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INTERNATIONAL MONETARY FUND

UNITED STATES OF AMERICA

Selected Issues

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Approved by the Western Hemisphere Department

July 15, 2003

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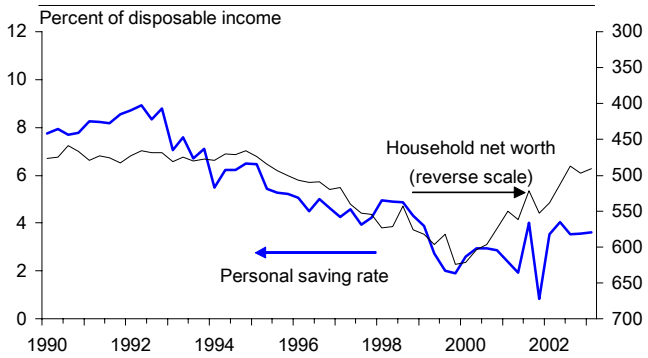
I. U.S. Household Saving: Long-run Determinants and Short-term Risks[1]

1. ***The recent drop in household wealth has raised concern regarding the extent to which consumption can continue to support the U.S. recovery.*** Household net worth has fallen sharply since 2000, from about 6¼ times personal disposable income to 4½ times personal disposable income. While personal saving rates have risen somewhat, the increase seems smaller than what would be implied by a casual inspection of the relationship between wealth, income, and saving. Indeed, Figure 1 suggests that the personal saving rate would need to increase by around 2½-3 percentage points to match the current levels of household wealth.

Figure 1. Household Wealth and Saving Rates

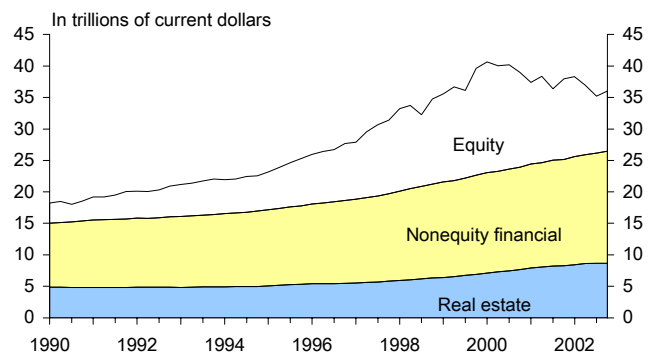


2. ***However, the analysis presented in this chapter suggests that the saving rate is only about 1 percentage point below its long-run trend.***[2] This unexpectedly modest differential reflects several factors. First, the effect on the saving rate of the decline in equity wealth has been partially offset by the effect of increases in other forms of wealth, including real estate and relatively liquid wealth such as demand deposits. Second, the U.S. saving rate has exhibited a secular, downward trend over the past decade—due, in part, to financial innovation.

A. Recent Trends in Household Wealth

3. ***The sharp increase in household wealth during the past decade has reflected gains in the equity and residential markets, as well as other forms of wealth.*** Partly owing to the strength of housing prices and stock market gains, net housing and net equity wealth rose by $3¼ trillion and $2½ trillion, respectively, between end-1995 and 2003Q1 (Figure 2). However, net holdings of non-equity financial wealth rose by even more—by $6¼ trillion over the same period, reaching $21¾ trillion in 2003Q1 and exceeding the value of equities at the

Figure 2. Components of Household Net Wealth



[1] Prepared by Christopher M. Faulkner-MacDonagh (WHD).

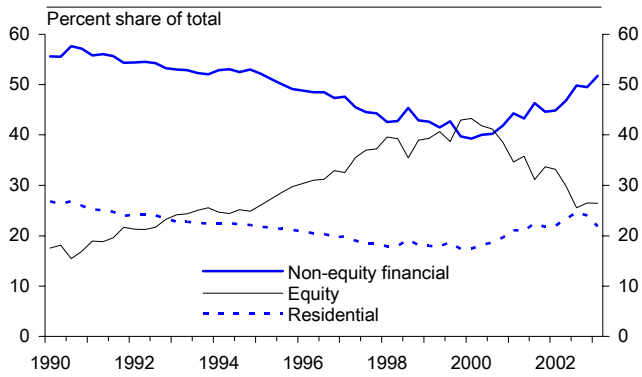
[2] However, this does not mean that U.S. households are saving "enough" for retirement or other goals. Indeed, survey evidence in Ucello (2001) suggests that 5-25 percent of U.S. households are not likely saving enough for retirement; most of these are poor, unmarried households.

height of the stock market in early 2000.[3]

4. ***Since the collapse of the equity bubble, net non-equity financial wealth has become increasingly concentrated in liquid holdings.***[4] Most of the recent rise in non-equity financial wealth reflected an increase in demand deposits and money market shares—spurred by the stock market decline that led households to redirect savings into less risky assets and to lock in capital gains. During 2000-2003, the share of non-equity financial wealth held in the form of demand deposits rose from around 25 percent to nearly 30 percent. At the same time, holdings of corporate and municipal bonds rose rapidly.

5. ***To a large extent, the recent shift in the composition of household wealth represents a return to more traditional portfolio allocations.*** Between 1969-1996, equity wealth accounted for just under 20 percent of household net wealth, and non-equity financial wealth accounted for almost 60 percent; residential wealth comprised the balance. During the latter half of the 1990s, the share of equity wealth rose sharply—to almost 45 percent at the height of the stock market bubble, but has since fallen sharply to 25 percent, with the proportion of other assets returning to roughly their long-run averages (Figure 3).

Figure 3. Components of Household Net Wealth



B. Long-run Determinants of Consumption and Saving

6. ***A long-run consumption model is estimated in order to gauge the extent to which the saving rate has deviated from its long-run equilibrium.*** The basic framework is based on the permanent income hypothesis (PIH), which posits that household consumption and saving decisions reflect expected levels of permanent income and wealth.[5] Following Lettau and Ludvigson (2001), a long-run relationship is estimated between (the logs of) real consumption services (c_t), real household assets (a_t), and real labor income (y_t^l, see Appendix for the variable definitions):

$$c_t = \alpha + \beta_1 t + \beta_2 a_t^r + \beta_3 a_t^e + \beta_4 a_t^n + \beta_5 y_t^l + \sum_{\substack{i=-k \\ v=r,e,n}}^{k} \gamma_k^v \Delta a_{t-i}^v + \sum_{i=-k}^{k} \gamma_k^y \Delta y_{t-i}^l + u_t \qquad (1)$$

[3] Non-equity financial wealth comprises paper, bonds, deposits, and equity in noncorporate business (the imputed value of small businesses and sole proprietorships).

[4] Not all non-equity financial wealth is liquid. A sizable portion (just under one-quarter, or $5 trillion) is in the form of equity in noncorporate businesses, which could be difficult to sell quickly.

[5] The literature on consumption behavior is large and reviewed in Attanasio (1999).

where assets are decomposed into residential (a^r), equity (a^e), and financial non-equity wealth (a^n).[6] The results are reported in Table 1.

7. ***The results illustrate substantial differences in the "wealth effect," depending on how the three asset categories are aggregated.*** The estimated wealth effect—i.e., the impact on consumption of a $1 dollar increase in wealth—ranges from 2-3½ cents. The smallest wealth effects are found if residential wealth is included separately, rather than being combined with another wealth component. In the disaggregated equation, the impact of shocks to equity and residential wealth are relatively small, with the largest effect coming from the non-equity financial wealth term. This large effect could be due to the relatively liquid nature of much of non-equity financial wealth (in the form of demand deposits), which could yield a non-pecuniary return in terms of lower transactions costs, or the possibility that more liquid assets reduce the need for precautionary saving. The importance of this term in the results reported here raises the question whether other studies that have shown a larger wealth effect from residential wealth may have been biased by the omission of non-equity financial wealth.[7]

8. ***The regressions where wealth is disaggregated appear to fit the PIH model better than the traditional regression that consolidates all of the wealth terms into one variable.*** The PIH model used to derive this cointegrating relationship predicts that the coefficients on the income and wealth terms should sum to one. A Wald test of this hypothesis is rejected for the model where all wealth is aggregated into one consolidated term (column 1), but fails to reject the hypothesis for the more disaggregated models. Further, the Akaike Information Criterion (AIC) indicates that the model with consolidated wealth terms fits the data the least well, out of all of the models considered here. Instead, AIC prefers the model that has residential and non-equity financial wealth combined into a composite wealth term.

9. ***The results also suggest that consumption has exhibited an exogenous upward trend, possibly related to improvements in household access to credit.*** This result is consistent with the study by Cerisola and De Masi (1999), which focused on the long-run properties of the personal saving rate and identified a downward trend in the saving rate. In their study, the longer-term decline in the saving rate is explained by improved household access to credit.

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[6] Stock and Watson (1993) suggest including the leads and lags, which are not reported in Table 1, to address the endogeneity bias in OLS estimates of cointegrating relationships. The Akaike Information Criterion is used to choose the lag length ($k=5$). The standard errors are corrected as suggested in Hamilton (1994), p. 610.

[7] For example, Case, Quigley, and Shiller (2001) and IMF (2002) use house prices to proxy for residential wealth and include a measure of equity wealth, but do not include a measure of non-equity financial wealth. Indeed, when residential and non-equity financial wealth are combined into a single variable (column 3, Table 1), the composite wealth term is about 5 times the coefficient on equity wealth.

Table 1. Estimates of the Consumption Cointegrating Equation

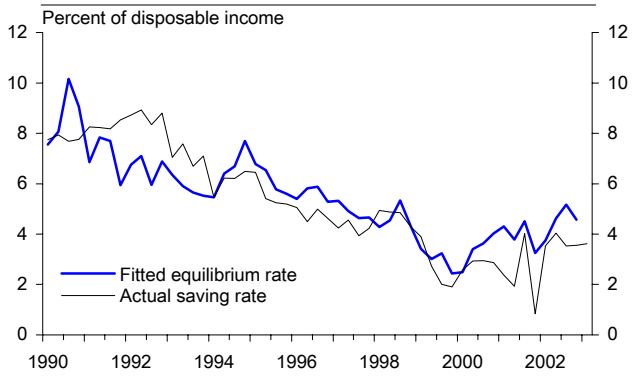
	Wealth Aggregation			
	(1)	(2)	(3)	(4)
Constant	0.009	**-0.432**	-0.311	-0.079
	(0.150)	(0.148)	(0.160)	(0.168)
Time	**0.043**	**0.020**	**0.026**	**0.027**
	(0.005)	(0.005)	(0.005)	(0.005)
Residential (a^r)		**0.113**		**0.057**
		(0.015)		(0.025)
Equity (a^e)			**0.056**	**0.059**
			(0.005)	(0.005)
Non-equity (a^n)				**0.264**
				(0.065)
Composite Wealth	**0.255**	**0.156**	**0.287**	
	(0.035)	(0.017)	(0.024)	
Income	**0.630**	**0.818**	**0.651**	**0.577**
	(0.087)	(0.059)	(0.046)	(0.067)
Wealth Effect	3.5¢/$	2.0¢/$	3.1¢/$	2.3¢/$
Adjusted R^2	0.996	0.997	0.997	0.997
Akaike Info. Criterion	-6.448	-6.715	-6.879	-6.764
Wald test of:				
Income & Wealth sum to 1	**3.955**	2.779	0.015	0.771
p-value	0.050	0.068	0.985	0.514
Sample period: 1970Q1-2002Q4				

Source: Fund staff estimates. Bolded estimates are significant at the 5 percent level, using corrected standard errors.

Note: (1): Residential, non-equity financial, and equity wealth all combined ($a^r+a^e+a^n$).
(2): Financial wealth terms (a^e+a^n) are combined and estimated separately from residential wealth (a^r).
(3): Residential and non-equity wealth (a^r+a^n) are combined and estimated separately from equity wealth (a^e).
(4): Separate coefficents for residential, non-equity, and equity wealth (a^r, a^e, a^n).

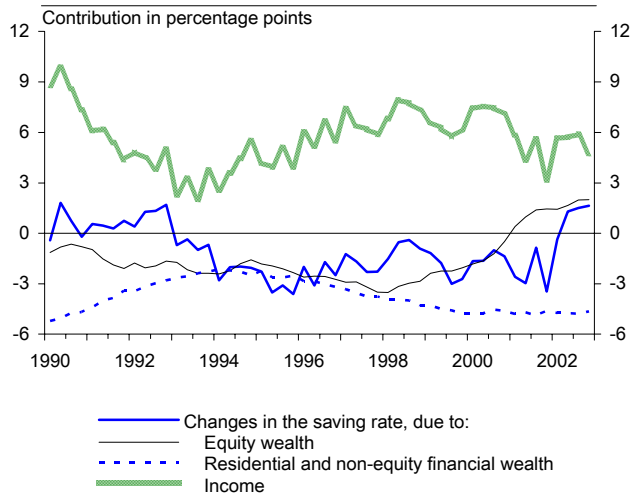
10. ***The consumption equation indicates that the personal saving rate is about 1 percentage point lower than the rate determined by fundamentals (Figure 4).***[8] Since saving is the residual between disposable income and consumption, the fitted values for consumption from the preferred equation (column 3) imply an equation for the saving rate.[9] The fitted value of the personal saving rate is calculated at 4½ percent at end-2002, compared with the actual rate of 3½ percent, suggesting that the saving rate was only modestly out of line with prevailing levels of household income and wealth.

Figure 4. Personal Saving Rates
Actual and estimated rates from long-run relationships



11. ***The estimates from the long-run equation also confirm that the sharp retrenchment in equity prices has had a substantial effect on the saving rate*** (Figure 5)**.** After declining steadily since the early 1990s, the personal saving rate rose by around 2 percentage points during 2000-2003. The model parameters suggest that the decline in equity wealth accounted for all of the increase, since it helped to push the saving rate up by 2 percentage points.[10] At the same time, strong income growth also continued to exert upward pressure on the saving rate. These factors more than offset the dampening effect on the saving rate of the strong growth of residential and non-equity financial wealth.

Figure 5. Changes in the Personal Saving Rate
3-year change in selected components of the saving rate



[8] The FM-OLS results from Cerisola and De Masi (1999) were duplicated using data from this paper, with the personal saving rate a function of: wealth to income ratios, the general government fiscal balance, and Social Security and Medicare transfers. These results suggest an "equilibrium" saving rate of 5 percent, only somewhat higher than estimated by this paper.

[9] Technically, equation (1) provides an estimate for consumption *services*. To derive the fitted value of consumption, the fitted value of consumption services is adjusted by the difference between actual consumption and consumption services.

[10] The components in Figure 5 may not sum to the total changes in the personal saving rate because the equation in (1) does not lend itself to a close-form solution for the saving rate, and because the trend term and residual terms are not included in the chart.

C. Does Saving Pose a Risk to the Outlook?

12. ***Despite the moderate shortfall in personal saving relative to levels determined by income and wealth, any upward adjustment could weigh on the short-term outlook.*** If saving were to adjust by the full 1 percentage point of disposable income necessary to return the actual rate to its fitted value, the effect would be to reduce GDP growth by around ¾ percentage points.

13. ***Furthermore, a larger correction in the saving rate remains a risk if the economic recovery disappoints.*** Because the rise in housing and other forms of wealth has been relatively strong, a slower-than-expected recovery could lead to a continued decline in household wealth and weaker labor market conditions. Net housing wealth, in particular, is vulnerable because a slowing economy could depress house prices—a potential danger because households have borrowed extensively against the value of their homes.[11]

14. ***Finally, the trend decline in the saving rate may not continue into the future.*** As Cerisola and De Masi (1999) highlight, financial innovation has likely allowed households to save less and still achieve the same level of wealth and consumption. If the pace of innovation has slowed or has been nearly completed, the saving rate is unlikely to continue its trend decline.

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[11] See Chapter II for a discussion of real estate market developments.

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Details on Data Construction

Consumption services

This chapter provides a direct estimate of household consumption services, which is then used to estimate long-run cointegration equations. While Lettau and Ludvigson (2001) assume that the flow of consumption services can be proxied by nondurables and services consumption, Rudd and Whelan (2002) note that this approximation is poor. Indeed, when measured properly (below), consumption services is not a constant multiple of nondurable and services consumption—a critical assumption in Lettau and Ludvigson (2001). Nevertheless, the consumption services series is very similar to the personal consumption expenditures, because nondurables and services account for nearly 90 percent of both series.

- The service flow of consumer durables is imputed from the consumer durables stock (from annual BEA data)—following the methodology suggested in OECD (2001, pp. 54-69). It is taken as the **user cost of capital** times the **stock of durables** for each of the 13 major categories of consumer durables.

- The **user cost of capital** requires a measure of depreciation and interest rates for each variable. Depreciation is available from the BEA; the interest rates are calculated assuming that the rates correspond to the interest rates on auto loans, home mortgages, or personal loans (the 13 cost of capital terms use one of these three rates).

- The nominal and real data for the **stock of consumer durable assets** are interpolated to a quarterly frequency, using the quarter's share of nominal spending on consumer durables in the yearly total to allocate the yearly change in the capital stock into each quarter. Thus, the level of the capital stock in the fourth quarter corresponds to the yearly capital stock data, which is measured on a year-end basis. An implicit price deflator is derived from the nominal and real service flow data.

- Once consumption services are available for the 13 categories (in nominal and real dollars), the 13 categories are chain-weighted together to form the flow series for durables consumption. The service flow of consumer durables is then chain-weighted with the consumption data for nondurables and services to form a chain aggregate.

Household net wealth

The Federal Reserve's *Flow of Funds* provides a detailed breakdown of the net wealth position of households and nonprofits. This chapter uses three, broad classifications: **net residential wealth**, **net equity wealth**, and **net non-equity financial wealth:**

- **Net residential wealth** is the difference between owner-occupied real estate assets and household mortgages.

- **Net equity wealth** is calculated as the difference between broad equity assets and security credits. Broad equity assets are defined in Davis and Palumbo (2001, p. 46)

as the sum of: (a) household holdings of corporate equities (*Flow of Funds*, B.100 line 24); (b) corporate equities held by private pension funds (L.119, line 14); (c) corporate equities held by state and local government retirement funds (L.120, line 13); (d) corporate equities held by bank personal trusts and estates (L.116, line 14); (e) corporate equities held by closed-end funds (L.123, line 6); (f) corporate equities held by mutual funds (L.122, line 10); and (g) corporate equities held by life-insurance companies (L.117, line 13), multiplied by the ratio of reserves of life insurance companies (L.117, lines 18 and 19) to the total financial assets of life insurance companies (L. 117, line 1).

- **Net non-equity financial wealth** is the residual of net financial wealth (defined by the *Flow of Funds*) less net equity wealth (as measured above). Non-equity financial assets include: demand deposits, Treasury securities, corporate securities, municipal bonds, the imputed equity value of noncorporate businesses (e.g., sole proprietorships), and non-profits wealth. Non-equity financial liabilities include: consumer credit, bank loans, and nonprofit liabilities (commercial mortgages and trade payables).

- Net wealth of non-profits is included in non-equity financial wealth, even though a significant component of their wealth is in real estate. Since the saving patterns of nonprofits and households are very different (Mead, McCully, and Reinsdorf, 2003), including non-profit real estate wealth in residential wealth would result in potentially biased results for the net housing wealth coefficient.

- Because the service flow of durables is included in consumption services, consumer durable assets are not included in the measure of net household wealth.

Household labor income

Labor income is taken as personal disposable income less: proprietors' income (with inventory valuation and capital consumption adjustments); rental income (with capital consumption adjustments); dividend income; and interest income.

Household normalization

The consumption, wealth, and income terms are all scaled by the number of U.S. households to accurately gauge the effect of household formation rates on the long-run equilibrium relationships.

