
GDP per capita	0.003 *	0.084
Share of population over 65	0.238 *	0.016
Constant	4.147 *	0.005
R-squared = 0.31		
Adj R-squared = 0.25		

[1] Regressions are estimates using robust Huber/White/sandwich estimator of variance.

[2] * indicates significance at a 10 percent level.

life expectancy.[57] Similar results are reported in Table 6, while obesity is also identified as a factor that drives down overall health outcomes. These findings are consistent with the U.S. Medical Expenditure Panel Survey (USMEP), which shows that individuals' self-assessments of health are higher at middle and upper incomes (Table 7).

Income Inequality

15. ***There is mixed evidence regarding the impact of income inequality on health spending across countries***. Income inequality (as measured by Gini indices) does not appear to be a significant determinant of total health spending in cross-country regressions. However, higher income inequality does seem to cause higher levels of public health spending, even when other variables such as GDP per capita, share of elderly in total population, and educational levels are included (Table 8).

Table 6. Determinants of Life Expectancy in OECD Countries, 1999–2002		
	Coefficient	p-value
Specification with total health spending		
Total health spending	0.362 *	0.054
GDP per capita	0.013 *	0.007
Obesity level	-0.202 *	0.031
Constant	71.416 *	0.000
R-squared	0.671	
Adj. R-squared	0.650	
Specification with public health spending		
Public spending	1.035 *	0.037
GDP per capits	0.015 *	0.007
Obesity level	-0.157 *	0.063
Constant	66.812 *	0.000
R-squared	0.690	
Adj. R-squared	0.600	

[1] Regressions are estimates using robust Huber/White/sandwich estimator of variance.
[2] * indicate coefficients are significant at a 10 percent level.

16. ***U.S. survey data also indicates that income differentials explain a rather small part of the variation in total health spending.*** USMEPS data suggest that total health spending per person is relatively uniform across income distribution, and is actually slightly higher for the poor, possibly reflecting their worse health status (Table 9).

17. ***However, health care financing does vary widely by personal income***. The share of expenditures covered out of pocket or by private insurance schemes increases with income, while the share covered by public health care systems—Medicare, which provides health insurance to elderly and disabled and (especially) Medicaid, a program for poor—declines with income.

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[57] Examples include Bidani and Ravallion (1997), Filmer and Pritchett (1999), Kakwani (1993), and Lichtenberg (2002).

Table 7. United States: Self-Assessed Health Status by Income Distribution

	(By income, in US dollars)				
	Excellent	Very Good	Good	Fair	Poor
1-9,717	22.21	28.4	27.43	14.8	7
9,718-20000	20.64	30.59	31.1	12.29	5.05
20,001-36,023	25.92	35.17	28.88	7.62	2.25
36,024-280,000	31.44	39.32	22.9	4.94	1.34
	(By poverty level)				
Poor	23.14	26.05	30.5	14.13	5.84
Near-poor	26.74	24.93	29.32	12.14	6.33
Low income	24.61	30.51	29.74	10.8	4.09
Middle income	31.23	34.02	24.98	7.16	2.41
High income	35.9	36.34	21.43	7.78	2.97

Table 8. Determinants of Total and Public Health Spending in OECD Countries, 1999–2002[1]

	Coefficient[2]		Probability
With total health spending as dependent variable			
GDP per capita	0.010	*	0.004
Gini	0.030		0.650
Share of population over 65	0.289	*	0.068
Education level	0.552		0.273
Constant	4.940	*	0.012
Adj R-squared =	0.278		
With public health spending as dependent variable			
GDP per capita	0.002		0.287
Gini	0.057	*	0.065
Share of population over 65	0.596	*	0.043
Education level	0.153	*	0.040
Constant	2.073		0.365
Adj R-squared	0.578		

1/ Regressions are estimates using robust Huber/White/sandwich estimator of variance.

2/ * indicates coefficients are significant at a 10 percent level.

Table 9. United States: Individual Health Spending

	Percent with Expense	Spending Per Person with an Expense	Percent Distribution of Total Expenses by Source of Payment				
			Out of pocket	Private insurance	Medicare	Medicaid	Other
Total	85.2	3,302	19.1	39.7	22	10.8	8.3
Age in years							
Under 65	83.6	2,557	20.3	52.2	5	13.7	8.9
65 and over	96.3	7,797	16.9	15.2	55.7	5.1	7.1
Health insurance status							
<65, Any private	88.2	2,484	21.4	69.8	2.2	1.5	5.1
<65, Public only	84.5	3,663	8.5	0	16.9	62.9	11.8
<65, Uninsured	57.4	1,491	49.3	0	0	0	50.7
65+, Medicare only	95.1	7,090	21.4	0	63.9	0	14.8
65+, Medicare and private	97.5	7,736	16.9	25.3	53.4	0.4	3.9
65+, Medicare and other public	95.1	10,222	8.4	0	50.6	34.7	6.2
Poverty status							
Poor	78.3	3,811	13.3	12.4	26.3	37	11
Near-poor	80.7	3,778	16	17.4	37.8	18.9	9.9
Low income	79.5	3,863	16.7	27	30.5	13.6	12.2
Middle income	84.5	3,089	19.3	44.3	20.4	8.5	7.5
High income	90.6	3,095	22.5	53.6	16.4	1.3	6.2

Source: Medical Expenditure Panel Survey

[1] Uninsured refers to persons uninsured during the entire year. Public and private health insurance categories refer to individuals with public or private insurance at any time during the period; individuals with both public and private insurance and those with Tricare (Armed-Forces-related coverage) are classified as having insurance.

[2] Poor refers to incomes below the Federal poverty line; near poor, over the poverty line through 125 percent of the poverty line; low income, over 125 percent through 200 percent of the poverty line; middle income, over 200 percent to 400 percent of the poverty line; and high income, over 400 percent of the poverty line.

Structural issues

18.   **The structure of the U.S. health care system may also drive its high costs.** It is sometimes argued that the absence of a single-payer system leaves the responsibility for controlling costs to private insurers, which may not have sufficient incentives to contain usage or prices, and also increases administrative costs.[58] Moreover, the absence of universal coverage is also often argued to reduce access to preventive care, especially by low-income groups, leading to poorer health and excessive reliance on more expensive acute care (IOM, 2002). These contentions are difficult to assess in cross-country regressions, but USMEP data suggest that insurance inequality and income inequality appear to create obstacles to access to health care (Table 10).[59]

Table 10. United States: Obstacles to Receiving Health Care			
Population Characteristic	(In Percent)		
	Experiencing Difficulty	Couldn't Afford	Insurance Related	Other Reasons
Total	11.5	57.2	18.7	24
Age in years				
Under 65	12.9	59.2	18.1	22.6
65 and over	5.6	38.2	24.6	37.2
Health insurance				
<65, Any private	9.5	44.8	24.6	30.4
<65, Public only	21.5	53.6	22	24.4
<65, Uninsured	25.6	89.1	3.8	7
65+, Medicare only	n/a	--	--	--
Poverty status [2]				
Poor	18.7	69.2	12.1	18.7
Near-poor	16.6	73.8	8.1	18.2
Low income	16.7	69.3	16.8	14
Middle income	10.9	56.2	20.7	23
High income	6.7	29.7	27.8	42.1

Source: Medical Expenditure Panel Survey.