- While other authors have used per capita consumption, this chapter takes households as the most important unit for consumption and saving decisions. Household formation rates are an important determinant of residential wealth accumulation, which subsequently affects consumption of durables. Additionally, many services are also consumed at the household, and not individual, level—such as utilities and homeowner's rent.

II. ARE U.S. HOUSE PRICES OVERVALUED?[1]

1. ***The recent rapid appreciation of house prices has led to fears that the real estate market is exhibiting signs of a speculative bubble***. After remaining flat through the early 1990s, median house prices in the United States have increased at an annual rate of 4¼ percent since 1995, surging by 6 percent in 2002 (Figure 1a). Against the background of the collapse of equity prices, as well as even stronger price increases in other countries, many analysts have suggested that the U.S. housing market may be overvalued.[2]

2. ***A collapse in housing prices could have adverse consequences for the economy***. For example, the increase in residential wealth has provided valuable support to household balance sheets and consumption growth in recent years.[3] With residential housing accounting for roughly a third of household assets, the appreciation of real estate values has offset a considerable portion of stock losses suffered over the past years, and has allowed households to fund consumption by extracting housing equity through mortgage refinancing (Table 1).

Table 1. Household Balance Sheet Indicators

(In trillions of dollars unless otherwise noted)

		1995-97	2000	2001	2002
Assets		35.9	49.2	48.9	48.1
of which:	Real estate	9.2	12.6	13.7	14.9
	Equity	9.5	15.3	13.0	9.9
Liabilities		5.4	7.5	8.0	8.8
of which:	Home mortgage debt	3.6	4.9	5.4	6.1
	Consumer debt	1.2	1.6	1.7	1.8
Net worth		30.5	41.7	40.9	39.3
Memorandum items:					
Total debt (percent of financial assets)		22.4	22.0	24.8	26.8
Debt service burden (percent)		13.2	13.9	14.4	14.1

Sources: Federal Reserve, *Flow of Funds Accounts of the United States* ; and Fund staff estimates.

3. ***In addition, a weakening of the real estate market would adversely affect financial institutions***. With wholesale banking business yet to recover from a steep drop in recent years and interest income low, origination and refinancing of mortgages have played an important role in sustaining banking sector profits. Moreover, mortgage-backed securities have become an important asset class for financial institutions, and a shock that affected the market value of these instruments could cause system-wide losses.

4. ***However, the empirical evidence discounts the possibility of a nation-wide housing bubble***. Recent studies indicate that some highly-priced metropolitan markets could be vulnerable to a correction in coming years, but view sharp adjustments as unlikely in the absence of substantial adverse shocks to incomes and labor market conditions. These results are confirmed by empirical tests reported below, which suggest that house prices in the

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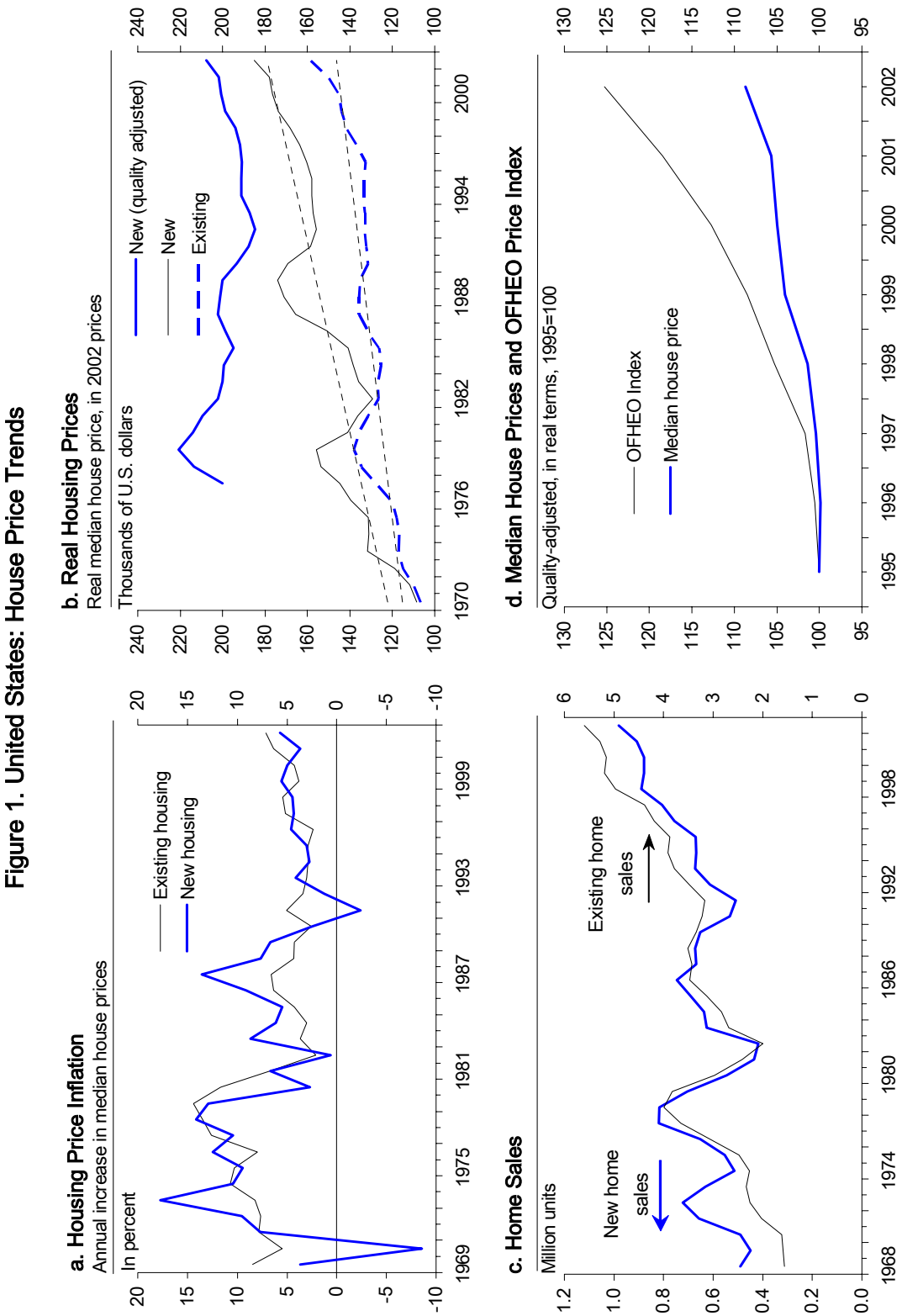
[1] Prepared by Martin Mühleisen and Martin Kaufman.

[2] Concerns also exist regarding the commercial real estate market—where increasing vacancy rates have led to questions about the possible exposure of financial institutions—and to some extent the market for multi-family housing. However, this chapter focuses exclusively on the market for single-family housing, which is of wider macroeconomic relevance owing to its size and importance for household balance sheets.

[3] See the accompanying chapter on household saving in this *Selected Issues* paper.

Figure 1. United States: House Price Trends



United States are currently within—albeit at the upper end of—a range consistent with economic and demographic fundamentals.

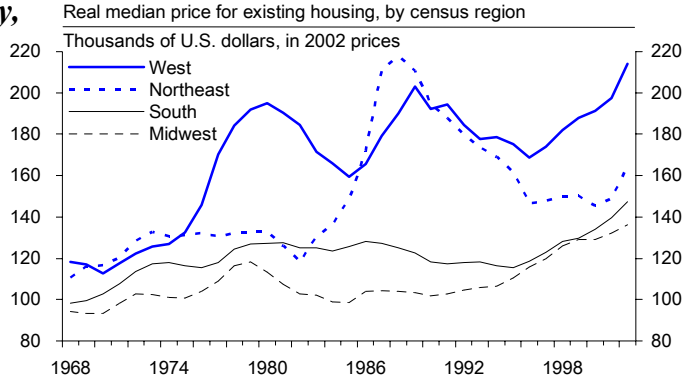
A. House Price Developments: Stylized Facts

5. ***Real house prices have recently appreciated above long-term trend levels*** (Figure 1b). Housing prices have gone through two major cycles in the past 30 years, with periods of relatively strong increases in the mid-1970s and mid-1980s. However, subsequent corrections have typically been relatively mild, as illustrated by the observation that nationwide house prices have hardly experienced annual price declines since 1960. The recovery from the last housing bust in the 1980s was initially sluggish, and prices did not return to their long-term trend before 1999. However, the recovery was remarkable in that it was accompanied by strongly surging sales volumes, with the number of transactions exceeding trend by a significant margin (Figure 1c).

6. ***Price increases appear to reflect a growing demand for higher-quality housing in terms of size, features, and appliances***.[4] As a result, the median price index for new homes, adjusted for quality improvements, has risen at a considerably slower pace than the unadjusted price, barely exceeding its long-term average in 2002 (see Figure 1b). Price increases in recent years have also been concentrated in the higher end of the real estate market, as reflected in the growing divergence between median house prices and the Office of Federal Housing Enterprise Oversight's (OFHEO) price index (Figure 1d).[5]

7. ***On a regional level, the housing market has exhibited stronger volatility, especially in the West and Northeast*** (Figure 2). While recent increases in the real value of existing homes in the South and Midwest represent the first sustained strengthening of market conditions in more than two decades, prices in the West are in their third successive upswing over the same period, having emerged from a major downward adjustment in the early 1990s. The real estate market in the Northeast has been even more volatile, showing a

Figure 2. Regional House Price Developments



[4] For example, the median square footage of new single-family houses has increased by 11 percent over the past decade (to 2,114 sq. ft. in 2002), and the share of new houses with warm-air furnaces as primary heating source has risen 6 percentage points (to 71 percent) over the same period.

[5] OFHEO's price index includes geometric weights based on transaction amounts and therefore gives a larger weight to higher priced houses. Both the median price and OFHEO index are adjusted for quality, although the OFHEO index covers only repeat sales of existing houses with mortgages of conforming size. The two series have moved closely together in the past, and have only recently begun to diverge.

sharp upswing in the late 1980s, followed by a spectacular decline through 1995. Higher fluctuations in these two regions—especially in major cities—have been associated with the boom and bust cycles in the new economy and energy sectors in these areas (Table 2).

Table 2. Real Estate Bull and Bear Markets in Large Metropolitan Areas
(Quarterly house price index, adjusted for CPI inflation)

	1980s Bull Market			1990/91 Bear Market			2000/02 Bull Market	
Location	Peak	Peak	Price Change	Peak	Trough	Price Change	Peak	Price Change[1]
Boston	1979:2	1988:2	111.7	1988:2	1993:2	-24.5	1994:1	71.0
Chicago	1981:2	1989:4	17.5	1989:4	1990:4	-1.4	1996:1	25.5
Houston	...	...	...	1989:3	1990:4	-2.9	1996:1	27.3
Los Angeles	1983:1	1989:4	63.4	1989:4	1995:1	-32.2	1995:3	43.2
New York	1980:3	1988:2	117.1	1988:2	1995:1	-25.9	1996:1	52.3
San Francisco	1980:3	1989:4	64.1	1989:4	1994:4	-23.5	1995:3	74.6
Washington, DC	1982:1	1989:4	37.1	1989:4	1995:1	-15.9	1996:1	34.6

Sources: OFHEO; Fund staff calculations (see April 2003 *World Economic Outlook*).

[1]Appreciation from peak to 2002Q4.

B. Fundamentals Supporting Current House Price Levels

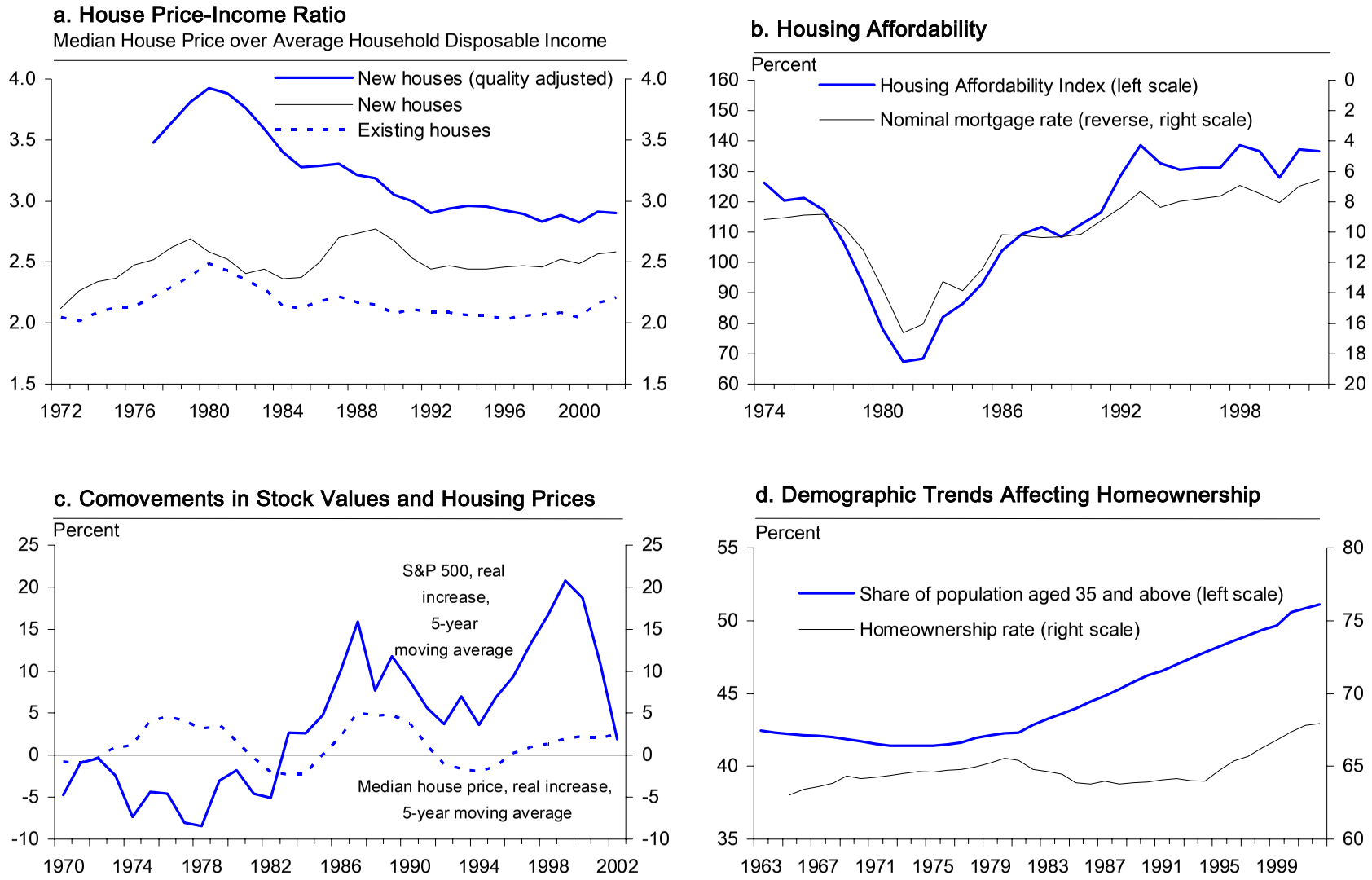
8. ***The strong economic environment of the mid- to late 1990s has helped boost housing demand and prices***.[6] The combination of strong disposable income growth, low interest rates, and large stock market gains has provided a powerful boost to the financial situation of households:

- ***High affordability***. House prices appear not particularly out of line relative to disposable household income—which has grown by an annual average rate of 4 percent since 1990—particularly when viewed in quality-adjusted terms (Figure 3a). Indeed, the Housing Affordability Index—which depicts median family income relative to the income needed to buy a median-priced, existing single-family home—has remained at a comfortable level throughout the 1990s (Figure 3b).

- ***Manageable debt levels***. Declining interest rates have allowed existing homeowners to reduce mortgage payments through refinancing or seek more expensive homes at the same monthly payment. As a result, despite a substantial increase in overall debt, the debt service burden on households has barely increased in recent years (see Table 1). Moreover, financial innovation has allowed households to access home equity more easily, which has contributed to the attractiveness of housing as an investment vehicle and may ease cash-flow problems in an economic downturn.

[6] See Abraham and Hendershott (1996), Malpezzi (1999), and Meen (2002).

Figure 3. United States: Factors Affecting House Prices



- ***Stock market wealth***. Although annual movements of stock values and house prices are generally uncorrelated, medium-term trends in stock and real estate markets appear to move more closely together, particularly during an economic upswing (Figure 3c). This could suggest that the equity gains of recent years have eventually filtered through to the housing market, but the observed co-movement could also be simply a manifestation of a strong underlying economy.[7]

9. ***Demand also has been reinforced by demographic trends that boosted the number of households.*** With home ownership rates increasing sharply for individuals in their thirties, the coming of age of the last cohorts of the baby-boom generation may have had a potentially large impact on the housing market (Mankiw and Weil 1989; Figure 3d). Housing demand has also been driven by a decline in average household size and a pickup in immigration.[8] The number of households rose by 9.7 million between 1996 and 2002, compared to 9.2 million units added to the housing stock during that period, and the home ownership rate (the share of households owning their own home) reached a record 68 percent in 2002.

10. ***The government-sponsored housing enterprises (GSEs) have had an important role in deepening the real estate market and reducing transaction costs.*** The U.S. mortgage market has become significantly more efficient in the past 10-15 years, owing to the growing use of mortgage-backed securities (MBS), which has facilitated the separation of mortgage origination and investment in mortgages (Colton, 2002; Deep and Domanski, 2002). GSEs such as Fannie Mae and Freddie Mac—which issue the bulk of securitized mortgages—have been the driving force in standardizing the mortgage application process and introducing greater levels of competition to the origination business. Greater uniformity in mortgage applications may have led to improved lending standards by facilitating the development of sophisticated scoring models and reducing the room for unsound lending practices.[9] At the same time, these methods reduced costs for mortgage applicants and contributed to improved access to mortgage loans for lower-income households.[10]

11. ***According to one study, high real estate valuations in some urban markets reflect zoning restrictions and other land-use controls.*** Glaeser and Gyourko (2003) found that

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[7] The relationship between equity values and house prices is not *a priori* well defined. During a rise in equity markets, housing demand could either strengthen if households maintained a balanced asset portfolio; or weaken if households sought to shift out of housing and into stocks.

[8] The number of legal immigrants to the United States averaged 900,000 per year in the 1990s—compared to an average of 730,000 in the 1980s—and census estimates also indicate a rising inflow of illegal immigrants.

[9] Mortgage holders may also have benefited from the GSEs holding a large portfolio of securitized mortgages on-balance sheet. Since GSE purchases of MBSs are financed using the GSEs' triple-A rating, this may have at least partially reduced costs to borrowers. This benefit is illustrated by the positive spread between mortgages of conforming size (which are eligible for GSE mortgage pools) and noneligible "jumbo" loans.

[10] Transaction costs for new mortgages have on average declined from 250 basis points of the loan amount in 1985 to below 50 basis points in 2002.

house prices were in general fairly close to physical construction costs in most of the United States. Moreover, the study showed that divergences between house prices and construction costs—which were limited to a few metropolitan markets—were largely related to measures of zoning strictness, as defined by restrictions on the size and characteristics of houses. By contrast, variables relating to the size of housing lots or population density were not found to have a significant influence on house prices, suggesting that supply factors can play a major role in explaining excessive real estate prices in some major urban centers.

C. Are There Reasons for Concern?

12. ***In addition to similarities with earlier boom and bust phases (IMF, 2003), concerns over price sustainability in the housing market derive from four sources***:

- ***Although housing affordability measures are high, some households may be vulnerable to economic shocks if nominal income growth slows***. Should the present low inflation environment persist for some time, nominal household income growth would likely fall below the 4 percent average achieved during the 1990s. In this case, the value of both mortgage debt and debt service relative to income would decline relatively slowly, which may leave households vulnerable to income shocks or unemployment (Baker 2002a).[11] Under such circumstances, homeowners could be forced to sell (or could be driven into default), increasing the supply of existing houses and driving down prices.

- ***An increase in interest rates could similarly affect households' debt-service capacity, as well as dampen housing demand***. As mortgage sizes have generally increased in line with rising house prices, higher interest rates would impose a burden on holders of adjustable-rate mortgages (ARMs) and reduce overall housing affordability. However, the drop in long-term mortgage rates has been accompanied by a decline in the share of ARMs to below 20 percent of newly closed mortgage loans (compared with 30 percent in the 1980s), and the ensuing refinancing wave has also helped increase the average maturity of outstanding mortgage debt.

- ***The recent divergence between house prices and rents is seen by some as signaling the need for a market correction*** (Figure 4). Two recent studies have pointed out that deviations of the house price-rent ratio from its long-term equilibrium are typically not sustained for extended periods (Baker 2002b, Leamer 2002).[12] Krainer (2003)

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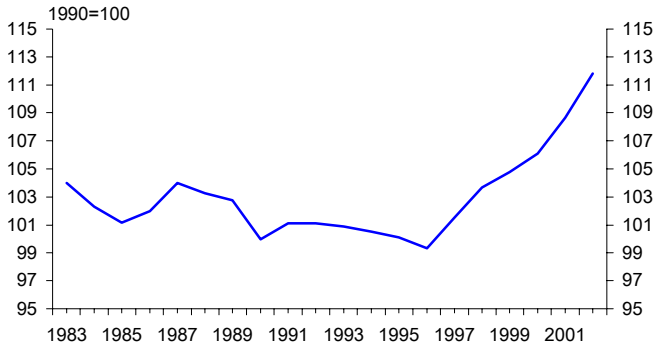
[11] For example, it is assumed that a household today allocates 25 percent of its disposable income to make payments on a new 30-year fixed mortgage at 6 percent interest. If nominal incomes grow by 4 percent per year, mortgage payments account for only 19.8 percent of income by 2008, compared to 22.2 percent under 2 percent nominal growth. After 10 years, the proportions are 15.6 percent and 19.7 percent, respectively.

[12] Similar to the stock price-earnings ratio, an increase in the house-price rent ratio would suggest that house price levels may not be justified by the discounted stream of future rent or imputed rent income.

finds that the house price-rent ratio currently exceeds its long-term average by 10-15 percent, but he also demonstrates that the ratio would return to this average if rents continued to grow in line with their long-term trend and house prices were flat for a period of two to three years—not an unusually long period of sluggish real estate markets.

Figure 4. House Price-Rent Ratio
Median existing house price over imputed homeowner rent



- ***Lower taxes on real estate capital gains could have led to some greater volatility in the housing market***. Housing demand has likely benefited from the 1997 Taxpayer Relief Act, which exempted capital gains of up to $500,000 for married home owners (previously, capital gains taxes could be *deferred*, but only if a house of equal or greater value was purchased at the same time). Moreover, the tax rate on capital gains was lowered to 20 percent, and first-time home buyers were allowed to withdraw up to $10,000 from individual retirement accounts without penalty. These changes could have contributed to an upward price shift in recent years. Moreover, by facilitating the realization and withdrawal of capital gains in the housing market (e.g., through a shift from ownership to rental accommodation), these tax changes could contribute to greater price volatility in the event of market downturn (Knight and Eakin, 1998).

D. Empirical Results

13. ***Recent analyses of house price developments using data for metropolitan statistical areas (MSAs) have found no signs of a nation-wide housing bubble*** (Burns, 2002; JCHS, 2003; Youngblood, 2003; Zandi, 2002). These papers have all come to the conclusion that price levels in most areas are broadly consistent with increases in personal income, although each study identified a (different) group of MSAs where price levels were found excessive relative to fundamentals. Only some 20 MSAs (out of a total of 250 MSAs) were identified as being excessively priced in more than one of the four papers, however. These 20 markets include the largest metropolitan regions in the United States and may therefore account for a more substantial share of the overall housing market than their number suggests.[13] However, deteriorating employment conditions in some of these markets (e.g., around California's Silicon Valley) have had a limited impact on housing price inflation; indeed, signs of an actual price decline only exist in one MSA so far. This appears broadly consistent with the

[13] These markets are located in the states of California, Colorado, Florida, Massachusetts, New Jersey, New York, Washington, and the District of Columbia. Together, these states account for about 25 percent of the single-housing stock in the United States.

consensus view that only a relatively large shock to employment and incomes would lead to an actual drop in house prices.

14. ***These studies are supplemented by the estimation of a housing market model that allows for the interaction of supply and demand effects.*** The model consists of two equations, which were estimated jointly using a three-stage least squares approach:

$$p_D = \alpha_D + \gamma_D s + \boldsymbol{\beta}_{\mathbf{D}}' \mathbf{x}_{\mathbf{D}} + \sum_i \delta_{D,i} d_i + \varepsilon_D$$

$$p_S = \alpha_S + \gamma_S s + \boldsymbol{\beta}_{\mathbf{S}}' \mathbf{x}_{\mathbf{S}} + \sum_i \delta_{S,i} d_i + \varepsilon_S$$

with *D* and *S* representing demand and supply, respectively. Endogenous variables included real house prices ($p_D = p_S$) and the number of homes sold (s). The model was specified separately for new and existing home prices.[14] Explanatory variables were chosen as follows:

- On the ***supply*** side, $\boldsymbol{x_S}$ initially included construction costs, the housing stock, and home ownership levels. The latter two variables proved insignificant and were replaced by a time trend in the new house price model (to broadly capture quality improvements); and by average household size in the model for existing home prices (reflecting a relative supply shrinkage caused by an aging population). The d_i are dummies for U.S. Census regions.

- On the ***demand*** side, $\boldsymbol{x_D}$ included real disposable income, the real mortgage rate, the unemployment rate (a measure for income uncertainty), financial wealth, and a variable representing the age structure of the U.S. population. The last two variables were dropped, however, due to insignificance in both specifications.

15. ***The results suggest that recent price increases are largely explained by economic fundamentals*** (Table 3). As expected, the income variable was strongly significant, with a marginal income coefficient of 0.7 and 0.5 for new and existing homes, respectively. These coefficients are broadly consistent with results in the existing literature, while also suggesting that new houses are viewed as luxurious, at least relative to older houses.[15] The estimates indicate that house prices are mostly in line with underlying variables, especially in the Midwest and South (Figure 5). In the West and Northeast, house prices are somewhat above model predictions, with a gap between actual and predicted values of 15–25 percent in the West and somewhat smaller in the Northeast.

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[14] Regressions using prices adjusted for quality improvements failed to produce satisfactory results.

[15] As discussed in Gallin (2003), it is hard to identify the statistical properties of house price models, since relatively slow price adjustments in the real estate market imply that the power of tests for co-integration remains rather low. Such a cointegrating vector was found in the model for new house prices, but none could be found for existing home prices, making the estimated coefficients as well as their statistical significance difficult to interpret.

Table 3. Results of Three-Stage Least Squares Regression for House Prices

New House Prices	Coefficient	Std. Err.	Prob	----- 95% Conf. Interval -----	
Supply Equation					
Constant	-15.226	5.251	0.004	-25.517	-4.934
Time trend	2.230	0.465	0.000	1.319	3.140
Number of Houses Sold	0.224	0.067	0.001	0.092	0.355
Construction Costs	0.751	0.274	0.006	0.215	1.288
Midwest region	0.341	0.076	0.000	0.192	0.489
Northeast region	0.670	0.101	0.000	0.471	0.869
Western region	0.339	0.045	0.000	0.250	0.428
Demand equation					
Constant	6.416	1.136	0.000	4.189	8.642
Number of Houses Sold	-0.134	0.104	0.199	-0.338	0.070
Real disposable per capita-income	0.668	0.109	0.000	0.454	0.882
Real mortgage rate	-0.003	0.004	0.399	-0.010	0.004
Regional unemployment rate	-0.242	0.082	0.003	-0.404	-0.081
Midwest region	-0.087	0.117	0.457	-0.316	0.142
Northeast region	0.019	0.163	0.908	-0.301	0.339
Western region	0.086	0.062	0.166	-0.036	0.207

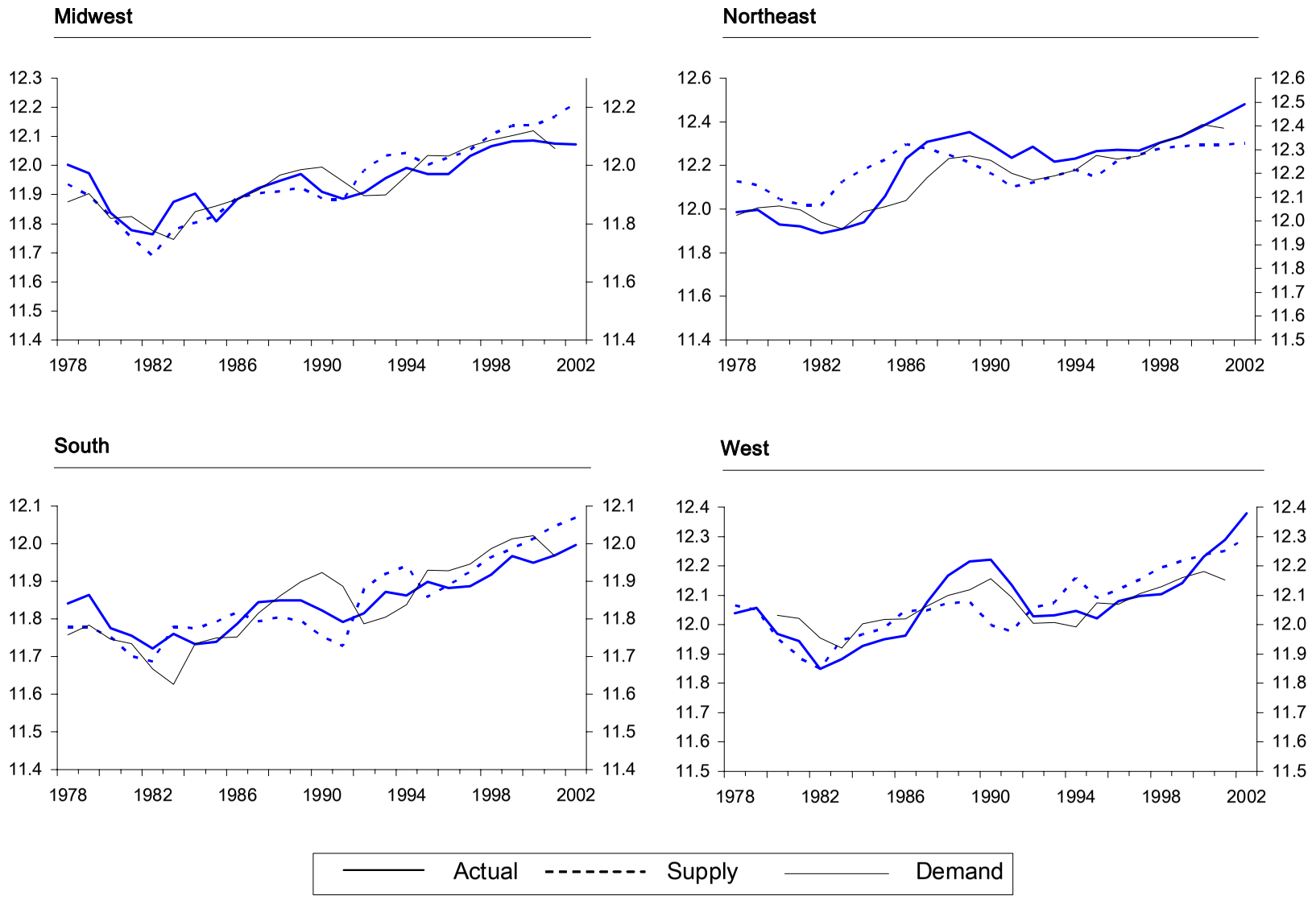
Endogenous variables: Real median house price (dependent variable), number of houses sold.
Annual data by major census regions, 1978-2002.

Existing House Prices	Coefficient	Std. Err.	Prob	----- 95% Conf. Interval -----	
Supply Equation					
Constant	9.001	1.255	0.000	6.542	11.460
Number of Houses Sold	0.194	0.056	0.000	0.085	0.303
Household size	-1.312	0.613	0.032	-2.514	-0.110
Construction Costs	0.554	0.291	0.057	-0.016	1.123
Midwest region	-0.045	0.035	0.193	-0.113	0.023
Northeast region	0.406	0.057	0.000	0.295	0.517
Western region	0.484	0.043	0.000	0.400	0.568
Demand equation					
Constant	9.447	1.778	0.000	5.963	12.931
Number of Houses Sold	-0.339	0.337	0.314	-1.000	0.322
Real disposable per capita-income	0.525	0.373	0.160	-0.206	1.256
Real mortgage rate	-0.008	0.007	0.302	-0.022	0.007
Regional unemployment rate	-0.254	0.144	0.078	-0.537	0.028
Midwest region	-0.284	0.155	0.066	-0.587	0.019
Northeast region	-0.170	0.368	0.643	-0.891	0.550
Western region	0.150	0.221	0.495	-0.282	0.582

Endogenous variables: Real median house price (dependent variable), number of houses sold.
Annual data by major census regions, 1978-2002.

Figure 5. Model Prediction of New Home Prices

(Logarithm of median price, not adjusted for quality)



Source: Staff Estimates.

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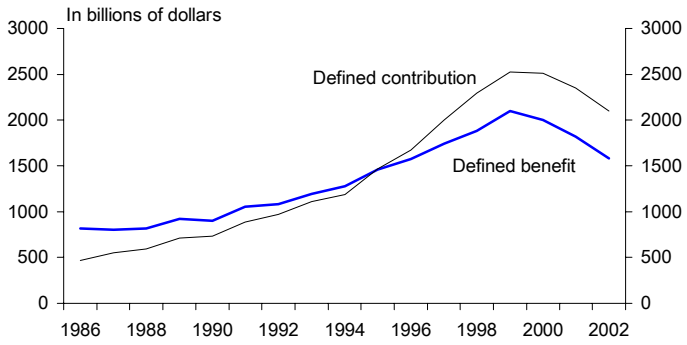
III. Underfunding of Corporate Pension Plans: Macroeconomic and Policy Implications[1]

1. ***The importance of defined-benefit (DB) pension plans in the U.S. pension system has declined in recent years.*** Once a staple of employee compensation packages, these plans—which offer a pre-defined retirement income based on the number of years of service and salary level—are now concentrated in manufacturing and other sectors with heavily unionized labor forces. Instead, defined-contribution pension plans—in which benefits are based on pre-retirement contributions by workers and their employers—have become more prevalent, especially in rapidly growing sectors, reflecting the fact that these plans offer greater employee portability and pose less financial risk for employers. By 2002, assets in defined-benefit plans had fallen to around 15 percent of GDP, compared with assets in defined-contribution plans of over 20 percent of GDP (Figure 1).

Figure 1. Corporate Pension Plans: Total Assets



2. ***DB plans have faced increasing financial pressures in recent years, reaching record levels of underfunding in 2002.*** This development has partly reflected the adverse demographic trends these plans are facing, as the number of retiree participants is expected to exceed the number of contributors for the first time in 2003 (PBGC, 2002). These structural pressures have been compounded by more recent financial market developments. The stock market decline has severely weakened the value of plan portfolios, given that a significant proportion of plan assets—55 percent in 1999—are invested in equities. In addition, the sharp drop in long-term interest rates has substantially increased the discounted present value of future liabilities.

3. ***The funding shortfall has potentially important macroeconomic and policy implications.*** Underfunded pension obligations have already acted as a drag on corporate profits and credit ratings for a number of major U.S. corporations. The recent failure of a number of large companies with significantly underfunded plans has also weakened the finances of the Pension Benefit Guarantee Corporation (PBGC), which is the federal agency that insures private pensions. These developments and related policy issues are analyzed in more detail below. The principal conclusion is that systemic consequences are a concern, but they are mitigated by the fact that underfunding is concentrated in only a few companies and could be alleviated significantly if the economy and financial markets continue to recover. At the same time, there would seem scope for strengthening the accounting treatment of DB pension plans and the financial position of the PBGC.

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[1] Prepared by Calvin Schnure.

A. Factors Underlying the Erosion of DB Plans

4. ***The weakening of the financial position of defined-benefit pension plans has been a relatively recent phenomenon.*** In 1999, pension plans of firms in the S&P 500 had been overfunded, in net present value terms, by nearly $250 billion. However, by end-2001, this surplus was exhausted, and by end-2002, DB plans had a deficit estimated at $216 billion (CSFB 2003). Rating agencies have begun to scrutinize more closely the pension obligations in their assessments of firms' credit worthiness, and have downgraded many companies with particularly large liabilities, causing their stock prices to fall and credit spreads to widen.

5. ***The funding shortfall largely reflects the impact of broader financial market developments.*** Pension plans had sought to limit their exposures to equity markets during the latter half of the 1990s, selling significant net amounts of equities (Figure 2). However, the rapid increase in equity prices still caused the share of pension plan assets held in equities to rise to around 55 percent by the end of the decade (Table 1). The subsequent collapse in stock market prices caused valuation losses totaling roughly $400 billion between end-1999 and end-2002. In addition, lower long-term interest rates used to discount future pension payouts have significantly increased the net present value of pension obligations.

Figure 2. Defined Benefit Pension Plans: Net Purchases of Corporate Equities

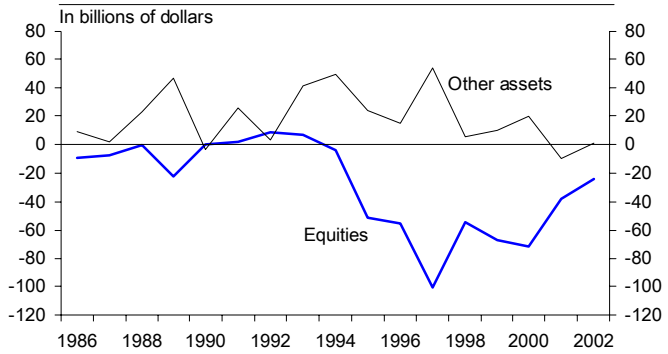

Table 1. Defined Benefit Corporate Pension Plans: Portfolio Composition

(In percent of total financial assets, end of year)

	1985	1999	2002
Corporate Equities	42	55	43
Government Bonds	19	11	15
Corporate Bonds	10	11	15
Mutual Fund Shares	1	6	5
Other	27	17	22

Sources: Federal Reserve, Flow of Funds Accounts, and Fund staff calculations.

6. ***Tax regulations and the stock market boom also discouraged employer contributions to DB plans.*** In particular, contributions are only deductible for income tax purposes if the plan is underfunded, and contributions that take the plan above this point are subject to corporate income tax and an excise tax. With the stock market boom pushing plans into surplus, firms had an incentive to avoid making contributions, even in the face of net withdrawals by retirees.

7. ***Taken from a longer-term perspective, however, pension plans have made significant gains from their holdings of equities.*** For example, data from the Federal Reserve's Flow of Funds accounts suggest that if the share of DB plan assets held in equities

had been strictly limited to 40 percent from the 1980s, plan assets would have been $250 billion below their actual end-2002 level.[2] Although significant losses occurred following the stock market collapse in 2000, these were more than offset by earlier capital gains, which averaged nearly $200 billion per year during the latter half of the 1990s. As a result, while cumulative stock market gains since 1985 have fallen sharply from a peak of $1.4 trillion in 1999, they remained at around $1 trillion at the end of 2002 (Figure 3).