[1] Uninsured refers to persons uninsured during the entire year. Public and private health insurance categories refer to individuals with public or private insurance at any time during the period; individuals with both public and private insurance and those with Tricare (Armed-Forces-related coverage) are classified as having insurance.

[2] Poor refers to incomes below the Federal poverty line; near poor, over the poverty line through 125 percent of the poverty line; low income, over 125 percent through 200 percent of the poverty line; middle income, over 200 percent to 400 percent of the poverty line; and high income, over 400 percent of the poverty line.

19.   *Uninsured individuals also tend to have worse health outcomes*. Standard measures find that roughly 16 percent of the U.S. population are uninsured, and this share has risen recently with the

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[58] The average costs of a hospital stay is three times the OECD median, while a recent study found U.S. consumers paid 40 percent more per capita but received 15 percent fewer real health care resources compared to their German peers, with any gains in the efficiency of delivery more than offset by higher administrative costs. Compared to the United Kingdom, the U.S. system used about 30 percent more inputs per capita (see Anderson and others, 2004).

[59] Insurance inequality also has been argued to be associated with unequal access to non-hospital health care (van Doorslaer and others, 2004).

increase in health cost inflation since 2000 (Figure 4).[60] Studies suggest that the uninsured receive roughly half the level of care than those with health insurance (e.g., IOM, 2003), resulting in worse health outcomes and more use of high-cost acute care.

20.   ***Several studies show that prices for medical services are much higher in the United States than in other countries*** (Anderson and others, 2003). This appears to reflect higher labor costs, especially for specialists and other professionals. As noted above, the U.S. insurance system allocates more market power to the suppliers of services than in other countries and Docteur and Oxley (2003) find that publicly controlled systems of health care financing and delivery are more effective in controlling costs.

Figure 4. U.S. Health Insurance Coverage

Source: Current population survey.
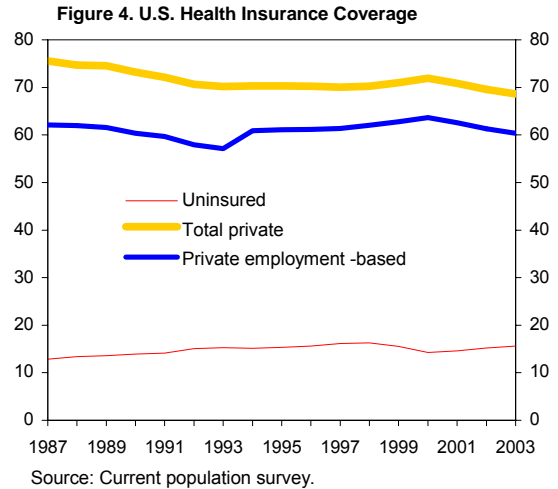
C. Conclusions

21.   ***The United States is an outlier among OECD countries in terms of health spending as a share of GDP***. Cross-country analysis reveals that much of this reflects fundamental factors such as higher U.S. income per capita, the decentralized nature of the U.S. health care system, and non-universal insurance coverage. Since these high costs do not seem to have yielded a commensurate gain in health outcomes, there would scope for efficiency gains, possibly by reducing administrative costs and broadening health insurance coverage, or by more fundamental reforms.

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[60] While some of the uninsured may be eligible for government programs, few doubt that the uninsured reflect a significant share of the U.S. population.

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VIII.   EFFECTS OF SOCIAL SECURITY AND TAX REFORM
IN THE UNITED STATES[61]

A.   Introduction

1.   ***The Administration has proposed two major fiscal initiatives in the past year—introducing Personal Retirement Accounts (PRAs) and tax reform***. PRAs would allow individuals to divert some of their Social Security payments into private accounts while reducing their "traditional" benefits from the system. A presidential advisory panel has also been asked to report on ways to make the U.S. tax system simpler and more efficient.

2.   ***This paper investigates the macroeconomic effects of introducing PRAs and reducing the taxation of capital***. A two-country version of the Global Fiscal Model (GFM) is used to examine the impact of:[62]

- ***Introducing PRAs***. The paper first considers the effects of introducing PRAs without other fiscal measures; it then considers the introduction of PRAs coupled with measures to prevent PRA-related increases in government debt.

- ***"Lockboxing" social security***. Next, the effects of fiscal adjustment assuming that the level of government debt is lowered by the asset accumulation associated with Social Security surpluses is examined.

- ***Eliminating the double taxation of saving***. Finally, the paper explores how reducing the personal income taxation of capital income could affect the economy.

B.   The Model and Calibration

3.   ***GFM is a theory-based annual simulation model that has been developed specifically to examine fiscal issues***.[63] Its main features include:

- ***A private sector that is assumed to be more "impatient" than implied by the government budget constraint***. Because the private sector uses a discount factor that is higher than the real interest rate, the effects of future policy actions are discounted more rapidly than is implied by the government budget constraint. As a result, individuals are only partly Ricardian, and fiscal policy changes influence national saving.

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[61] Prepared by Tamim Bayoumi, Dennis Botman (FAD), and Manmohan Kumar (FAD).

[62] See Botman and others (2005) for a description of GFM. Botman and Laxton (2004) have applied the model to study the effects of U.S. tax cuts. Bayoumi and others (2005) examine the long-term benefits from reducing government debt by delaying tax cuts as well as issues of tax spillovers within the context of Canada's rapid reduction in government debt.

[63] See Bayoumi (2004) for a discussion of the overall modeling effort.

- **Markets are not fully competitive**. Firms and workers have some monopolistic power, so that prices and wages are above their perfectly competitive levels. Labor income taxes affect the work-leisure trade off. In addition, profits reflect both returns to capital and economic rents extracted by firms. Compared with the case of perfect competition, these rents reduce the distortionary impact of corporate and personal income taxes.

4.   **The model involves a stylized representation of the U.S. tax system and the structure of public expenditures**. The analysis incorporates three taxes: a labor income tax levied on wage compensation; a corporate income tax levied on accounting profits of firms; and a personal income tax levied on labor income, accounting profits, government transfers, and interest income (on government bonds and net foreign assets). It is assumed that for all three taxes, there is a single marginal rate, which coincides with the average tax rate. Revenues raised by taxation are spent on lump-sum transfers to consumers, government consumption of nontraded goods, and servicing government debt.

5.   **Other main aspects of the model can be briefly summarized as follows**:

- Consumption and production are characterized by constant elasticity of substitution utility and production functions, respectively.