8. ***These conclusions are illustrated by an examination of the finances of a representative sample of 19 underfunded pension plans.*** These 19 firms account for $110 billion of the total underfunding, or slightly more than half the total funding shortfall, for the S&P 500 as a whole (Table 2). Their reports to the SEC provide data that are not available on an aggregate basis, including changes in pension benefit obligations, actual gains or losses on plan assets contributions made to pension plans during the year, and benefits paid. For these companies, nearly half of the deterioration in funding levels since 2000 resulted from stock market losses, with the balance arising from an increase in benefit obligations (due to lower discount rates) and net payouts (Table 3). However, viewed over a longer time horizon—1997–2002—equity market holdings made a positive contribution to funding levels, in excess of $100 billion.

B. Pension Funding and Profits

9. ***Funding shortfalls will need to be met by increased contributions, according to requirements specified by the Employee Retirement Income Security Act (ERISA) and the tax code.*** Underfunded plans are required to return to full funding over a five- to 30-year period. If a plan is less than 90 percent funded, additional contributions are required that would take the plan back to 90 percent within a three- to five-year period. This higher requirement only applies if the plan has been under the 90 percent threshold for two of the last three years, or if it is less than 80 percent funded.

10. ***However, further relief from these funding requirements can be obtained.*** For example, companies can apply for a three-year waiver of funding rules, and the Labor Department is able to extend by as long as ten years the period during which companies are required to amortize funding contributions. Congress also has considerable scope to ease funding pressures. For example, 1997 legislation eased funding requirements for the benefit of one specific transportation company, and legislation is presently being considered that would provide temporary relief to the airlines sector.[3] Legislation in 2002 also raised the interest rate plans are required to use to calculate the present value of pension liabilities to 120 percent of the 30-year Treasury bond yield, and legislation is being considered that would allow plans to discount future pension liabilities using corporate bond rates.

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[2] These data cover all pension plans, based on Form 5500 that plans must file with the Department of Labor. This form lists actual asset market values, rather than the assumed equity returns that are used to calculate reported earnings.

[3] See New York Times (2003).

Table 2. Funding Status of Defined Benefit Corporate Pension Plans
(Year-end; in billions of dollars)

	1997	1999	2002
Automotive and auto parts			
General Motors	-5.0	4.6	-25.4
Ford Motor	3.2	7.9	-15.6
Delphi	0.0	-0.9	-4.1
Goodyear	0.0	0.3	-2.2
Airlines and aerospace manufacturing			
Boeing	7.3	9.4	-7.2
Delta Airlines	-0.1	0.1	-4.9
Lockheed Martin	4.3	6.9	-4.2
United Technologies	0.9	0.4	-3.9
AMR Corporation	-0.6	-0.3	-3.5
Northrop Grumman	1.7	4.1	-3.0
Raytheon	2.3	2.9	-2.9
Petroleum and chemicals			
Exxon Mobil	-3.9	-2.9	-11.4
Du Pont	1.6	4.2	-4.5
Chevron Texaco	0.4	0.7	-2.6
Pfizer	0.1	0.2	-2.6
Other			
IBM	8.3	17.2	-6.5
Hewlett-Packard	0.0	0.1	-2.6
Procter & Gamble	-0.8	-0.9	-1.7
Pharmacia	-0.5	-0.1	-1.5
All 19 companies	19.2	53.9	-110.3

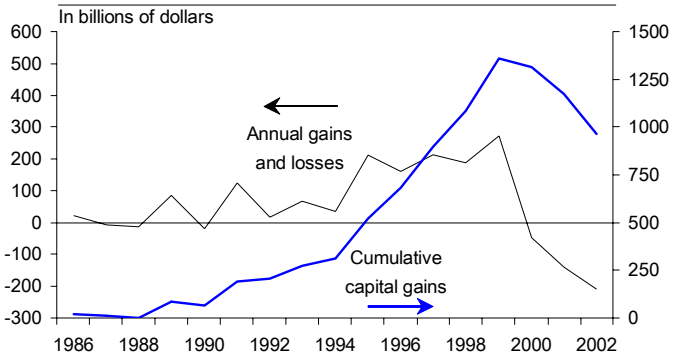
Source: Company 10-K reports.

Table 3. Change in Funding Status of Defined Benefit Pension Plans
(Selected companies, billions of dollars)

	2001-2002	1997-2002
Overall change in funding status	-147	-129
Capital gains/loss(-)	-64	104
Change in pension benefit obligation	-67	-113
Net payout in benefits	-33	-101
Other	17	-19

Sources: Company 10-K reports; Fund staff calculations.

Figure 3. Defined Benefit Pension Plans: Capital Gains and Losses



11. ***Higher contributions will likely weigh on profits in coming years.***[4] Pension costs have already dampened profit growth in 2002, with firms in the S&P 500 tripling their pension contributions over the previous year to $46 billion. As a result, the growth of economic profits was kept to 7½ percent, 5 percentage points lower than would have been the case if contributions had been unchanged (CSFB, 2002).[5] Looking ahead, many firms will need to increase contributions further. For example, benefit payments by the 19 firms examined above currently exceed the level of contributions by a factor of three.

[4] The discussion focuses on "economic" profits in the National Accounts, which provide the broadest measure of corporate earnings in the economy. Economic profits are free of many of the accounting distortions associated with firms' earnings reports, and use actual contributions that firms make to pension plans as the measure of pension costs, rather than an estimate based on assumptions about future asset returns.

[5] The 19 firms examined above accounted for nearly half this increase in contributions.

12. ***However, a strong recovery could help strengthen the financial position of DB plans and ease the burden on profits.*** Higher growth would boost corporate cash flows, improve equity returns, and raise bond yields, all of which would ease the position of DB plans.[6] In order to illustrate this point, staff macroeconomic simulations were constructed for 2003 and 2004: a baseline scenario corresponding roughly to the consensus forecast, and weaker and stronger scenarios around this baseline. Under the baseline scenario, S&P 500 firms would boost contributions and reduce the funding shortfall of their plans to $110 billion by end-2004, from $216 billion at end-2002 (Table 4). A stronger recovery, higher equity prices, and higher bond yields would allow firms to maintain contributions at their 2002 levels while still reducing underfunding to $65 billion. By contrast, a weaker recovery would require a large increase in contributions, sapping profit growth while still leaving pension plan shortfalls at $210 billion.[7]

Table 4. Simulation of Pension Fund Finances

Year	Corporate Contributions ($ billion)	Underfunding of S&P 500 Companies ($ billion)	Impact on Profit Growth (percent)
2002	46	216	-5
	Baseline scenario		
2003	60	170	-2
2004	70	110	-1
	Strong recovery scenario		
2003	46	140	0
2004	46	65	0
	Weak recovery scenario		
2003	85	220	-5
2004	100	210	-2

Source: Fund staff estimates.

C. Pension Funding and the PBGC

13. ***Shortfalls in the defined-benefit pension system have weakened the financial position of the Pension Benefit Guarantee Corporation (PBGC).*** The PBGC—a federal agency that guarantees private DB pensions—is funded by premiums it charges sponsors of DB pension plans. During the past two years the PBGC has had to assume the liabilities of a large number of pension plans that failed, taking on an additional $9 billion in benefit obligations. This factor, as well as valuation losses on its own assets, caused the PBGC's net actuarial position to erode significantly, falling into a $3½ billion deficit (Table 5).[8]

14. ***The financial shortfalls of the PBGC pose policy challenges.*** The size of the Corporation's assets appears to preclude liquidity problems in the foreseeable future. Nonetheless, measures may still be required to address the PBGC's actuarial deficit, especially in the event of significant additional failures of private sector plans. For example,

[6] Projected Benefit Obligations (PBOs) are extremely sensitive to interest rates, and according to one estimate, each 50 basis point increase in interest rates reduces the PBO for S&P 500 firms by $60 billion (CSFB 2003).

[7] However, to the extent that funding problems are concentrated in sectors with significant excess capacity—airlines and autos, in particular—the marginal impact on investment could be muted.

[8] The PBGC also provides a multi-employer program to ensure plans that cover workers from many firms. This plan is much smaller and its total assets exceed total liabilities.

stochastic simulations reported in the PBGC's 2002 annual report suggest that, in the absence of measures, there is only a 30 percent probability that the PBGC would be in a surplus position by 2012.

15. ***The policy options involve difficult tradeoffs, however.*** The PBGC is not explicitly backed by the government, and it relies on premiums to fund its operations. Annual premiums are presently $19 per plan participant, with an additional charge to underfunded plans of $9 per $1,000 of unfunded vested benefits. Although a hike in premiums, or shifting further to risk-based premiums, could be considered, this could create an adverse selection bias, since healthier firms would be encouraged to terminate their DB pension plans by switching to defined-contribution or 401(k)-type pension plans. Indeed, the present system already contains "moral hazards," since firms facing financial difficulty can continue to promise relatively generous pension benefits, which would have to be largely covered by the PBGC if the firm goes into bankruptcy.[9] Thus, restoring the financial position of the PBGC may require a delicate balance between amending its premium structure and a proactive approach to ensuring that insured plans are operated prudently and in a manner that avoid imposing additional large obligations on the Corporation.[10]

Table 5. Financial Status of the Pension Benefit Guarantee Corporation
(Single-Employer Program, billions of dollars)

	2001	2002
Financial Position		
Total assets	21.8	25.4
Total liabilities	14.0	29.1
Net loss	-2.0	-11.4
Net position	7.7	-3.6
Summary of Operations		
Premium income	0.8	0.8
Losses from terminations	0.7	9.3
Investment income (loss)	-0.7	0.3
Benefits paid	1.0	1.5

Source: PBGC, *Annual Report* , 2002.

D. Pension Accounting, Valuation, and Earnings

16. ***The weakness of DB pension plans has spurred greater attention to the accounting treatment of pension funds.*** Current accounting rules allow firms to calculate pension plan earnings using an expected return on pension assets, rather than actual returns. This rule allows firms to avoid having short-term asset price movements affect reported earnings, but

[9] For 2003, the maximum pension guaranteed by the PBGC is about $44,000 per year for workers who retire at age 65 (lower amounts apply to younger participants).

[10] The PBGC's Annual Report (PBGC, 2002) notes "… we remain exposed to further losses from additional large plan terminations. It may be that PBGC's current challenges require a policy response to restore the financial strength of the pension insurance system. Accordingly, we are reviewing every option available to ensure that PBGC remains on a fiscally sustainable path." (p. 3). The PBGC's takeover of the pension obligations of Bethlehem Steel in December 2002 was viewed as a bellwether action, designed to limit the further accrual of pension liabilities in advance of the company's bankruptcy.

may have the undesirable side-effect of obscuring firms' underlying financial position, especially in the event of a prolonged market downswing.

17. ***Indeed, pension earnings have been significantly over-reported in recent years, following significant underreporting during the 1990s.*** The expected return assumed by companies has typically been based on a historical equity return over a period of ten years or so, and thus may have diverged from actual returns by significant amounts.[11] In particular, while many firms have reduced expected return assumptions by a percentage point or more over the past two years, the median expected return is still above 8 percent, well above the sharply negative returns that funds actually achieved during 2001 and 2002. In the case of the representative sample of 19 firms described above, reported earnings exceeded actual returns by $130 billion during the past two years. Although the more recent over-statement of returns is roughly offset by the under-reporting of capital gains during 1995–1999, reported profits can be significantly mis-represented on a year-to-year basis.

18. ***Recent research suggests that the accounting treatment of defined-benefit pension plan assets also distorts equity valuations.*** Coronado and Sharpe (2003) examine the relationship between different categories of corporate earnings and stock market valuations, and find that valuations did not fully differentiate between core earnings and pension earnings. Their analysis suggests that investors placed "an unjustifiably high valuation" on firms with substantial pension earnings, reflecting insufficiently transparent accounting practices.[12]

E. Concluding Observations

19. ***The foregoing discussion suggests a number of points:***

- ***The financial problems of the DB pension plan system that have emerged in recent years do not appear to have been wholly the result of excessive investment in equities.*** The share of DB assets in equities rose during the latter half of the 1990s, but this largely reflected the effect of valuation gains, and valuation losses in recent years have not out-weighed earlier gains. Other factors, including insufficient contributions during the 1990s in the face of long-standing demographic problems, as well as the decline in bond yields, have also been important.

[11] For example, the 19 firms examined above assumed returns of 8 to 10 percent during the 1990s. Actual returns on the S&P 500 between 1995 and 1999, in contrast, averaged over 25 percent. As a result, the income these firms booked on pension plan returns between 1997 and 1999 was $65 billion *less* than their actual gains over this period.

[12] In June 2003, the Financial Accounting Standards Board tentatively ruled that companies will be required to disclose on a quarterly basis the amount of their pension plan contributions, details on plan investment returns, and information on pension costs.

- ***Although pension shortfalls may adversely affect corporate profits in the period ahead, these pressures may abate with an economic recovery.*** In the examples described above, a recovery in line with the consensus macroeconomic forecasts would significantly ease the burden on the system, by boosting stock market valuations and raising interest rates. However, baseline and weaker scenarios would still leave the underfunding significant and could pose continued pressures on some sectors and firms. Restoring the financial position of the PBGC is also likely to require additional measures, and care will be needed to ensure that insured firms do not impose additional burdens on the Corporation.

- ***There is scope for improving the accounting of pension fund results, including by requiring more explicit reporting of the impact of plan returns on reported earnings.*** Although these data are reported in the footnotes to financial statements, transparency would be improved by including this information in a more prominent place in profit and loss statements.

- ***A relaxation of tax penalties against contributions to fully funded pension plans could strengthen the financial position of plans.*** These tax rules were instituted to prevent firms from exploiting the tax-preferred nature of pension contributions. This concern should be balanced against the risk that the failure of a firm with large unfunded benefits jeopardizes the retirement income of employees, and may ultimately cause a burden on taxpayers. Allowing firms to deduct contributions to plans with some higher levels of funding—perhaps 110 percent rather than the current 100 percent limit—could help encourage full funding over the cycle, while still limiting the scope for tax avoidance.

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IV. Domestic and International Impact of U.S. Budget Policies[1]

1. ***The U.S. fiscal position has deteriorated significantly in recent years.*** In 2000, the Congressional Budget Office (CBO) projected surpluses in the range of 3 percent of GDP for the next ten years and for the federal debt to be nearly paid down by 2010. Since then, partly owing to the economic downturn, but mainly reflecting policy initiatives to boost spending and cut taxes, the budgetary balance has swung into substantial deficit. The fiscal deficit seems likely to reach around 4 percent of GDP in FY 2003 and FY 2004 and remain significant well into the future.

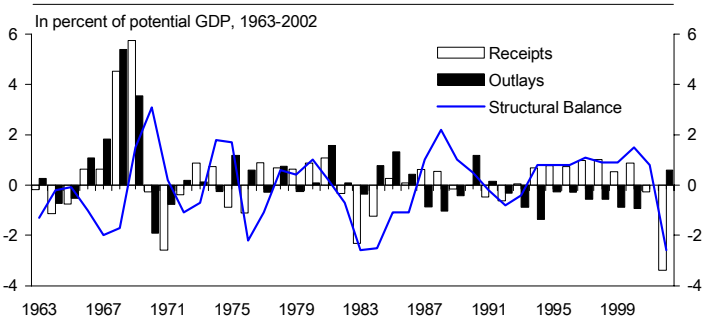
2. ***The turnaround in the fiscal situation—and the Administration's call for further tax cuts—has revived the long-standing debate about the macroeconomic impact of fiscal policies***. On the one side has been the view that tax cuts generate positive supply-side benefits sufficient to offset the adverse effects of higher fiscal deficits on interest rates and lower private investment (CEA, 2003). Others, however, have questioned the size of the supply-side benefits, and have argued that higher deficits would ultimately lower output.

3. ***The discussion in this chapter tends to support the view that budget deficits have adverse effects in the longer run, both domestically and abroad***. In particular, model-based simulations on the Administration's FY 2004 budget proposals, as well as a review of the recent crowding-out literature, suggest that recent U.S. fiscal policies would boost output in the short run, but larger deficits would tend to cause interest rates to rise above and output to fall below their baselines in the longer run.[2] Moreover, empirical evidence suggests that higher levels of U.S. public debt would cause an increase in global interest rates, illustrating the potential for adverse spillovers from U.S. fiscal policies.

A. The Historical Experience and Simulations of the FY 2004 Budget Proposal

4. ***Previous episodes of large fiscal expansion in the United States raise questions about the effectiveness of fiscal stimulus.*** There are three recent cases when the federal fiscal balance fell by at least 1½ percent of GDP, in cyclically adjusted terms, over a two-year period (Figure 1).

Figure 1. Two-Year Changes in Structural Fiscal Variables



[1] Prepared by Roberto Cardarelli and Ayhan Kose.

[2] The Staff report contains a detailed description of the Administration's original FY 2004 Budget proposals and of the tax legislation that was passed in May 2003.

During 1965-67, structural outlays rose by 1.8 percent of GDP, mainly owing to military spending associated with the Vietnam war. Tax cuts caused structural revenues to fall by 1.1 percent of GDP between 1974-76 and by 2.3 percent of GDP during 1981-83. Although the tax cuts were associated with some acceleration in real GDP growth over each of the subsequent three years, real GDP growth declined, or remained essentially unchanged in each of the subsequent ten years (Table 1).

Table 1. Change in Real GDP Growth Before and After Large Fiscal Expansions
(in percent)

	1965-67	1974-76	1981-83
Post 3-year average less pre 3-year average	-2.1	1.7	3.3
Post 10-year average less pre 10-year average	-1.1	-0.3	0.3

Source: Fund staff estimates.

5. ***Simulations of the FY 2004 Budget proposal also suggest that the short-term stimulus would wane quickly***. Table 2 summarizes the results of analyses of the FY 2004 Budget proposals based on macro-econometric models of the U.S. economy maintained by Macro-economic Advisors (MA) and Global Insight (GI). Both models predict that the proposals would have a significant positive effect on output growth over the next two years. However, the boost to aggregate demand would be more modest thereafter, owing to the crowding-out of private investment from higher real interest rates.[3]

Table 2. Estimates from Large-Scale Models
(Real GDP growth, change from baseline; in percent)

Study by:	CEA 1/	CBO 2/		MA 3/	GI 4/	HF 5/	
Model used:	n.a.	MA	GI	MA	GI	GI	Average
2003	0.4	0.5	0.4	0.5	0.2	0.3	0.4
2004	1.1	1.3	1.3	1.0	0.8	0.6	1.0
2003-07 (avg.)	0.2	0.6	1.3	0.0	0.1	0.1	0.4

1/ CEA: Council of Economic Advisors (2003)
2/ CBO: Congressional Budget Office (2003).
3/ MA: Macroeconomic Advisors (2003)
4/ GI: Global Insight (see Newport, 2003).
5/ HF: Heritage Foundation (see Beach, *et al.* , 2003)

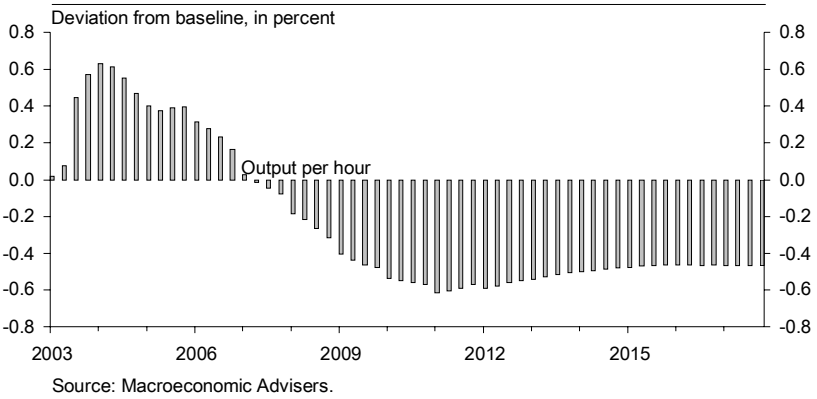
6. ***Moreover, most analyses indicate that the budget would dampen output in the long term***. In most macroeconomic models, the decline of public and national saving implied by the FY 2004 Budget proposals would cause higher real interest rates and lower capital accumulation—for example, in the MA model the effect is to lower labor productivity by about ½ percentage point in 2017, relative to the baseline scenario (Figure 2).