- Labor and capital are used to produce either traded or nontraded goods.

- Investment is driven by a Tobin's Q relationship, with firms responding sluggishly to differences between the future discounted value of profits and the market value of the capital stock.

- International capital mobility is perfect, implying the equalization of real interest rates across countries over time.

- Wages and prices are fully flexible.

- The model's financial market block is highly stylized. There are two kinds of assets, namely government debt (which can be traded internationally) and equity (which is held domestically).

6.   **The model has been parameterized to reflect some macroeconomic features of the United States and the rest of the world (RoW)**. In particular, the size of the U.S. economy is assumed to be around one-third of the world economy. Consequently, U.S. policies have a substantial impact on the global rate of interest. The macroeconomic structure of the economy—the ratios of consumption, investment, government spending, wage income, and income from capital relative to GDP—is calibrated to the U.S. economy. Similarly, fiscal variables—taxes rates on capital, labor, and personal income, and government debt—have been calibrated to correspond to the U.S. fiscal structure. Behavioral parameters are based on micro-economic estimates (Box 1).

Box 1. Parameterizing the Model

Key behavioral parameters are set equal across the United States and the RoW. These include parameters characterizing real rigidities in investment, markups for firms and workers, the elasticity of labor supply, the elasticity of substitution between labor and capital, the elasticity of intertemporal substitution, and the rate of time preference.[1]

Simulations examine the impact of changing the values of the following key parameters:

- ***The sensitivity of labor supply to the real wage (Frisch elasticity)***: The baseline value (-0.04) is mid-range in the values found by micro-economic studies. Alternative simulations assume values around the upper and lower limits of these estimates (-0.08 and -0.01, respectively).

- ***The elasticity of substitution between labor and capital in the production function***: The baseline value is -0.8, with alternative simulations using values of -0.6 and -1 (the Cobb-Douglas case).

- ***The elasticity of intertemporal substitution:*** The baseline value for this parameter that describes the sensitivity of consumption to changes in the real interest rate is -0.33. Parameter values in alternative simulations (-0.2 and -0.5) are consistent with the lower and upper end of microeconomic estimates.

- ***The wedge between the rate of time preference and the yield on government bonds:*** This parameter—which determines consumers' degree of impatience—has not been subject to extensive microeconomic analysis. Comparing real interest rates charged to consumers on credit card debt (the main source of unsecured loans where the lender takes the full risk of default) and government debt indicates that this wedge may be substantial. Based on this, we set the baseline value of the wedge to 10 percent, with alternative simulations using 5 percent and 15 percent values.

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[1] See Laxton and Pesenti (2003) for a more detailed discussion of evidence on parameter values.

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7.   ***The impact of fiscal policy on real activity combines responses from aggregate supply and demand***. Aggregate supply changes are triggered through the "distortion channel." Fiscal policy influences include the impact of wage taxes on the incentive to work and the effect of corporate income tax rates on the rate of return of capital. Aggregate demand changes largely depend on fiscal policy's effects on wealth and interest rates. The strength of the wealth channel is influenced by the level of consumer "impatience." Fiscal policy also affects the global real interest rate, with consequences for investment and private savings, and spillovers on the RoW (see also Chapter 5 of this *Selected Issues* paper).

C. Introducing Private Retirement Accounts

8.   ***PRAs are assumed to follow the Administration's proposals closely***:

- ***Workers can divert part of their labor income taxes from social security contributions into PRAs***. Initially, the amount workers can divert is $1,000, which increases by $100 each year to a maximum of $4,000. PRAs would be phased in gradually for younger workers.

- ***The PRA system matures after 45 years***. It is assumed that workers up to the age of 45 can participate and that they retire at 65, so that PRAs start paying benefits after 20 years. However, contributions to PRAs exceed benefit payments for a further 25 years, when the youngest workers that participated at the start of the program (assumed to be 20 years old) reach retirement.

- ***Withdrawals from PRAs result in equal reductions in government transfers***. Reflecting the stylized nature of financial markets in the model, there is no equity premium to be exploited by owners of PRAs.

9.   ***The model suggests no significant impact from PRAs on GDP, national saving, and financial markets, but indicates a significant increase in federal deficits and debt over several decades*** (Figure 1). As payroll contributions are diverted from the Social Security system to PRAs, government revenue declines markedly, falling by 3½ percentage points of GDP relative to the baseline after about 20 years. As a result, government debt is 40 percent of GDP above baseline after 20 years. However, when benefit payments from PRAs start, "traditional" Social Security payments decline by a corresponding amount, which allows government deficits and debts to fall. In the long-run, government debt exceeds the baseline by 30 percentage points of GDP (see Orszag, 2005, for a similar estimate).

10.   ***As private saving through PRAs offset government dissaving, there is no impact on national saving***. Real interest rates are virtually unchanged and there is little effect on investment. It should be emphasized that these results follow from the stipulation that workers cannot borrow against accumulated savings held in their PRAs. In this case, a shift from government to private saving does not affect perceived wealth, and there is no change in consumer behavior.

11.   ***Introducing PRAs could, however, lead to perceptions of higher future transfer payments***. Survey evidence suggests that workers, especially younger ones, are skeptical about the value of their future Social Security benefits, possibly reflecting the underfunded nature of the Social Security system. Placing contributions into individual accounts could be interpreted as an obstacle to reneging on future benefit payments. Workers could perceive this as an effective increase in their permanent income.[64]

12.   ***To simulate this, we assume a smaller decline in Social Security benefit payments after PRAs start, financed by a delayed and gradual increase in labor income taxes*** (Figure 2). The results suggest a mild rise in consumption and output compared to the baseline. However, this effect dissipates when taxes increase to pay for higher transfer payments,
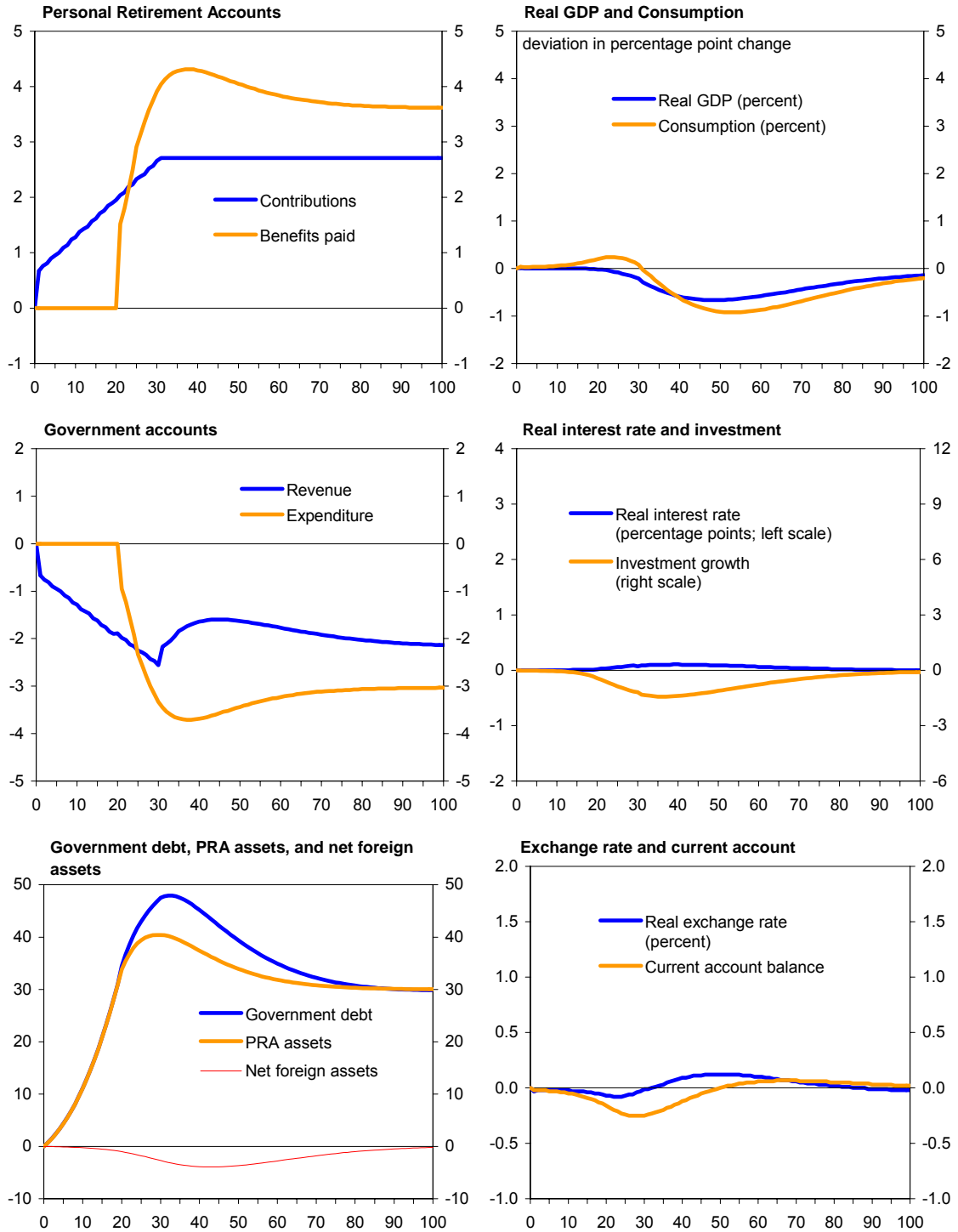
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[64] However, if workers currently assume that the government will not fully meet its promises, this also implies that workers correspondingly should expect a smaller increase in future government debt or taxes in the absence of PRAs.

Figure 1. Effects of Introducing Personal Retirement Accounts (PRAs)
(Deviation from baseline in percent of GDP unless otherwise noted)
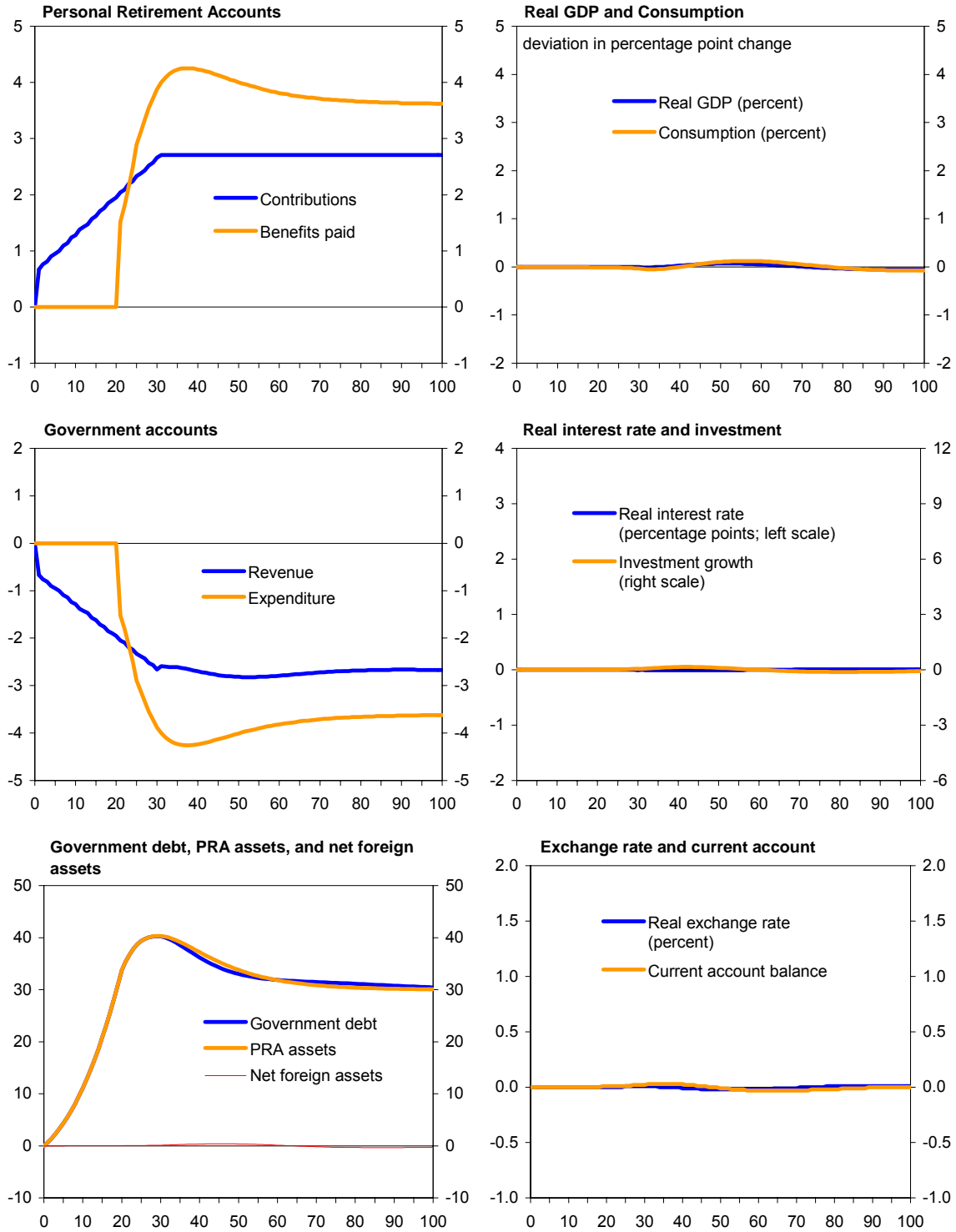
Source: IMF staff estimates.