7. ***This result is confirmed by a CBO study that examines the budget proposals from the perspective of several alternative models.*** In a "textbook" neoclassical growth model, in which economic agents do not modify their behavior in response to expected future changes in policy, the budget would lower GDP ¾ percent below baseline during 2009-2013. Using

[3] The studies employ different assumptions regarding the baseline scenario. Further, while the CBO study examines the implications of the entire FY 2004 Budget proposals, the other studies focus only on the Economic Growth Package. Finally, the study by the CEA does not report which model is used, but notes that "the particular values of the numerical estimates presented reflect judgments regarding the implementation of the proposals" (CEA, 2003).

life-cycle and infinite-horizon models, in which economic agents are forward-looking, the CBO shows that the budget proposals would only increase long-run output if the tax cuts are anticipated to be reversed in the future. In this case, households work and save more in order to be able to pay for future taxes, offsetting the crowding-out effect (Table 3).[4] The CBO's analysis also illustrates that, in an open economy context, net inflows of foreign capital can help offset the decline in national savings and alleviate crowding out.

Figure 2. Impact of 2003 Tax Cuts on Labor Productivity



Source: Macroeconomic Advisers.

B. Fiscal Deficits and Real Interest Rates

8. ***A key indicator of the extent to which budget policies risk crowding out private investments is their impact on interest rates.*** Consequently, most empirical analysis of crowding-out has focused on the connection between fiscal deficits and interest rates. This literature is summarized below.

Table 3. Estimates from Small-Scale Models
(Average change in GDP from CBO's baseline, in percent)

	2004-2008	2009-2013
Textbook Growth Model	-0.2	-0.7
Closed Economy Life-Cycle Growth Model		
Lower government consumption after 2013	-0.3	-1.5
Higher lump-sum taxes after 2013	0.5	0.3
Open Economy Life-Cycle Growth Model		
Lower government consumption after 2013	-0.6	-0.5
Higher lump-sum taxes after 2013	0.3	0.6
Infinite Horizon Growth Model		
Lower government consumption after 2013	0.2	-0.6
Higher lump-sum taxes after 2013	0.9	1.4

Source: CBO (2003).

9. ***Simulations of large-scale macro-econometric models generally indicate that budget deficits have a sizeable effect on interest rates***. In these models, the size of crowding-out typically depends on the monetary policy reaction function, the interest rate sensitivity of investment, the openness of the economy, and on how expectations of future policies are modeled.[5] In a recent survey,

[4] In the textbook growth model, labor supply increases because of lower marginal tax rates, but output declines because higher government and private consumption crowds out capital accumulation. It is only when expectations of higher taxes after 2013 induce additional savings that the tax cuts have a positive impact on savings, investment and output (as in the two models with forward-looking agents). This effect is larger in an infinite-horizon model, since agents take into account the higher tax burden on their descendants. In all models, maximum effect is achieved if the future increase in taxation is through higher lump-sum taxes. Estimates assuming an increase in future marginal tax rates fall between those presented in Table 3.

Gale and Orszag (2002) found that the average prediction of these types of models is that a 1 percentage point increase in the primary deficit-to-GDP ratio, caused by a tax cut, is followed by a 40 basis point increase in long-term interest rates after one year, and 60 basis point increase after ten years. This compares to an increase of 60 basis points and 130 basis points, respectively, if the same increase in the primary deficit is induced by higher government spending.

10. ***Econometric estimates of reduced-form models have often provided conflicting results on the relationship between fiscal deficits and interest rates***. This likely reflects the difficulty that studies have faced in taking into account the extent to which long-term interest rates respond to expectations of future fiscal policies, rather than to the current policy stance.[6] More recent papers (surveyed in Table 4) that have sought to address this issue have found a positive and significant impact of expected budget deficits on expected future interest rates—averaging 35 basis points for a one percentage point increase in the deficit-to-GDP ratio, roughly in line with the estimates of the large-scale models.[7]

11. ***The Administration's FY 2004 Budget proposals were accompanied by estimates of much smaller effects of deficits on interest rates.*** These estimates were based on a neoclassical framework developed by Elmendorf and Mankiw (1999), in which real interest rates in the steady state equal the marginal productivity of capital, which in turn depends on the capital share of income and the income-to-capital ratio. Using historical averages for these parameters, and assuming that a one dollar increase in public debt reduces the long-run stock of capital by 60 cents, a 1 percentage point increase in the debt-to-GDP ratio leads to an increase of real interest rates of only around 2-3 basis points (CEA, 2003).[8]

12. ***However, these arguments do not provide significant comfort.*** For example, Laubach (2003) notes that the estimates above would be consistent with an increase of interest rates of approximately 15 basis points following a permanent one percentage point increase in the deficit-to-GDP ratio. Moreover, while the CEA's analysis suggests a

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[5] For a brief description of some of these models in the context of a dynamic scoring analysis of fiscal policy measures (including two large-scale structural models of the U.S. economy used by the Federal Reserve), see Mauskopf and Reifschneider (1997).

[6] Among the studies that find no statistically significant relationship between fiscal deficits and interest rate are the ones by Plosser (1987) and Evans (1987), which proxied expected fiscal deficits using forecasts from vector autoregressive models (VAR). However, the usefulness of this method to capture actual expectations is subject to a series of limitations (Elmendorf, 1993).

[7] A caveat on these results is that the reduced-form relationship between expectations of future budget deficits and interest rates could be driven by changes in the expectations of output growth. However, Elmendorf (1996) shows that this relationship is robust to the explicit introduction of a variable capturing expectations on the future state of the business cycle.

[8] The assumption made by CEA (2003) is that, while private savings do not respond at all to the increase in public debt, around a third of the decrease in national savings is offset by larger capital flows from abroad.

Table 4. Survey of Selected Studies on the Impact of U.S. Deficits on Real Interest Rates

	Crowding out effect (in bps) 1/	Interest rates considered	Fiscal variable	Business cycle regressor
Laubach (2003)	23	10-year Treasury bond yield expected over the next 5 years	CBO 5-year ahead forecast	No
"	36	5-year Treasury bond yield expected over the next 5 years	OMB 5-year ahead forecast	No
"	9	10-year Treasury bond yield	CBO 5-year ahead forecast	No
Canzoneri, Diba, Cumbi	60	Slope of yield curve (10-year note less 3-month bill)	CBO 5-year ahead forecast	No
"	40	Slope of yield curve (10-year note less 3-month bill)	CBO 10-year ahead forecast	No
Elmendorf (1993)	49	Change in 3-year Treasury bond yield	DRI forecast of deficit/GDP ratio	Unemployment rate

1/ Increase in interest rates caused by a 1 percent rise in the deficit/GDP ratio.

relatively modest interest rate effect, this is predicated on a substantial degree of crowding out. In the CEA's example, a 5 percent of GDP increase in government debt would lower the capital stock by around 3 percent of GDP, which given estimates of the gross marginal productivity of capital of around 10 percent would be consistent with a permanent reduction in output of roughly one third of a percent.

C. International Implications of Higher U.S. Public Debt

13. ***The integration of capital markets over the last three decades suggests the possibility of important spillovers from U.S. fiscal policy to the rest of the world.*** Higher fiscal deficits and public debt in one country will tend to absorb global savings and might cause higher world interest rates. This proposition is examined below.

Table 5. Correlations of G-7 Real Interest Rates (1977-2002)[1]

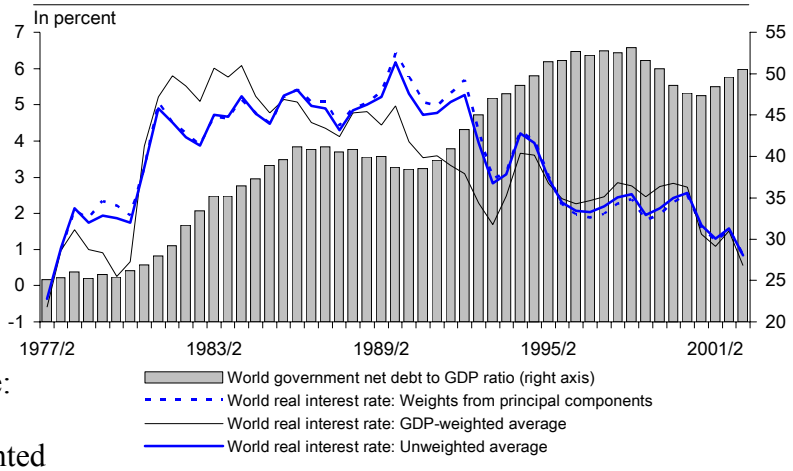
	Canada	Germany	U.K.	Japan	U.S.	France	Italy
Canada	1						
Germany	0.7	1					
United Kingdom	0.6	0.4	1				
Japan	0.7	0.7	0.5	1			
United States	0.6	0.3	0.5	0.5	1		
France	0.6	0.5	0.6	0.7	0.5	1	
Italy	0.7	0.5	0.7	0.5	0.5	0.8	1
World	0.8	0.8	0.7	0.8	0.6	0.8	0.8

Source: OECD

[1] Interest rates are 12-month Euromarkets interest rates deflated by the same period CPI inflation rate. The world real interest rate is the simple average of national rates.

14. ***Country-specific real interest rates have tended to move together over the last three decades.*** Table 5 shows that the real interest rate correlations for industrialized countries are all positive and generally quite high, which some authors have argued suggests the existence of a "world" real interest rate.[9] Figure 3 shows the evolution of different proxies for this rate: the unweighted average of the national rates, their GDP-weighted average, and a measure based on the first principal components of the national rates. Each of these indices exhibited significant increases during most of the 1980s, a period of rapid growth of world public debt, but declined over most of the next decade despite still-high levels of world public debt.

Figure 3. World Government Net Debt to GDP Ratio and World Real Interest Rate



15. ***Several studies have suggested that "world" fiscal policy matters for the determination of national real interest rates***. Net public debt is found to be a significant determinant of the "world" real interest rate in Helbling and Wescott (1995) and of national real interest rates in Orr and Conway (2002). Ford and Laxton (1999) estimate the impact of world government net debt and consumption on national real interest rates of selected industrialized countries. They find that a 1 percentage point increase in world net government debt raises real interest rates by around 20 basis points. The main results and estimation methodologies adopted by these three papers are reported in Table 6.

16. ***The relationship between national real interest rates and world public debt is re-examined below.*** The sample comprises 11 industrialized countries (the G-7 countries plus Belgium, Netherlands, Switzerland and Denmark) over the period 1977-2002. The interest rates used are the 12-month Euro market interest rates on certificates of deposits, deflated by the same-period CPI inflation rate. Two approaches were used in this chapter. First, each country's real interest rate was regressed by OLS on two world fiscal variables, namely, the net public debt-to-GDP ratio and the share of real GDP absorbed by government

[9] Using panel data techniques, Gagnon and Unferth (1995) show that national real interest rates do not exhibit persistent deviations from a common world interest rate, defined as the simple average of the rates of nine OECD countries. The only exception seems to be the United States, a result that the authors suggest may be reflecting the lower trade integration of this country with the rest of the world. On the correlations reported in Table 4, it should be noted that since 1999 the European countries that joined the Euro have essentially shared the same interest rate.

Table 6. Survey of Selected Studies on the Impact of World Fiscal Variables on Real Interest Rates

Authors	Crowding out effect (in bps)	Interest rates considered as dependent variable	Fiscal Regressor	Expected Inflation	Methodology and period
Helbling-Wescott (1995)	16-20	World (GDP weighted) 3-month Treasury bill yield	World (GDP weighted) gross government debt to GDP ratio	Exponential smoothing	Cointegration analysis through dynamic OLS and error correction model (1960-1993)
"	37-50	World (GDP weighted) 3-month Treasury bill yield	World (GDP weighted) net government debt to GDP ratio	"	"
"	10-13	World (GDP weighted) 10 year Treasury bond yield	World (GDP weighted) gross government debt to GDP ratio	"	"
"	16-42	World (GDP weighted) 10 year Treasury bond yield	World (GDP weighted) net government debt to GDP ratio	"	"
Ford-Laxton (1999)	17-23	National 12-month Euromarket certificates of deposits interest rate	World (GDP weighted) net government debt to GDP ratio	Same year CPI inflation rate	Pooled OLS and SURE time series estimation, imposing equality of coefficients across countries (1977-1997)
Orr and Conway (2002)	16	National 10 year government bond yields	National net government debt to GDP ratios	Hodrick-Prescott filter of CPI inflation rate	Error correction model estimation, imposing equality of long-term coefficients across countries (1986:Q1-2002:Q1, countries: Australia, New Zealand, USA, UK, Canada, Sweden, Germany).

1/ Increase in interest rates caused by a 1 percent increase in the government debt/GDP ratio (in bps)

consumption and investment.[10] Second, the data were pooled and the 11 equations were estimated as a system, imposing the constraint that the coefficients of the fiscal variables were the same across all countries.[11] Instrumental variables were used to avoid potential biases stemming from the dependence of public debt on interest rates.[12] The system estimates were derived using a Generalized Method of Moment (GMM) estimation methodology, which yields consistent and asymptotically normal estimators under relatively unrestrictive assumptions on the error term and regressors.

17. ***The regression results generally confirm that an increase in world public debt affects national real interest rates, but cannot rule out the existence of a break in the relationship over the 1990s.*** The OLS coefficients of the world fiscal variables have the right signs, but only in few cases are significant at a 5 percent level (Table 7). The results also indicate that augmenting the OLS regressions with the country-specific public debt-to-GDP ratios does little to improve the results, as this coefficient is rarely both significant and positive.

18. ***The system estimates show that both world public debt and government absorption are significant determinants of national real interest rates***. A 1 percentage point increase in the world government debt to GDP ratio induces an increase in national real interest rates of around 10 basis points over the 1997-2002 period (Table 8). This result is robust to the addition of other variables, such as those capturing the business cycle and monetary policy and inflation changes. Given the relatively scarce number of observations available, however, it is difficult to test for the stability of the coefficients over the period considered.[13] Moreover, as most of the desirable properties of GMM estimators are only valid asymptotically, the point estimates should be taken with caution. With these caveats in mind, these estimates suggest that the 15 percentage point increase in the U.S. public debt ratio projected over the next decade by the CBO would lead to an average ½-1 percentage point increase in national real interest rates.

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[10] This captures the two channels through which fiscal policy is supposed to crowd out private investments, the "portfolio" channel (via higher public debt) and the "transaction" channel (via higher government spending). Following Ford and Laxton (1999), the change in real government consumption is also used as a regressor. As economic theory suggests that both the fiscal variables (expressed as a share of GDP) and the real interest rates are stationary, no attempt is made to estimate a long-run relationship between these variables using a cointegration approach.

[11] This approach improves the efficiency of the estimators, if disturbances are correlated across countries, and also increases significantly the degrees of freedom, as it allows estimating the coefficients of the fiscal variables using a much larger number of observations.

[12] The list of instruments consists of the lagged values of the world net government debt to GDP ratio, plus the other fiscal regressors which are taken as predetermined. The Wu-Hausman test reported in Table 7 supports this choice, as it failed to exclude the exogeneity of the world net public debt to GDP ratio in the interest rates OLS regressions, while it could not rule out the exogeneity of government consumption. This may reflect the fact that government consumption does not include interest paid on the stock of debt.

[13] A Chow test on the stability of the coefficients in two equally sized sub-samples rejects the null of stability.

Table 7. OLS Regressions of Real Interest Rates on World Fiscal Variables 1/

	c	WGND 2/	WGA 3/	DWGA 4/	R Sq.	DW	Wu-Hausman test 5/ WGND	Wu-Hausman test 5/ WGA	National public debt to GDP
Belgium	-16.31	-0.05	1.07	1.13	0.50	0.59	-2.49	-0.52	0.10
	[0.20]	[0.34]	[0.04]	[0.38]					[0.00]
Canada	-29.48	0.11	1.36	-2.08	0.17	0.65	-2.92	-1.03	0.05
	[0.02]	[0.04]	[0.01]	[0.16]					[0.32]
Switzerland	-12.95	0.08	0.54	-0.05	0.10	1.00	-1.98	-0.13	-
	[0.23]	[0.11]	[0.20]	[0.95]					-
Germany	-9.38	0.01	0.57	1.52	0.16	0.61	-2.85	0.65	-0.16
	[0.36]	[0.82]	[0.15]	[0.24]					[0.05]
Denmark	-48.7	0.10	2.29	1.29	0.48	0.59	-1.41	0.14	0.07
	[0.00]	[0.02]	[0.00]	[0.20]					[0.15]
United Kingdom	-53.5	0.26	2.18	-1.14	0.38	0.67	-3.26	0.74	-0.10
	[0.00]	[0.00]	[0.00]	[0.36]					[0.00]
Japan	-40.05	0.07	1.86	1.16	0.49	0.46	-3.86	1.05	0.03
	[0.00]	[0.29]	[0.00]	[0.35]					[0.18]
Netherlands	-26.31	0.00	1.38	-0.31	0.34	0.44	-3.01	0.33	-0.02
	[0.04]	[0.91]	[0.01]	[0.86]					[0.77]
United States	-25.20	0.06	1.21	-2.32	0.14	0.31	-1.05	-0.63	-0.21
	[0.30]	[0.55]	[0.21]	[0.20]					[0.03]
France	-67.10	0.23	2.89	0.48	0.42	0.63	-1.52	-0.26	-0.03
	[0.00]	[0.00]	[0.00]	[0.55]					[0.64]
Italy	-71.95	0.27	3.02	-1.69	0.45	0.89	-1.62	-0.99	0.14
	[0.00]	[0.00]	[0.00]	[0.27]					[0.05]

1/ Data are semiannual from 1977:1 to 2002:2; p-values from Newey-West heteroskedasticity and autocorrelation-consistent standard errors are reported in square brackets. The dependent variables are the national 12-months Euromarket interest rates deflated by the same period CPI inflation rate.

2/ WGND is the GDP-weighted average of national net government debt ratio to GDP, with the only exclusion of Switzerland. GDP is converted using PPP exchange rates.

3/ WGA is the GDP-weighted average of national real government absorption (consumption plus investment) as a share of GDP.

4/ DWGA is the first difference of WGA.

5/ t-statistics of the Hausman-Wu test for the exogeneity of WGND and WGA. The null hypothesis is exogeneity. The list of instruments used comprises the second and third lags of WGND and WGA. Critical values are from the standardized normal distribution (10 percent = ±1.28, and 5 percent = ±1.64).