**Figure 2. Effects of Introducing PRAs If Future Benefits
are Assumed To Be Higher**
(Deviation from baseline in percent of GDP unless otherwise noted)

Personal Retirement Accounts

Contributions
Benefits paid

Real GDP and Consumption

deviation in percentage point change

Real GDP (percent)
Consumption (percent)

Government accounts

Revenue
Expenditure

Real interest rate and investment

Real interest rate
(percentage points; left scale)
Investment growth
(right scale)

**Government debt, PRA assets, and net foreign
assets**

Government debt
PRA assets
Net foreign assets

Exchange rate and current account

Real exchange rate
(percent)
Current account balance

Source: IMF staff estimates.

leaving the economy worse off starting after 25 years, before returning to the baseline in the long-run.[65]

13.   ***Significant macroeconomic benefits may accrue when PRAs are accompanied by greater fiscal discipline that prevents PRA-related increase in government debt*** (Figure 3). By making future liabilities explicit, PRAs could increase pressure to offset the resulting increase in government debt. Assuming such deficit reduction is achieved, output falls modestly below the baseline over the short run. Over the longer run, higher government saving and lower government debt reduces the real interest rate and boosts investment. Simulation results suggest that the short-run effects are broadly invariant to whether taxes are raised on labor income, corporate income, or personal income, although labor income tax-based consolidation appears to yield quicker but smaller long-run benefits.

14.   ***The long-term gains of fiscal consolidation depend particularly on the planning horizon of consumers*** (Figure 4). Alternative parameterizations of labor income tax-based consolidation suggest greater long-run gains to GDP accrue if consumers discount future tax reductions more rapidly, which induces higher saving and capital accumulation. If capital and labor are closer substitutes, or consumers are less sensitive to changes in the real interest rate, fiscal consolidation leads to smaller output losses in the short run, but has a larger and earlier expansionary effect over the long term.

15.   ***"Lockboxing" Social Security surpluses could yield further long-term benefits*** (Figure 5). PRAs could lead to fiscal discipline through recognition of future unfunded liabilities. However, the same objective could be achieved faster and more directly by tightening fiscal policy to preserve current and future Social Security surpluses—which accumulate to 28 percent of GDP through 2026—thereby helping to ensure that these assets are available to fund future benefits.[66] In the short run, labor supply would decline, and both consumption and output would be modestly adversely affected. However, lower public debt would lead to lower interest rates, boosting investment and real GDP.
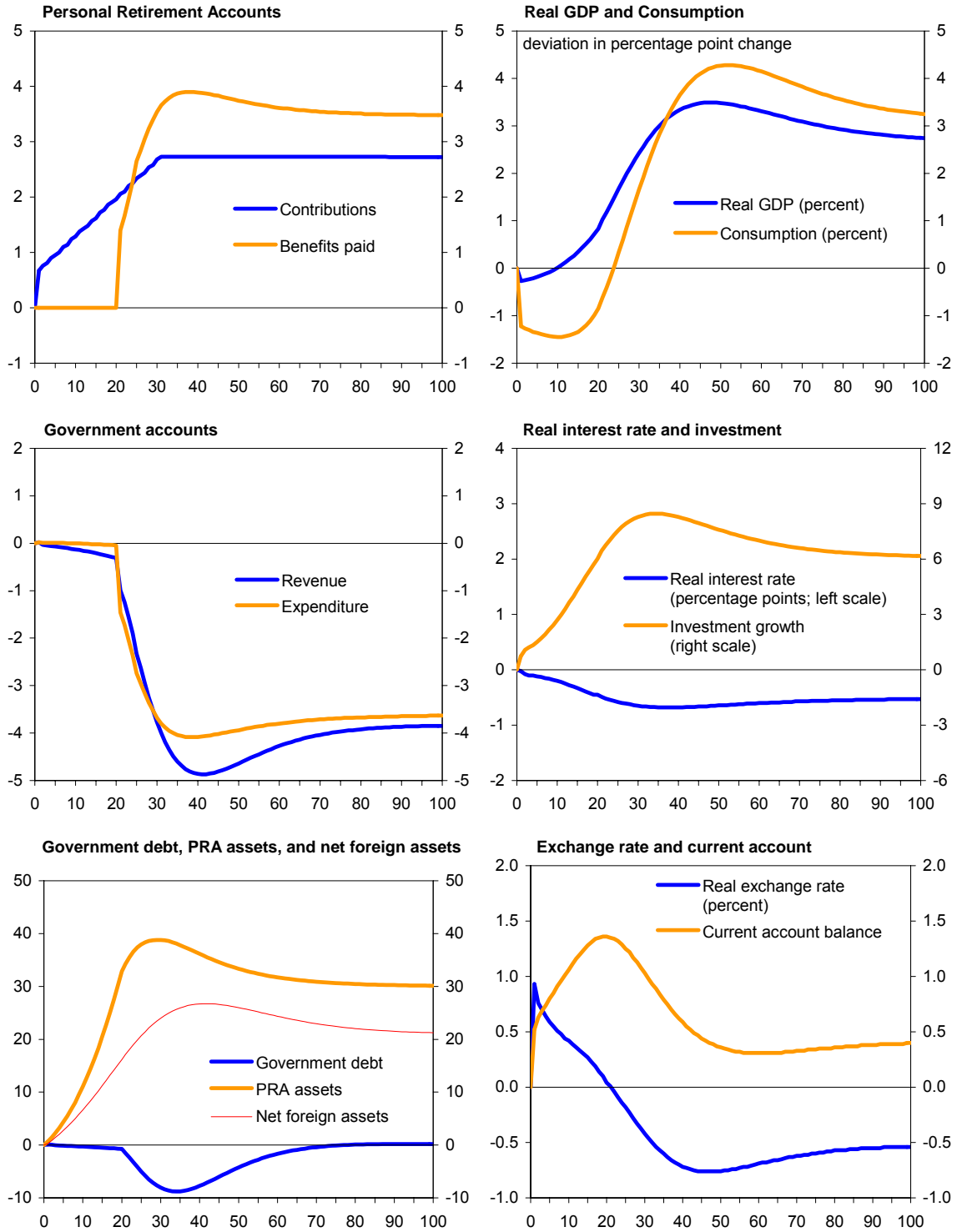
D. The Effects of Reducing the Taxation of Savings

16.   ***Since the personal income tax base includes profits of firms, the return to capital can be taxed twice***. GFM reflects the traditional view that taxation of dividends negatively

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[65] Financial markets may also expect PRAs to lead to an additional increase in government debt. Financial markets may underestimate implicit liabilities in anticipation of future reforms of benefits that reduce payment obligations of Social Security. If PRAs increase the estimated size of future liabilities by making implicit debt explicit, the risk premium on government bonds may increase.