Table 8. Joint GMM Estimation of National Real Interest Rates Imposing Equality of Coefficients Across Equations 1/

WNGD	0.12	0.09	0.15	0.15	0.16	0.13
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
WGA	1.34	1.34	1.67	1.66	1.92	2.79
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
DWGA	1.24	-0.04	1.10	0.86	0.62	1.41
	[0.00]	[0.88]	[0.00]	[0.00]	[0.05]	[0.00]
Euro Dummy 2/	-1.47	-0.68	-0.94	-0.88	-0.75	-0.32
	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.02]
UNE 3/		0.47				
		[0.00]				
DINFL 4/			0.20			
			[0.00]			
DIRS 5/				0.14		
				[0.00]		
LAF 6/					0.17	
					[0.27]	
PBAL 7/						0.99
						[0.00]
J-statistic 8/	2.75	10.80	0.11	0.11	7.23	5.58
	[0.99]	[0.46]	[0.99]	[0.99]	[0.78]	[0.89]

1/ Data are semiannual, from 1977:1 to 2002:2. Total system observations: 566. p-values are in square brackets. The Heteroskedasticity and Autocorrelation Consistent covariance matrix is estimated based on the Newey and West estimator. The vector of instruments comprises the second and third lags of WNGD and the other regressors.

2/ Dummy for 1999:1-2002:2.

3/ World (GDP-weighted) unemployment rate.

4/ Change in world (GDP-weighted) CPI inflation rate.

5/ Change in world (GDP-weighted) short term real interest rate (CPI inflation deflated).

6/ World (GDP-weighted) labor force growth.

7/ Change in world (GDP-weighted) primary balance.

8/ Model specification test. The Null is that the model is well specified. Critical values are from a Chi-2 distribution with 11 degrees of freedom (equal to the number of overidentifying restrictions in the system).

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V. Budget Crisis of State and Local Governments in the United States: Will it Hinder Economic Growth?[1]

1. ***Following a decade of strong revenue growth, state and local governments (SLGs) are now facing significant budget shortfalls for a third consecutive year***. At a time when the federal government has embarked on expansionary fiscal policies to support economic activity, these shortfalls have raised concerns that corrective budgetary measures taken by SLGs could offset some of the federal stimulus and dampen economic activity. This chapter reviews the principal causes of the state and local fiscal crisis and attempts to quantify its macroeconomic implications.

A. State and Local Government Finances in the United States

2. ***The SLG sector represents an important and growing part of the overall economy.*** Current expenditures by SLGs have grown strongly in recent decades, accounting for nearly all of the 7 percent of GDP increase in general government spending since 1960 (Table 1).[2] Moreover, SLG investment has remained essentially constant in relation to GDP over time, which—given the decline in federal investment—has also made SLGs the principal source of public investment. Growing SLG expenditures have been financed by tax and other revenue increases, amounting to 4½ percent of GDP since 1960, as well as an increase in federal grants of 2 percent of GDP. Indeed, federal grants have become significantly more important for SLGs, accounting for almost one quarter of total revenues in 2002 (Table 2).

3. ***SLG spending and federal grant receipts have increased strongly, partly in response to expenditure mandates by the federal government***. In the United States, SLGs are the primary provider of government services such as education, public infrastructure, and public health and safety for which they receive grants, loans, and tax subsidies from the federal government. In recent years, however, over half of federal transfers have been directed toward income support and health care programs, including welfare, Medicaid, and education.[3] This shift reflects a growing proportion of state expenditure being channeled toward these programs, owing to federal mandates that specify the level of services provided by the states. For example, states participating in Medicaid must administer their programs in a manner consistent with the requirements of the Medicaid Act, which specifies and defines categories of medical services for which federal reimbursement is allowed, and requires that states cover mandatory categories (O'Connell, *et al*., 2003).

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[1] Prepared by Iryna Ivaschenko.

[2] State and local governments are typically aggregated because the breakdown of data between these two levels of government varies across states (see Stotsky and Sunley (1997) and references therein). Local government expenditures were of roughly the same magnitude as those of state governments during 1960-1990.

[3] Federal grants for Medicaid are currently administered on a cost-sharing basis, with the federal share varying across states—from 50 percent to 80 percent—depending on state's per capita income. Welfare programs are financed on a block-grant basis.

Table 1. Government Revenues, Spending, and Investment

(In percent of GDP)

	1960	1980	1990	2002
Current receipts				
General government 1/	24.9	27.4	27.7	27.5
Federal government	17.6	18.7	18.2	17.9
State and local governments	8.0	11.3	11.4	12.5
Federal grants-in-aid to state and local governments	0.8	2.6	1.9	2.9
Current expenditures				
General government 1/	22.7	29.0	30.6	29.9
Federal government	16.3	20.6	21.2	19.9
Federal grants-in-aid to state and local governments	0.8	2.6	1.9	2.9
State and local governments	7.2	11.0	11.4	13.0
Gross Investment				
General government	5.4	3.6	3.7	3.4
Federal government	2.7	1.3	1.5	1.0
State and local governments	2.6	2.3	2.2	2.3

Source: National Income and Product Accounts.

1/ Excluding intergovernmental transfers.

Table 2. State and Local Governments: Composition of Receipts

(In percent of total receipts)

	1960	1980	1990	2002
Personal income tax receipts	6.0	13.4	16.2	15.4
Corporate profits tax accruals	3.0	4.6	3.4	2.6
Sales taxes	28.7	26.2	27.6	25.6
Property taxes	38.4	21.7	24.3	20.5
Contributions for social insurance	1.1	1.1	1.5	0.7
Federal grants-in-aid	9.5	22.8	16.8	23.4

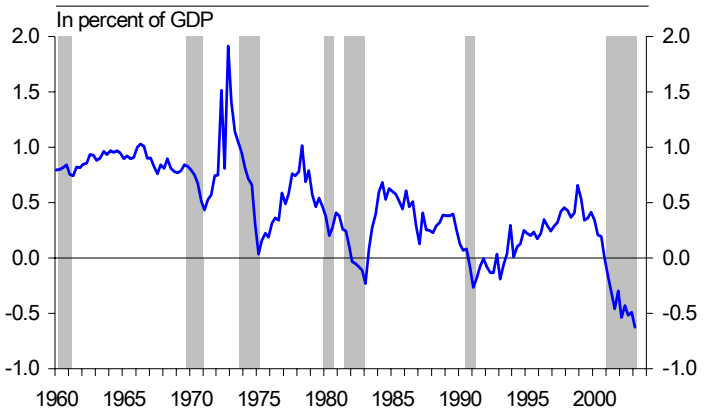
Source: National Income and Product Accounts.

4. ***However, there is little coordination of federal and state tax policies, with the result that states differ greatly in how taxes are raised***. The Constitution grants federal and state governments independent taxing powers, and local governments derive their taxing powers from state governments. As a result, each level of government imposes and administers its taxes independently, and there are no tax-sharing arrangements between the federal and state governments (Stotsky and Sunley, 1997).[4] However, states typically piggyback on the federal income tax code by using federal definitions of personal and corporate taxable income before applying state-specific adjustments. For corporate taxes, most states also use the depreciation schedule applied by the federal government. Nonetheless, the degree of conformity between federal and state tax systems differs significantly across states.

B. Recent Developments in State and Local Government Finances

5. ***The economic downturn in recent years has contributed to a significant deterioration in the fiscal position of state and local governments***. At the end of the 1990s, SLGs were running substantial current surpluses—up to around ½ percent of GDP—benefiting from increased spending discipline and solid economic growth (Figure 1). With the economy weakening, however, state and local governments fell back into deficit in late 2000, with current deficits reaching a post-war peak of ½ percent of GDP in 2002. The budgetary situation appears to remain very difficult—a deficit exceeding ¾ percent of GDP seems likely in FY 2004, with almost 90 percent of states projecting revenue shortfalls that will exceed 5 percent of their general funds.[5]

Figure 1. State and Local Governments: Current Balances

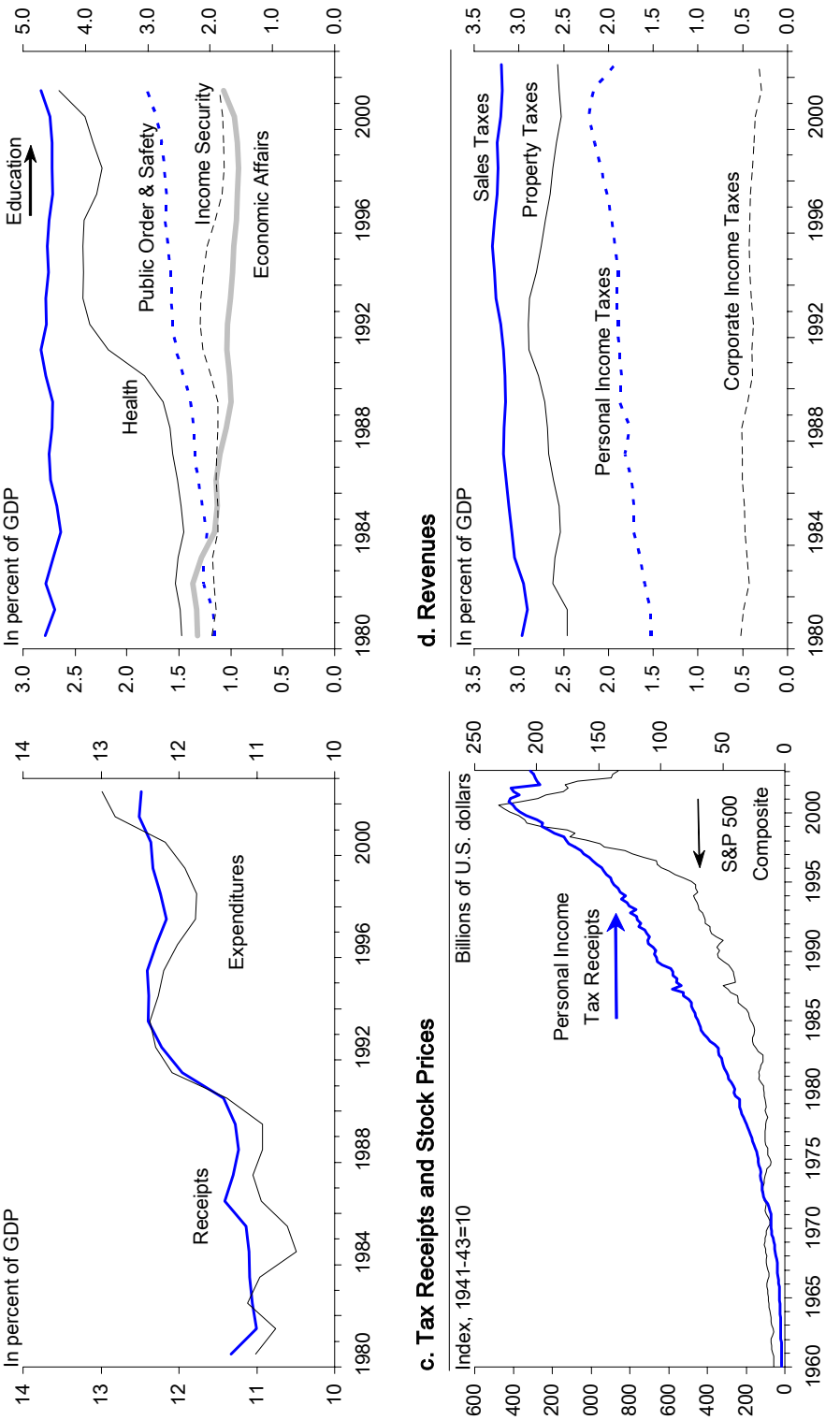


6. ***The shift to deficits was partly caused by a sharp increase in cyclical and health-related spending*** (Figure 2a). Health-related spending grew by ½ percent of GDP during this period, mostly driven by Medicaid spending (Figure 2b, Table 3). This reflected in part the effects of higher demand for Medicaid during the recession, but decisions by many states to

[4] Historically, state estate taxes have been set equal or above the federal estate tax credit—a credit that taxpayers receive against their federal estate tax liability for state estate and inheritance tax payments. However, the federal estate tax is scheduled for repeal beginning in 2005 under the Administration's 2001 tax package.

[5] In most states, the fiscal year runs from July 1 to June 30. The budgetary forecast for FY 2004 is based on data provided by 41 states to the National Conference of State Legislatures through April 2003; and on data from NASBO and NGA (2003).

Figure 2. United States:
Revenues and Expenditures of State and Local Governments



Source: Haver Analytics.

increase the generosity of the system during the 1990s, as well as broader pressures on U.S. health care costs, also played a major role (NASBO and NGA, 2003). Moreover, in response to a tighter labor market and rising unemployment rates, SLG spending on income-support and welfare programs rose by 0.1 percent of GDP between 1999 and 2002.

Table 3. State and Local Governments: Composition of Spending and Investment, 2002

(In percent)

	Spending	Investment
General public service	9.6	9.3
Public order and safety	14.1	4.6
Economic affairs	8.3	37.7
Housing and community services	0.6	8.9
Health	20.7	4.7
Education	36.7	31.6
Income security	8.6	0.7
Other	1.5	2.6
Total	100.0	100.0

Source: National Income and Product Accounts.

7. ***At the same time, a sharp drop in income tax collections hurt states on the revenue side.*** Corporate and personal income tax revenues represent roughly one fifth of total state receipts, and both these revenue sources declined by roughly ¼ percent of GDP during 2001-2002 (see Table 2). Other revenue sources, including sales and property taxes, remained relatively robust, reflecting the strength of consumer demand and the housing market.

8. ***Several factors have contributed to the sharp decline in income tax revenues***:

- The economic slowdown dampened labor incomes, and the collapse of the stock market severely eroded capital gains, especially in California and on the East Coast, where a considerable amount of personal wealth resides (Figure 2c).
- States had responded to the revenue boom of the late 1990s by cutting tax rates, including on property, which left them more dependent on cyclically-sensitive revenue sources such as income tax (Figure 2d).[6]
- Tax cuts at the federal level have also had a (relatively modest) effect on SLG revenues—the 2001 and 2003 tax cuts are estimated to lower state tax revenues by about $5 billion.[7]

[6] Johnson (2002) estimates ongoing revenue losses from tax cuts at around $40 billion. See also Rivlin (2002).

[7] Specifically, the following measures in the Economic Growth and Tax Relief Reconciliation Act of 2001 affected states taxable income base: the increased standard deduction, new rules for individual retirement accounts, and additional deductions for education expenses. In addition, the recently enacted Jobs and Growth Tax Relief Reconciliation Act of 2003 is likely to further reduce state tax revenues. The "bonus depreciation" tax break for corporations, additional deductions for small and mid-size businesses, and increases in deduction for married couples are estimated to cost states $3 billion in lost revenues, absent any measures by states to undo the effect (Johnson, 2003; McLaughlin, 2002).

C. Balanced Budget Rules and Fiscal Adjustment

9. ***Most states are obliged to maintain "balanced budgets," but this requirement did not impose a hard fiscal constraint until recently***. All states but one have balanced-budget requirements, determined either by state constitutions or state law.[8] However, this constraint typically applies only to current budgets, and states are permitted to borrow to fund capital spending. Moreover, there is often some scope to circumvent balanced budget constraints on a temporary basis. For example, many states are only required to balance their budgets on an *ex ante* basis, and most states have scope to delay payments to shift spending into future years by building arrears (NASBO, 2002). In addition, until recently, states have been able to draw on significant reserve funds accumulated during the surplus years of the 1990s.

10. ***However, the depletion of reserve funds means that more difficult adjustments lie ahead***. By the end of FY 2000, state reserve funds stood at about 10 percent of state expenditures, compared to less than 5 percent at the end of the 1980s (Table 4). In recent years, some 16 states have had to cover their deficits by drawing down these reserves, leaving overall reserve balances virtually exhausted by end-FY 2003. This has led some commentators to argue for an easing of legislative limits on the size of rainy-day funds; some studies estimate that states would need reserves of more than 18 percent of expenditures to accommodate a macroeconomic shock of the magnitude of the 1990-91 recession (Lav and Berube, 1999).

Table 4. State Government Budget Reserves
(In billion of dollars, FY)

	2000	2001	2002	2003 1/
Total reserves 2/	48.8	41.0	22.0	6.3

Source: Center for Budget and Policy Priorities, National Governors Association.
1/ Estimated.
2/ Sum of general fund balances and rainy-day funds.

11. ***States have already made substantial adjustments to control budget deficits in FY 2002 and FY 2003***. On the spending side, measures have included hiring freezes, cuts in spending for prisons, education, childcare, and support for local governments (NASBO and NGA, 2003). Medicaid spending has been largely excluded from cuts because of cost-sharing arrangements with the federal government, but states tightened eligibility requirements for optional participants and adopted several cost-saving measures.[9] Little emphasis, so far, has been placed on tax hikes, but states may have some recourse to tobacco settlement funds, which amounted to $32 billion between 1998-2002 (Lindblom, 2003), to cover revenue shortfalls.

[8] Vermont does not have balanced-budget restrictions of any form.

[9] These included tightening eligibility requirements and creating preferred drug lists. Currently 19 states have authorized the use of such lists, compared to three states two years ago, according to the National Conference of State Legislatures. Drug expenses are one of the largest Medicaid spending items (New York Times, 2003).

12. ***Nevertheless, states were also forced into higher borrowing, which in part appears to reflect efforts to reclassify operating expenses as capital expenditures***.[10] This has caused market debt owed by state and local governments to increase from 12 percent of GDP in 2000 to 14 percent in early 2003, still well below the 18 percent peak during the 1990-1991 recession (Figure 3). State credit ratings and risk premiums have not been significantly affected so far, except for several states that are facing more severe financial difficulties (Figure 4).[11]

Figure 3. State and Local Governments: Credit Market Debt

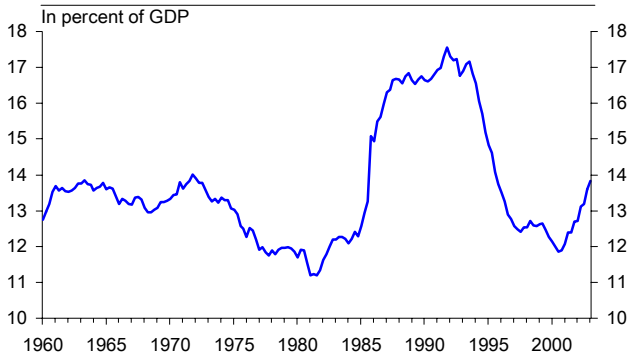
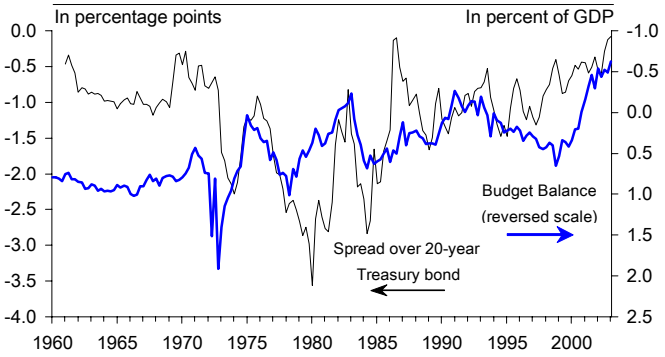


Figure 4. State and Local Budget Balances and Spreads on SLG Debt



13. ***Budget difficulties are expected to worsen in FY 2004.*** Surveys by the National Governors Association suggest that more cuts in program expenditures, including education, human, health services, and aid to local governments, are likely to take place. As a result, state spending is expected to fall by around ¼ percent in real terms in FY 2004. In addition, governors in 29 states have recommended tax and fee increases for FY 2004 with an expected yield of $17.5 billion (or 0.2 percent of GDP)—the largest since 1979.