[66] Proposals for such a "lockbox" have been discussed repeatedly since at least the mid-1990s with the twin objectives of safeguarding the viability of the Social Security system and highlighting the positive contribution of Social Security to the budget. After 2026, when social security will record deficits, regulations require increasing social security contributions.

Figure 3. Effects of Introducing PRAs Accompanied by Debt Consolidation
(Deviation from baseline in percent of GDP unless otherwise noted)

Personal Retirement Accounts

Contributions

Benefits paid

Real GDP and Consumption

deviation in percentage point change

Real GDP (percent)

Consumption (percent)

Government accounts

Revenue

Expenditure

Real interest rate and investment

Real interest rate
(percentage points; left scale)

Investment growth
(right scale)

Government debt, PRA assets, and net foreign assets

Government debt

PRA assets

Net foreign assets

Exchange rate and current account

Real exchange rate
(percent)

Current account balance
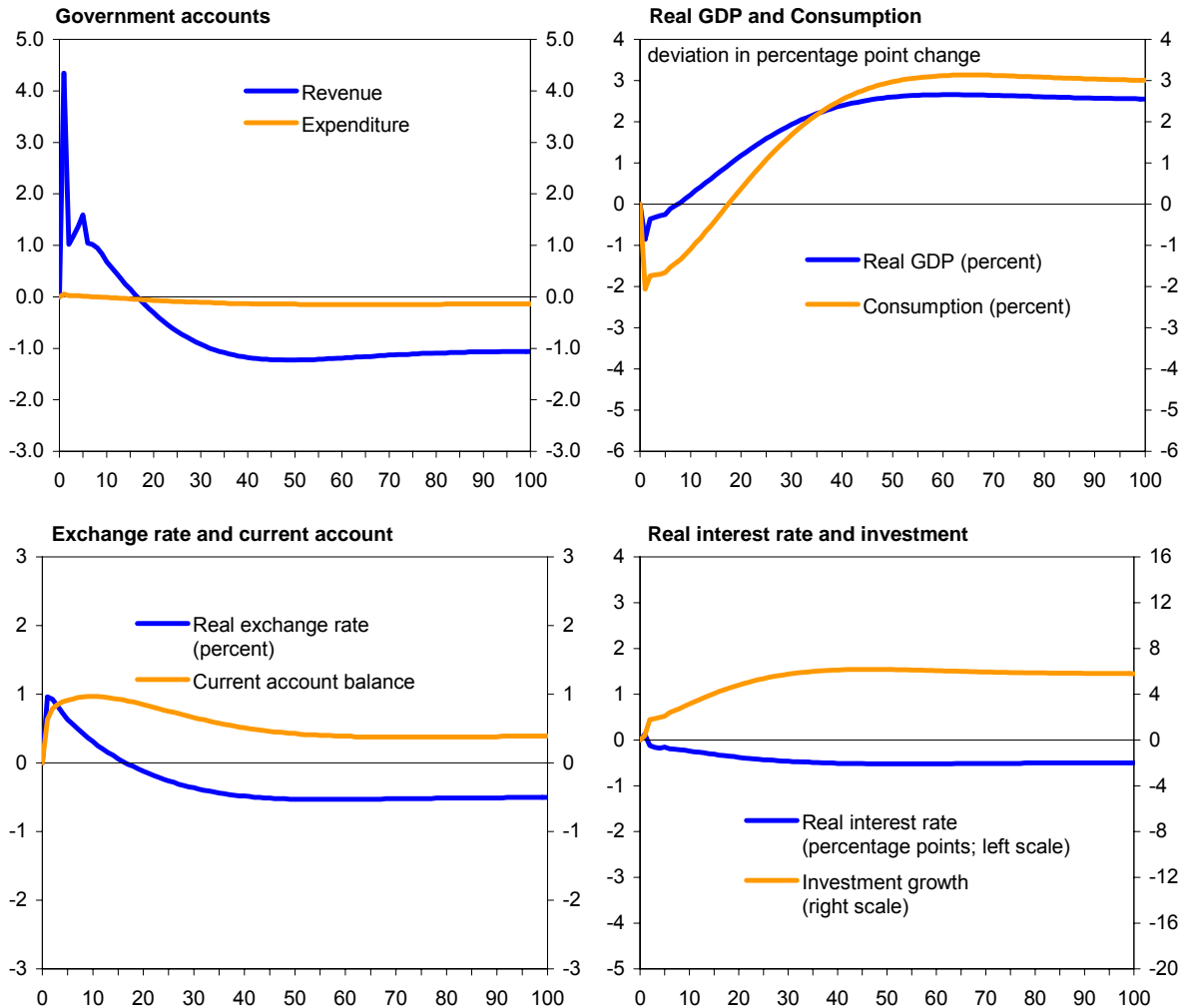
Source: IMF staff estimates.

Figure 4. Effects of Debt Consolidation on Real GDP
Under Alternative Parametrizations [1]
(Percent deviation from baseline)
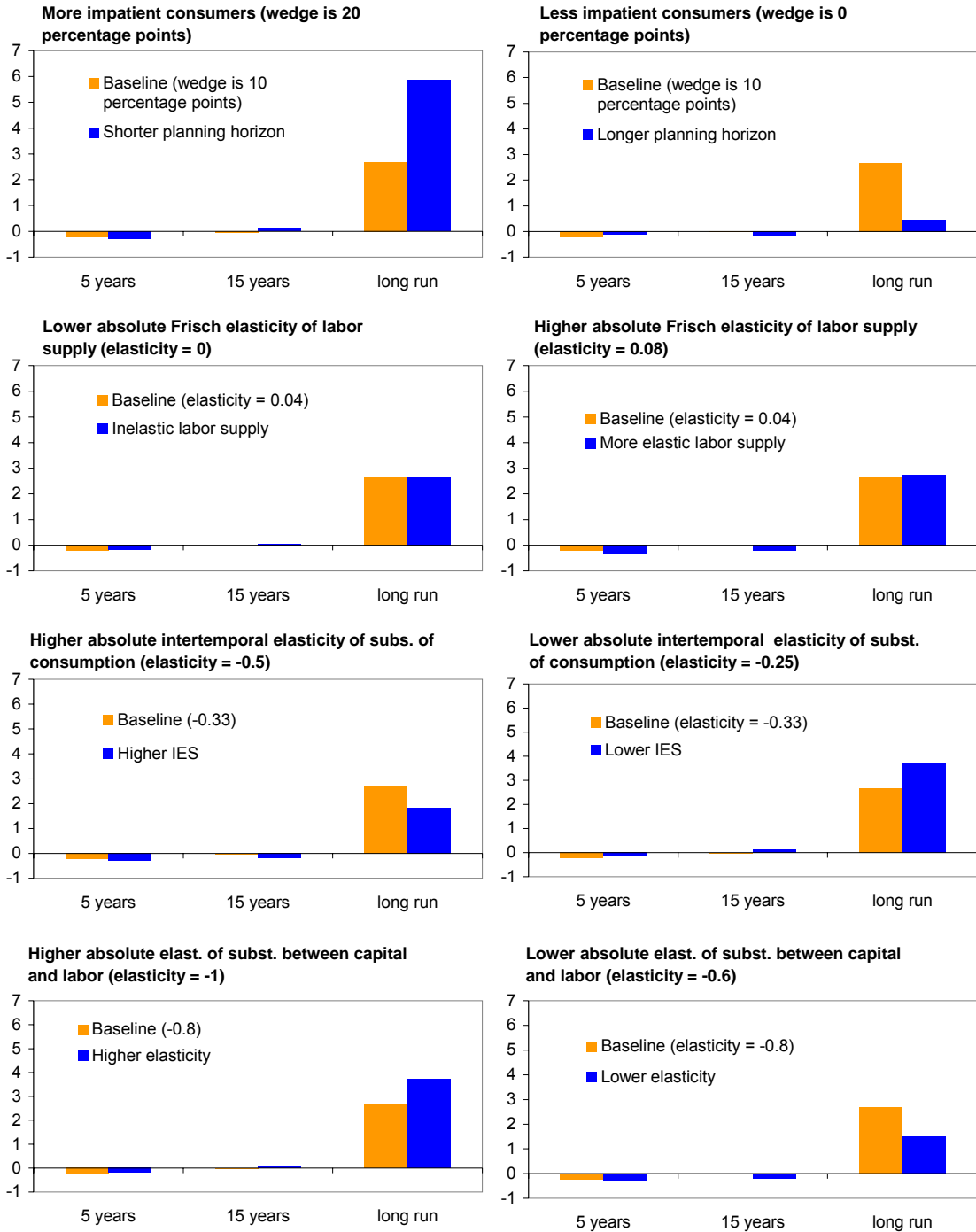
Source: Fund staff calculation