D. How Much of a Drag on Growth?

14. ***The prospect of significant budgetary adjustments by SLGs raises questions about the possible effects on the broader macro-economy and the recovery***. The policy response by SLGs is likely to be procyclical and work against the substantial stimulus that has been injected by the fiscal and monetary authorities at the federal level.

15. ***Such concerns are partly alleviated by the fact that the size of budget shortfalls is relatively modest.*** For example, the analysis of changes in structural balances of the general and federal governments indicates that the adjustment by SLGs necessary to satisfy their

[10] State and local governments can borrow to ease short-term revenue shortfalls. Stotsky and Sunley (1997) also note that some state governments used short-term borrowing to conceal deficits in their operating budgets.

[11] Premiums have widened for California, New York State and New York City (Financial Times, 2003).

balance-budget requirements would result in a fiscal contraction of about ¼ percent of GDP in 2003, offsetting only a small part of a 1¾ percent of GDP fiscal stimulus injected at the federal level. Moreover, SLG policies are not expected to add to the slight withdrawal of federal stimulus in 2004 (Table 5).

Table 5. Fiscal Impulse By Level of Government
(Calendar year data; in percent of GDP)

	2000	2001	2002	2003	2004
Change in actual balances (NIPA basis)					
General government	0.7	-1.9	-3.0	-1.8	0.6
Federal government	0.5	-1.6	-2.7	-1.9	0.4
Change in structural balances					
General government	0.5	-1.1	-2.7	-1.5	0.4
Federal government (budget basis)	0.5	-1.2	-2.4	-1.7	0.4

Sources: Budget of the U.S. Government, various issues; and Fund staff estimates.

16. ***Significant uncertainty surrounds estimates of the impact of fiscal policy on output.*** Most estimates for the United States place fiscal multipliers in the range of 0.3-1.4 for spending increases and 0.2-1.3 for tax cuts (Hemming, *et al.*, 2002).[12] The low end of these ranges are consistent with the view that the demand-side effects of expansionary fiscal policy are offset by Ricardian effects—i.e., private saving rises in response to fiscal expansions as households prepare for higher future taxes. Indeed, some studies have suggested that fiscal multipliers can turn negative if fiscal policy increases uncertainty or is expected to crowd out private investment (Caballero and Pyndick, 1996; Krugman and Obstfeld, 1997).

17. ***The uncertainty that surrounds these multipliers is illustrated by the results of simple vector-autoregression (VAR) model.*** The VAR approach allows for feedback among macroeconomic and fiscal variables, and has been used in a number of studies to assess the effects of monetary and fiscal policies on output (e.g., Blanchard and Perotti, 2002). The model employed in this study uses quarterly data on the output gap and both federal and SLG fiscal variables, in order to be able to take into account feedbacks between policies at both levels of government. The specific fiscal variables were: tax revenues net of transfers to persons; public consumption expenditure; and federal grants to SLGs. Fiscal variables were expressed as a ratio to GDP and detrended, using an HP filter to exclude long-term trends in the fiscal variables. Revenues and expenditures were also adjusted to exclude intergovernmental transfers. Four lags were employed in the VAR estimation, as suggested by several information criteria tests.

18. ***The results indicate that SLG spending and tax policies could have a significant temporary impact on real GDP.*** A one standard deviation shock to the share of SLG consumption spending in GDP would reduce the output gap—hence increase GDP—by 0.4 percentage points immediately, with the effect slowly decreasing to almost zero by the fifth quarter.[13] At the same time, a similar one standard deviation shock to SLG net taxes

[12] Most of these results were obtained for the general government.

[13] Generalized impulses—a modification of the Cholesky factorization that does not depend on the VAR ordering—are used in the estimation. See Pesaran and Shin (1998) for details.

would have negligible effect on GDP in the first quarter, with the impact slowly building and reaching almost 0.4 percentage points in the fifth quarter. The effect of the tax shock dissipates completely after 6 quarters (Figure 5).[14]

19. ***The results also indicate that fiscal policies of SLG have stronger impact on real GDP than the federal government.*** For example, a one percentage point increase in net federal taxes as a share of GDP would have no significant impact on the output gap, while similar increase in federal spending would reduce the output gap by about 0.2 percentage points in the first quarter. However, the latter effect would entirely dissipate after three quarters.

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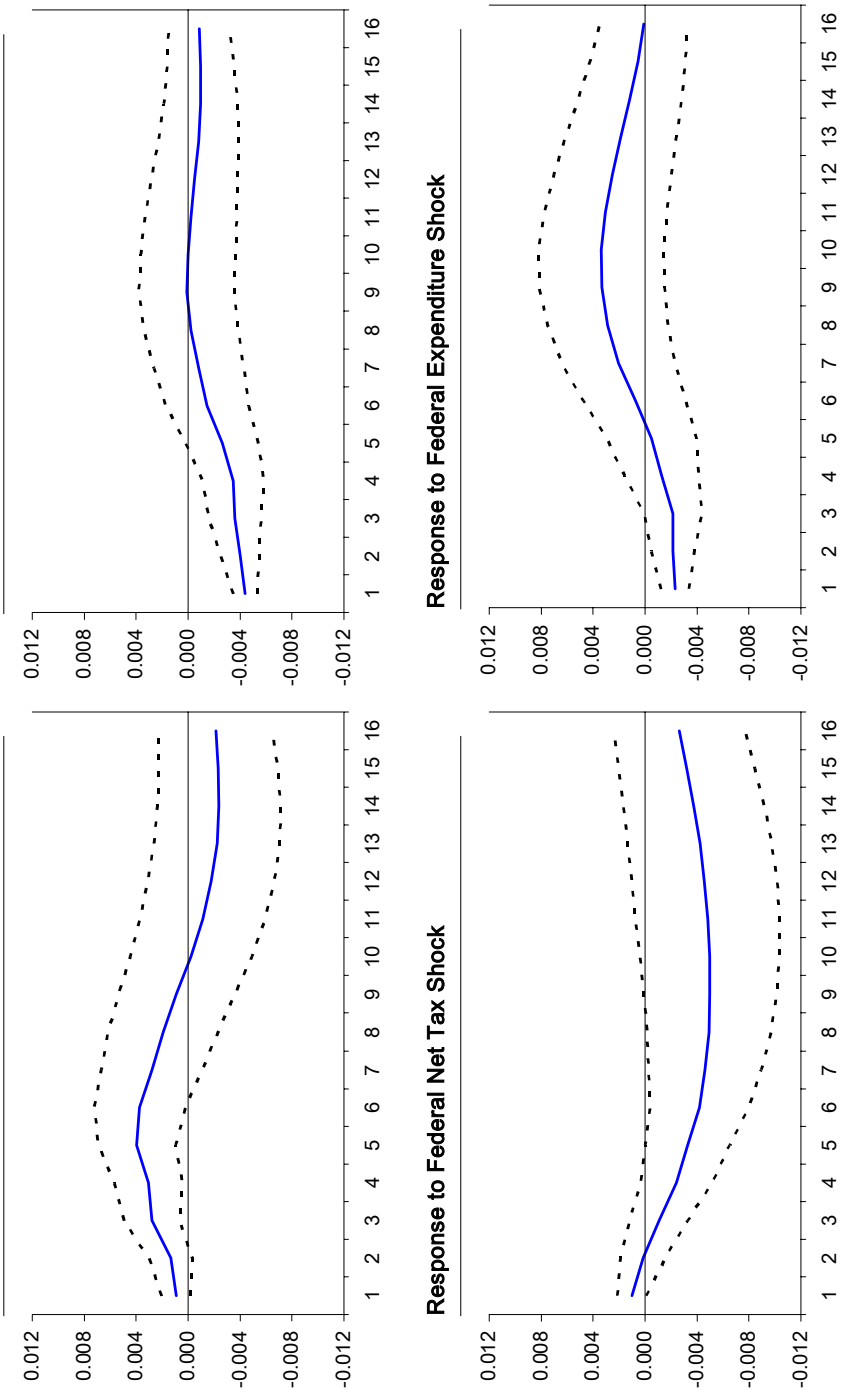
[14] The estimation results should be interpreted with caution since most components of SLG budget data available in the National Income and Product Accounts (NIPA) are available only with a two-year lag and the most recent data are estimated. In addition, most quarterly data are being interpolated from the annual data.

Figure 5. United States: Dynamic Responses of the Output Gap to Fiscal Variables

Dotted lines indicate two standard deviation range



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VI. Effects of Energy Price Shocks on the United States Economy[1]

1. ***The recent volatility of world energy prices has led to concern regarding the potential adverse effects on the U.S. and world economies.*** Geopolitical and other factors helped cause world oil prices to roughly double between late 2001 and March 2003, and prices remained elevated into June. Natural gas prices also have risen sharply, nearly tripling from levels in 2000, amid concerns regarding supply constraints, including in pipeline and storage capacity, and rising demand. The already tentative nature of the current U.S. recovery, as well as the adverse effect of previous energy price shocks—including oil price shock of the 1970s, have led many analysts to worry that high energy prices pose continuing risks to U.S. growth prospects.

2. ***This chapter examines the impact of energy shocks using the IMF's Global Economy Model (GEM).*** The GEM model is particularly useful because it permits the analysis of supply as well as demand effects, reflecting the use of energy as both intermediate and final consumption good. The simulation results suggest that the impact of energy price shocks tends to be moderate, especially if price hikes are short-lived and monetary policy responds appropriately.

A. The Modeling Framework

3. ***GEM is a new open-economy macroeconomic model based completely on a choice-theoretic framework.***[2] A two-country version of GEM is considered here, comprising the United States and the rest of the world. The model includes four types of goods: (1) energy (oil and natural gas) as a tradable intermediate input; (2) a traded intermediate good; (3) a non-traded intermediate good; and (4) a non-traded final consumption/investment good. Energy is used in the production of both the traded and non-traded intermediate goods and consumed directly in the final good. The model incorporates a distribution sector that uses non-traded goods to deliver energy to its final users. This implies that the retail price of energy changes by less in percentage terms than the producer price of energy.[3]

4. ***Energy prices are market determined under monopolistic competition, implying energy firms charge a markup over marginal cost***. Energy is produced with capital, labor and land—a fixed factor—using a constant elasticity of substitution (CES) technology. Price shocks can originate from two sources on the supply side: changes in the quantity of land available for use in energy production, and changes in the markup charged by energy firms. With an extremely large elasticity of substitution between domestically produced and

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[1] Prepared by Benjamin Hunt.

[2] Because adjustment is costly, prices and volumes respond gradually to disturbances, allowing a fundamental stabilization role for policy in GEM. The theoretical structure and the derivation of the model can be found in Pesenti (2003), and an extension of the model fully incorporating the oil market is explained in Hunt (2003).

[3] The model structure implies that distribution costs are fixed in terms per unit. Consequently, the distribution sector has an effect similar to most types of energy taxes. Per unit taxes on energy goods lead to a smaller percentage increase in the retail price of energy than the percentage increase in the producer price of energy.

imported energy goods, changes in the quantity of land, or in the markup in the rest of the world, lead to identical changes in energy prices for both foreign and U.S. producers.

5. ***With two central roles for energy in the economy, each with different frictions, energy price shocks affect volumes and prices with different speeds.*** Because the short-run costs of switching to more energy-efficient production processes are high, profit-maximizing firms respond to increased energy costs by reducing the labor input. The impact on *production output* is therefore felt relatively quickly. However, competitive pressures are assumed to impose costs on firms that change output prices too rapidly, and the effect on non-energy goods *prices* is therefore only felt over time. By contrast, energy price shocks have an immediate impact on the consumer price index, and therefore on real wages and household welfare, because energy is consumed directly in the final consumption good.

6. ***The model was calibrated to reflect U.S. oil and gas usage in 2000.*** Valued in terms of real producer prices, the consumption of oil and natural gas was set at 2.4 percent of GDP, of which 1.1 percentage points are produced domestically and the remainder are imported. The calibration assumes that roughly half of the energy consumed is used in the production of intermediate goods, and another half in the final consumption good.

B. Model Results

7. ***The impact of energy price shocks is illustrated by a 50 percent increase in the price of oil and gas.*** Three alternative durations for the shock are considered: the first alternative has a duration of only one quarter, the second has a half life of one year, and the final alternative has a half life of five years.[4] These shocks are induced by changing the markup charged by the energy producers in the rest of the world.[5] The model incorporates rational expectations, so that future energy price paths are completely understood by all agents. The responses of several key variables are presented in Figure 1.

8. ***Output losses are relatively moderate, including in the case of an energy price shock lasting over several years***:

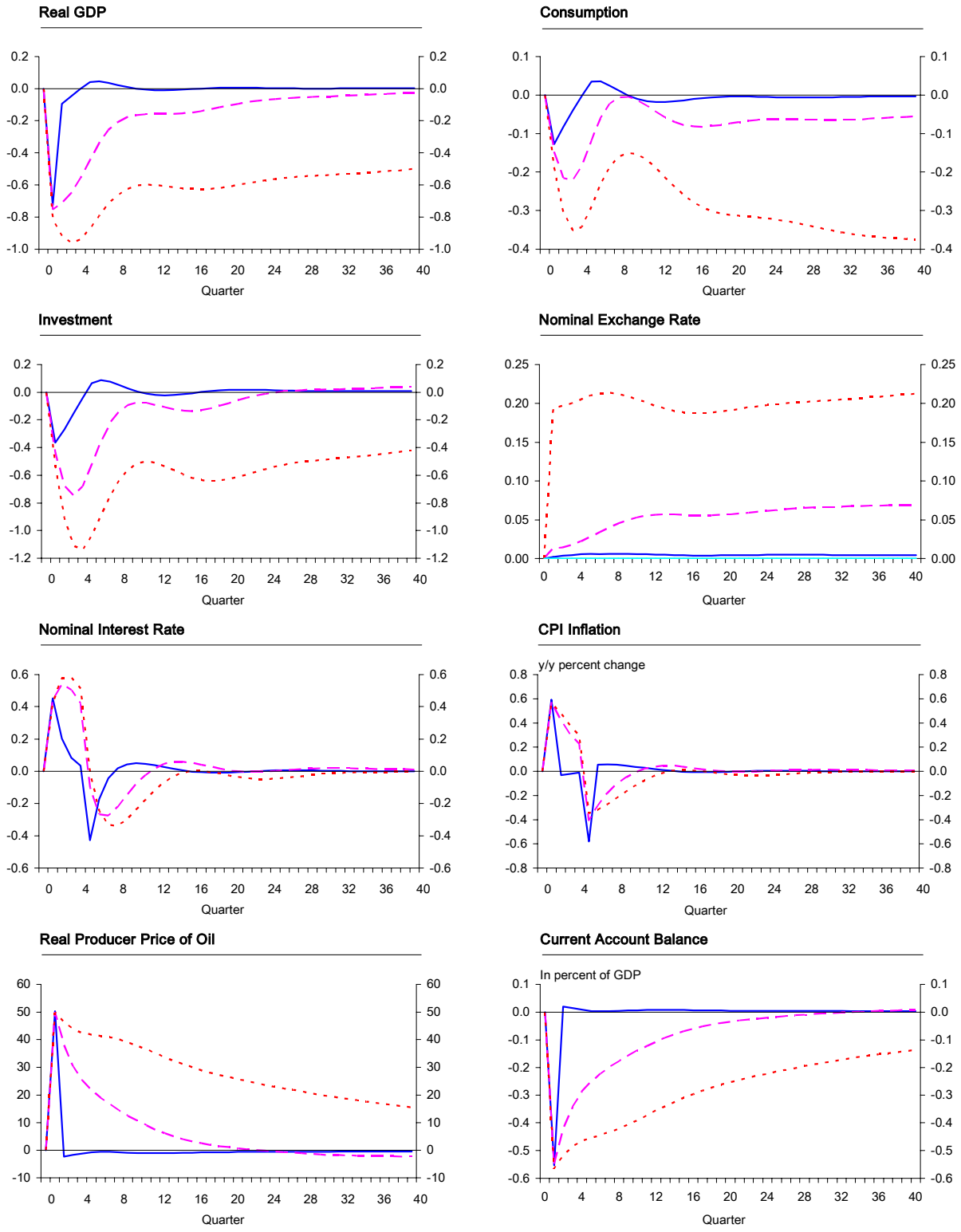
- The simulation results suggest that an energy shock lasting for one quarter reduces real GDP by roughly ¾ percent relative to baseline in the first quarter. However, as the return to the baseline GDP level is almost instantaneous, the long-term impact is negligible. By contrast, effects on output and inflation are longer-lived under a more

[4] A half life of one year implies that the price of energy has moved half way back to its initial level after one year (from 50 percent to 25 percent above baseline).

[5] From a modeling standpoint it is easier to achieve a desired path for energy prices by changing the producer markup than by changing the quantity of land available for energy production. Preliminary work suggests, however, that the source of the shock does not significantly affect its impact.

Figure 1. United States: Impact of a Fifty Percent Increase in the Producer Price of Energy 1/

In percent or percentage point deviation from baseline 2/



1/ Producer price of oil and natural gas.

2/ Solid: Increase lasts for one quarter; Dashed: Increase with one-year half life; Dotted: Increase with a five-year half life.

persistent price shock.[6] In the case of the longest lasting shock, the maximum effect on GDP is a drop of roughly 1 percent occurring after three quarters. Over the long-term, however, this impact gradually eases, with GDP 0.4 percent below baseline after ten years.

- Under the long-lived increase in energy prices, the brunt of the adjustment to energy price shocks is borne by consumers, which own companies and therefore hold all external debt in the model. The initial increase in the current account deficit leads to a higher stock of foreign debt, the servicing and eventual repayment of which depresses consumer spending relative to baseline for a sustained period. Investment initially falls because of an increase in the user cost of capital, reflecting tighter monetary policy, as well as a decline in the return to capital due to increased costs and limited ability to raise output prices. With the capital stock below baseline as the oil price shock dissipates, the gap between the return to capital and its user cost reverses and investment spending will increase above baseline until the two are re-equilibrated. Households supply additional savings to fund this investment, further constraining consumption spending.[7]

- The response of monetary policy is determined by an inflation-targeting monetary policy reaction function, which firmly anchors inflation expectations. Inflation stabilization is aided by the model structure, which assumes nominal wage stickiness (rather than real wage stickiness), i.e., workers do not attempt to maintain real wages even under persistent energy price increases. As a result, CPI inflation increases for a short period initially, but thereafter returns to baseline relatively quickly.

9. ***However, there are several reasons why these simulations may understate the effects of energy price shocks especially when compared to historical episodes***:

- The model assumes that the deterioration in the U.S. current account would be financed by increased borrowing from the rest of the world. However, if the ability to borrow is constrained, including by shifts in confidence or portfolio preferences, U.S. consumption and investment may decline more than these simulation results suggest.

- If the monetary authority was more accommodative of the inflationary impact of the shock, attempting instead to mitigate output effects and, at the same time, workers

[6] Simulations assuming that real energy prices are expected to return to baseline more gradually do not show an appreciably larger first-quarter impact on real GDP or headline CPI inflation. Even if the shock is expected to be permanent, the first quarter impact on real GDP is only 1 percent.

[7] The two-country setup used for this analysis implies that the rest of the world (which includes energy exporters) experiences a positive terms of trade shock. Initially, output in the rest of the world declines by slightly more than in the United States, since production is assumed to be more energy-intensive. Especially under the more persistent shocks, however, the positive income effects eventually lead to a much smaller decline in absorption than in the United States. While the effect on other oil-importing countries would be similar to that in the United States, positive effects would essentially be confined to oil exporters.

bargained aggressively to maintain their real consumption wage, the persistent shock could lead to more persistent CPI inflation and longer-lived real output effects.[8]

- In the simulations, energy-exporting countries—which are included in the rest-of-the-world block—increase consumption in proportion to higher energy revenues. If energy exporters' saving rates temporarily increased, however, as was the case during past oil price shocks, demand for U.S. exports could be weaker than simulated.