[1] Debt consolidation via labor income taxes; 5 years refers to average impact during first five years, similarly for 15 years, and long-run is new steady state value.

Figure 5. Effects of a Social Security "Lock Box"
(Deviation from baseline in percent of GDP unless otherwise noted)

Source: IMF staff estimates.

affects capital accumulation.[67] Narrowing the personal tax base to labor and interest income—eliminating the personal income taxation of capital—should reduce economic distortions.

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[67] The new view argues that borrowing by debt issuance rather than equity issuance is the main form of financing of investment. Since debt financing is tax deductible, capital income is effectively taxed only once, and hence there is no need to reduce the personal income taxation of capital. This has little impact on the simulations in this paper, which focus on the macroeconomic consequences of reducing the taxation of personal capital income, rather than on the welfare implications of taxation across factors of production.

17.   ***Eliminating the personal income taxation of capital in a revenue neutral manner has significant long-term positive effects*** (Figure 6). In the short-run, narrowing the personal income tax base to labor income while raising rates on the remaining tax base to prevent revenue losses causes a small decline in real GDP as higher labor taxes damp consumption. Over time, however, national saving increases substantially, the interest rate declines, and capital accumulation results in output increasing about 2 percentage points above baseline.[68]

18.   ***Narrowing the tax base without increasing tax rates, however, is inferior to the status quo as it increases government debt***. The consequences of this "failed reform," which is assumed to be reversed after 5 years, are illustrated in Figure 7. As personal income tax rates are raised to repay the increase in government debt over the reform period and in the long run, there is effectively no beneficial impact on investment or GDP. Simulations in which the reversal of the reform occurs after 10 years (not reported for the sake of brevity) find even larger transition costs.

19.   ***The long-run benefits from revenue-neutral tax reform depend on the planning horizon of consumers as well as the substitutability between capital and labor*** (Table 1). A longer planning horizon (more patient consumers) suggests that incentives to save are stronger after the tax reform, which induces a larger reduction in the real interest rate, greater capital accumulation, and larger long-run gains in output. Higher substitutability between labor and capital amplifies distortions from the taxation of capital; thus, eliminating it can yield larger gains.

Table 1: Impact of Different Parameters on Simulation Results	
Long-term effect on GDP (in percent relative to baseline)	
Baseline 1/	2.35
Longer planning horizon	4.30
Inelastic labor supply	2.67
Lower intertemporal elasticity of substitution	2.82
Higher elasticity of substitution between capital and labor	3.65
Introducing rule-of-thumb consumers	2.57
Lower elastacity of substitution between home and foreign goods	2.33

1/ Effects on long-term GDP of eliminating the double taxation of dividends under alternative parametrizations (revenue neutral; see Figure 7 for baseline)

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[68] If tax reform results in a reduction in the taxation of overall savings, instead of capital income only, the benefits are smaller. The reason is that increasing labor income taxes to reduce taxes on interest income increases distortions in the economy.

**Figure 6. Effects of Revenue Neutral Tax Reform
that Lower Personal Taxation of Capital Income**
(Deviation from baseline in percent of GDP unless otherwise noted)
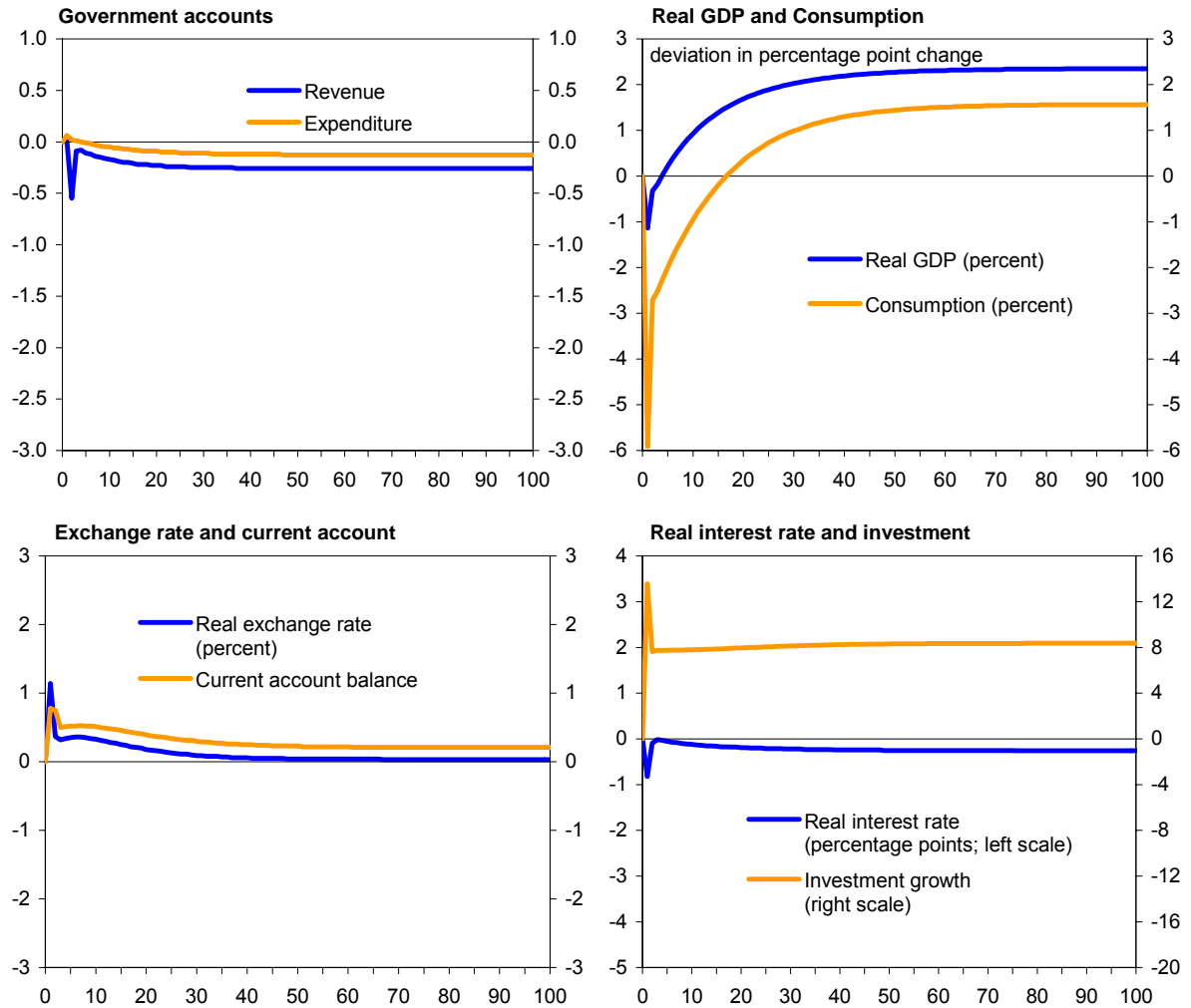
Source: IMF staff estimates.

**Figure 7. Effects of Non-Revenue Neutral Tax Reforms
that Lower Personal Taxation of Capital Income**
(Deviation from baseline in percent of GDP unless otherwise noted)
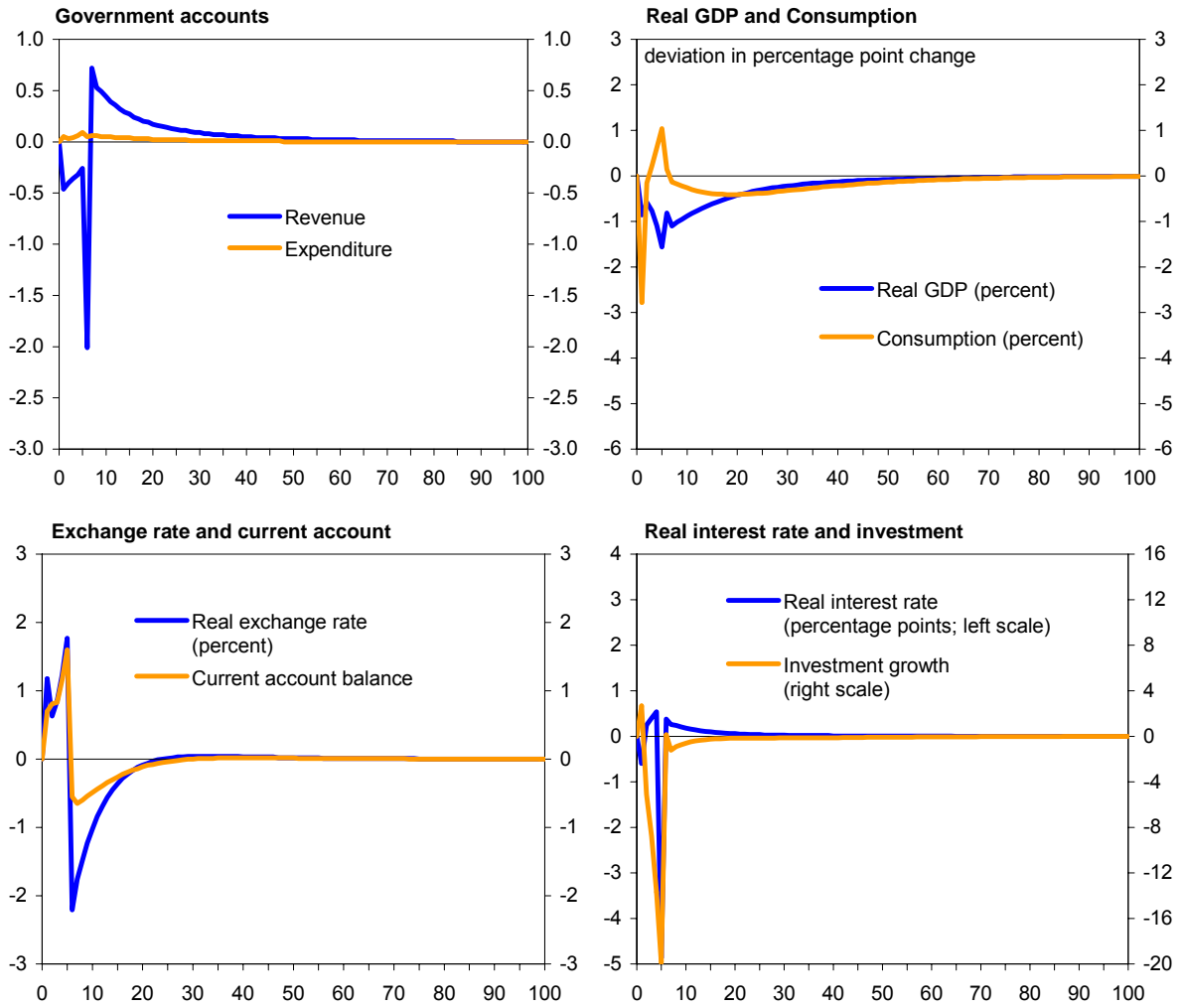
Source: IMF staff estimates.

E.   Conclusions

20.   ***Personal Retirement Accounts (PRAs) are unlikely to yield significant macroeconomic benefits unless lower social security returns spur additional fiscal consolidation***. If the introduction of PRAs is combined with fiscal consolidation to prevent a large increase in government debt, interest rates decline by about 50 basis points in the long run, and output increases to about 3 percentage points above the baseline. Even larger benefits are obtained if the social security surplus is placed in a lockbox while maintaining the same debt target.

21.   ***Lowering the taxation of investment income is beneficial, but only if the reform is revenue neutral***. A revenue-neutral personal income tax reform yields a long-run increase in GDP of about 2 percentage points above the baseline. In contrast, a reform that is not revenue neutral and needs to be reversed implies no long-run benefits and entails transition costs over the short to medium run.

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