- Historically, large shocks to energy prices have often coincided with significant geopolitical events that may have impacted on investor and consumer confidence; however, the energy price shocks considered here have no such effects.

C. Conclusion

10. ***The simulation results presented here suggests that the impact on U.S. growth of temporary energy price shocks should be mild.*** A short-lived spike in energy prices, such as occurred during the past year, would have a modest and short-lived impact on growth. The simulations also suggest that even in the face of expectations that a shock would be longer-lived, the impact on growth would be only marginally larger. However, the results have to be interpreted with caution, in part because the analysis does not incorporate confidence effects of the kind that have accompanied oil price shocks in the past.

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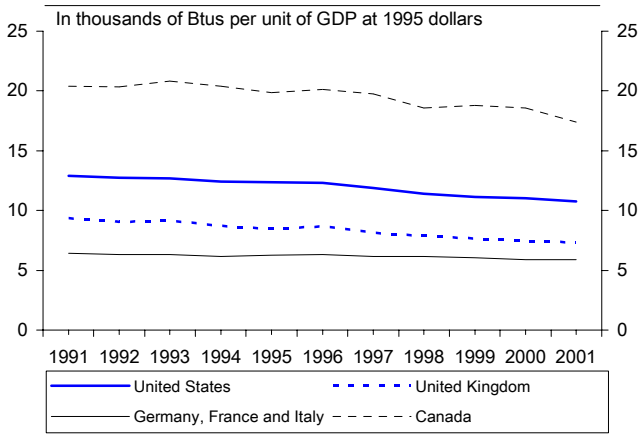
[8] Hunt (2003) considers alternative responses of workers and the monetary authority.

VII. Energy Policy in the United States: The Role of Taxation[1]

1. ***Following the release of the Administration's National Energy Policy in 2001, far-reaching energy legislation is being debated in Congress.*** The current debate seems to be mainly driven by two issues: the geopolitical and economic consequences of the United States' dependence on oil imports; and a recognition of the environmental consequences, including with regard to greenhouse gas emissions, of the energy intensity of the U.S. economy.

2. ***None of the initiatives have laid an emphasis on taxes as a means of discouraging energy consumption.*** The focus, instead, has been on measures geared toward boosting domestic energy supply and developing new technologies to increase the efficiency of energy use. Tax proposals have been limited to providing tax subsidies for domestic energy production as well as the development of energy-efficient production processes, at a substantial fiscal cost. This chapter suggests that there may be a case for considering consumption-based energy taxes in order to meet both energy and fiscal policy objectives.

Figure 1. Energy Intensity of GDP
International Comparison, 1991-2001

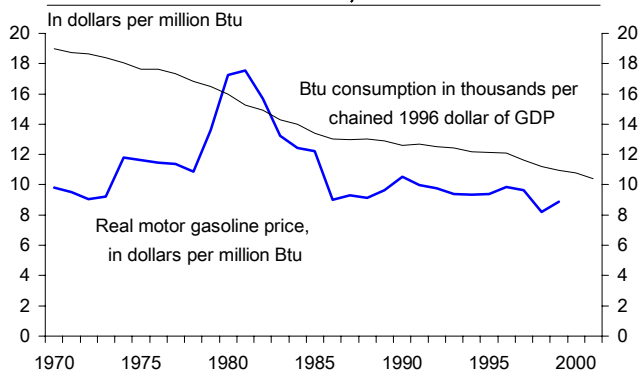


Source: EIA, International Energy Annual, 2001

A. Energy Use in the United States

3. ***Although declining, the energy intensity of GDP in the United States remains well above that in most other industrial countries*** (Figure 1). As in many other industrialized countries, the energy intensity of GDP in the United States has fallen steadily during the last half-century. The drop in energy intensity, measured in British thermal units (Btu) per real dollar of GDP, was particularly rapid from the 1970s through the mid-1980s, when real energy prices were above their historical

Figure 2. United States: Energy Intensity of GDP and Real Motor Gasoline Price, 1970-2001



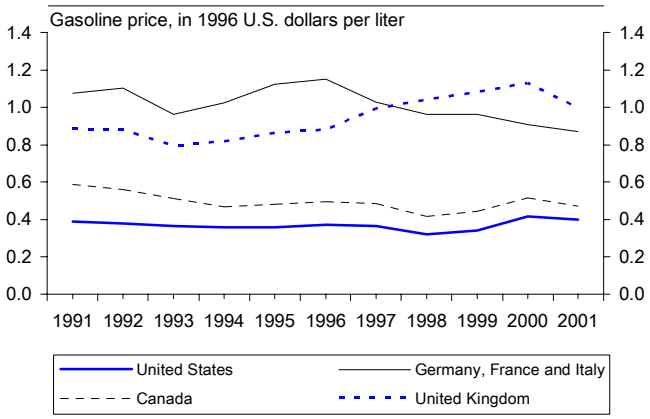
Source: EIA, State Energy Price and Expenditure Report, 1999

[1] Prepared by Jim Prust and Dominique Simard, with the research assistance of Asegedech WoldeMariam. Ben Hunt prepared the simulations presented in the final section.

average (Figure 2). More recently, the decline has accelerated again, partly reflecting a structural shift toward a more information-intensive economy (EIA, 2003). Nevertheless, U.S. consumption remains 30–50 percent higher than in Europe.[2]

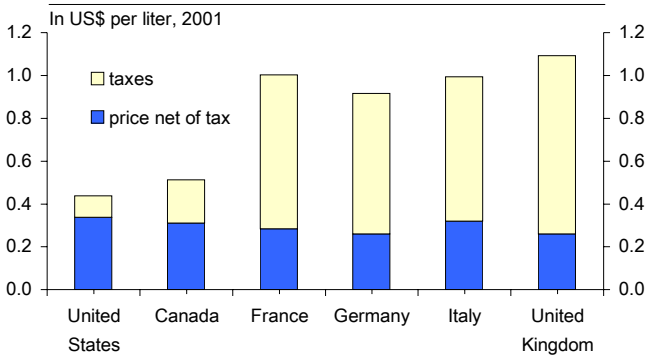
4. ***The higher energy intensity of the United States partly reflects geographic and tax-related factors***. Both the United States and Canada have a relatively high energy intensity, reflecting low population densities and relatively severe and variable climate conditions compared to Europe.[3] However, energy prices in the United States are also significantly lower. For example, average U.S. gasoline prices in 1996 were more than 50 percent below European prices and 10-15 percent lower than Canadian prices (Figure 3), with the difference mostly accounted for by taxation (Figure 4). The prices of most other energy products—e.g., electricity and natural gas—display similar cross-country variation.[4] Canadian prices for natural gas and electricity have in the past tended to be lower than in the United States, reflecting their relatively abundant supply, including from hydroelectric generation.

Figure 3. Real Prices of Premium Unleaded Gasoline



Sources: International Energy Agency, Energy Prices and Taxes; and IMF, World Economic Outlook; and Western Hemisphere Department database.

Figure 4. Prices and Taxes of Premium Unleaded Gasoline



Source: International Energy Agency, Energy Prices and Taxes.

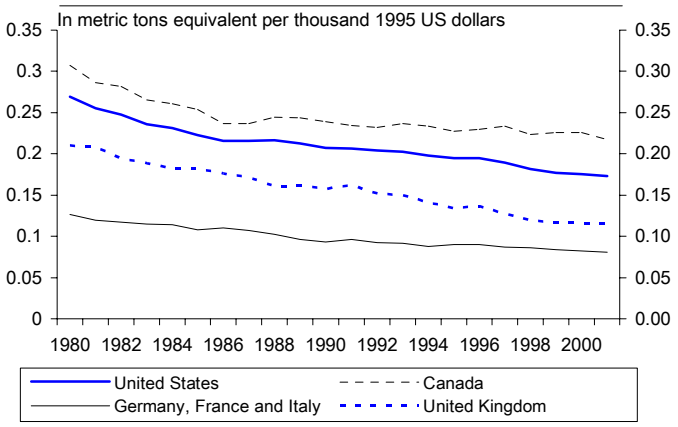
[2] Japan was omitted from the group of comparable countries due to its vastly different geography and land use patterns.

[3] The main user of energy in the United States in 2001 was the industrial sector (33 percent of total Btu consumption); followed by the transportation sector (28 percent), the residential sector (21 percent) and the commercial sector (18 percent). Canada's high level of energy intensity reflects also the preponderance of energy-intensive industry.

[4] According to International Energy Agency statistics, this observation is robust across different years. Products with homogeneous net-of-tax prices across countries, such as gasoline and diesel, display a wide cross-country variation of end-user prices due to different tax policy choices. Other products, which are less easily traded internationally, such as electricity and natural gas, display a wider international variation in their net-of tax prices. However, taxes on these products also differ across countries.

5. ***Higher U.S. energy intensity has been associated with larger levels of emissions of pollutants.*** U.S. greenhouse gas (GHG) emissions per unit of GDP are among the highest of major industrialized countries (Figure 5). International rankings of CO_2 emissions (the most important GHG) are broadly consistent with the energy intensity of GDP, suggesting that higher levels of energy intensity are associated with increased levels of emissions of pollutants, with coal typically associated with the highest level of carbon-based emissions.

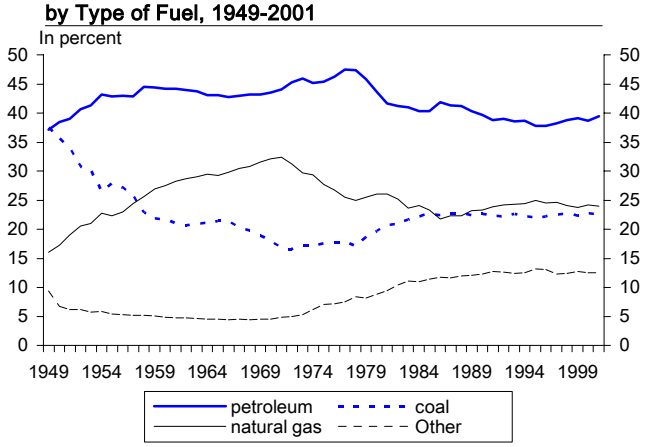
Figure 5. CO2 Emissions per GDP



Source: http://www.eia.doe.gov/emeu/international/total.html#Intlcarbon

6. ***Hydrocarbons represent the principal source of U.S. energy*** (Figure 6). The share of energy consumption from petroleum fell from a peak of nearly 50 percent in the mid-1970s to around 40 percent by the end of the 1990s. The share of natural gas peaked at 32 percent in 1970 and now stands at around 25 percent—roughly the same share as coal, which remains the main source of fuel for electricity generation. Although the share of electricity produced from nuclear, hydroelectric, and other non-fossil fuel sources has increased since 1973, it remains at just under 15 percent of total energy use.

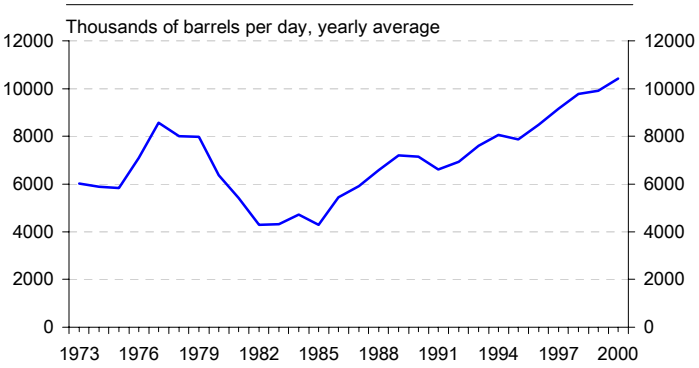
Figure 6. United States: Shares of Energy Consumption by Type of Fuel, 1949-2001



Source: http://www.eia.doe.gov/emeu/aer/txt/ptb0103.html

7. ***Petroleum imports have been rising steadily since the mid-1980s*** (Figure 7). Net imports of petroleum are projected by the U.S. Department of Energy to continue to grow strongly for the next quarter century, and the share of net imports in total U.S. petroleum consumption is expected to increase from 55 percent in 2001 to 68 percent in 2025.

Figure 7. United States: Net Petroleum Imports



Source: EIA, Monthly Energy Review, May 2003.

B. Energy Policy

8. ***The Administration's National Energy Policy (NEP) was released in May 2001***. The NEP's principal focus is on addressing the "fundamental imbalance between supply and demand" and the projected increase in U.S. dependence on energy imports. Specific policy measures focused on promoting "dependable, affordable, and environmentally sound production and distribution of energy." Proposals included:

- subsidies to promote conservation by households;
- funding for research and development into alternative energy sources;
- the establishment of a new regulatory structure for the electricity sector, including the extension of the tradable emissions permit system on sulphur dioxide and the introduction of similar systems for emissions of nitrogen oxides and mercury;
- revisions to emissions standards for autos and household appliances;
- tax credits to encourage the use of fuel efficient vehicles, new landfill methane projects, electricity produced from wind and biomass, residential solar energy property, and the purchase of new hybrid or fuel-cell vehicles; and
- opening the Arctic National Wildlife Reserve (ANWR) for oil exploration and pipelines, and the earmarking of associated royalties for conservation.

9. ***Key provisions of the NEP have been incorporated in different energy bills currently under discussion in Congress.*** Although the House and Senate versions differ in important respects, they would both provide loan guarantees and tax credits for pipeline development; tax incentives for natural gas production; increased funding for research and development; incentives for development of nuclear energy; and tax credits for renewable energy sources, including biomass and waste (see Appendix for details). The House version would also open ANWR to exploration and mandate increased use of ethanol in gasoline.

10. ***The Administration's environmental policy proposals have potentially important implications for the energy sector***. In 2001, the Administration rejected the Kyoto protocol, which would bind countries to targets for reducing GHG emissions. The decision to reject the Protocol reflected the Administration's view that its goals were unrealistic and had potentially harmful implications for U.S. economic growth.[5] Instead, the Administration proposed its Clear Skies Initiative in 2002. The centerpiece of the Initiative is a commitment to reducing the United States' emission intensity—defined as GHG emissions as a share of real GDP—by 18 percent by 2012.[6] This objective is to be met primarily through the

[5] The United States, for example, would have to cut its emissions of greenhouse gases by 7 percent by 2008-2012, compared with 1990 levels. Estimates have placed the cost of achieving this reduction as high as 2 percent of GDP.

[6] Goulder (2002) suggests that the Administration's target would leave emissions roughly 10 percent higher than at the beginning of the decade and nearly 30 percent above the Kyoto Protocol target.

combined effect of measures proposed by the Administration, including through an extension of existing cap-and-trade programs.

11. ***Significant cap-and-trade programs are already in place in the United States to reduce air pollutants.*** For example, under the Clean Air Act, electric utilities were allocated SO_2 emissions allowances beginning in 1995 and were allowed to buy and sell unused portions of these allowances as they saw fit. A tradable permits program also exists for nitrous oxide (NO_x) emissions in the Eastern United States.

C. Reducing Energy Consumption: Energy Taxation and Other Instruments

12. ***Many analysts have argued that energy taxes can play an important role in achieving conservation and environmental goals.*** Taxes are widely viewed as an effective instrument for restraining demand and encouraging efficient resource use, as well as for aligning private and social costs in the presence of externalities (Sandmo, 1976). Simulations reported by Goulder and Schneider (1999) illustrate that achieving a 10 percent reduction in carbon dioxide emissions would be ten times more costly if technology subsidies were employed as a stand-alone measure, relative to a broader approach combining technology subsidies with policies to raise the cost of carbon, such as tradable carbon permits or carbon taxes. Moreover, the scope for using such instruments to address environmental, conservation, and fiscal objectives is illustrated by the wide range of energy-related excise taxes that already are in place in the United States (Box 1).

13. ***Although it is difficult to define the optimal level of energy taxation, some studies suggest that U.S. energy taxes are too low.*** As emphasized by Bovenberg and Goulder (2002), economic theory suggests that optimal tax rates would be expected to vary across countries, based on the different costs that countries face regarding environmental degradation and remediation of environmental harm, the opportunity cost of public funds, and political and administrative considerations. Two recent studies based on a representative agent model calibrated to the U.S. and U.K. economies (Parry, 2002; Parry and Small, 2002) identify the key factors determining the optimal fuel tax. These include, in decreasing order of importance, the social cost of automotive congestion, the capacity of the tax to raise revenue, and the extent to which fuel consumption imposes environmental externalities. This framework suggests that the United States and Canada would be expected to impose relatively low taxes on diesel and gasoline, given their low population densities and congestion externalities relative to Western European countries. Nonetheless, even adjusting for these considerations, the studies conclude that gasoline taxes in the United States may be only half their optimal level.

14. ***Alternative approaches—including regulation and tax incentives—have important drawbacks.*** For example, a study by the Congressional Budget Office—which compared the relative merits of Corporate Average Fuel Economy (CAFE) standards and similar regulatory approaches with gasoline taxes—found that taxes were considerably less costly from an economic efficiency point-of-view (CBO, 2002). Since CAFE standards did not directly target fuel-saving activities by the consumer, any given decrease in targeted gasoline

Box 1. Energy Excise Taxes in the United States

Federal government

A large number of federal excises are levied on energy by the federal government. Fuel taxes average $0.184 per gallon, and estimates by the Joint Committee on Taxation and Internal Revenue Service indicate that federal fuel taxes yielded $29.6 billion (0.3 percent of GDP) in FY 2003. The yield on other excises is smaller: e.g., the excise tax on coal yielded $550 million, and the excise tax on the sale of automobiles with low fuel economy ratings yielded $78 million. The specific excises include:

Energy excise taxes for general revenue include:

- Tax of $0.43 per gallon rail diesel fuel and inland waterways fuel; $0.068 per gallon motorboat fuel, small engine gasoline, and special fuels.

Excise taxes dedicated to environmental trust funds or designated funds include:

- Abandoned Mine Reclamation Fund: Tax of $0.35 per ton of surface coal, $0.15 per ton of coal mined underground, $0.10 per ton of lignite (average tax estimated about $0.26 per ton in 1999).
- Aquatic Resources Trust Fund: Tax levied on motorboat gasoline and other fuel.
- Highway Trust Fund: Tax of $0.043 per gallon motor fuel.
- Leaking Underground Storage Tank Trust Funds: Tax of $0.001 per gallon motor fuel.
- Nuclear Waste Fund: Tax estimated to impose a 1.45 percent cost increment for power provided from nuclear energy in 1999.
- Pipeline Safety Fund: User fees collected from pipeline operators.
- Uranium Enrichment Decontamination and Decommissioning Fund: Contributions from commercial utilities based on historical enrichment services.

Excise taxes dedicated to health-related trust funds include:

- Black Lung Disability Trust Fund: Minimum of $0.55 per ton of coal or 4.4 percent of sales revenue if selling price is less than $25 per ton from surface mines or $12.50 per ton for surface coal.

Excise tax on the sale of automobiles with relatively low fuel economy ratings include:

- Tax ranging from $1,000 for an automobile rated between 21.5 and 22.5 miles per gallon (mpg) to $7,700 for an automobile rated at less than 12.5 mpg.

State governments

All state and many local governments levy specific excise and sales taxes on fuel and other energy commodities. In 2002, excise taxes on motor fuel represented 6 percent of total taxes collected by states. Total state and local taxes on fuel varied from $0.08 per gallon in Alaska to $0.35 per gallon in New York. Many states also levy severance taxes—a tax on a portion of the value of natural resource extracted—on oil, gas and coal production. State energy severance taxes accounted for less than 0.8 percent of total state tax revenue in 2002.

Sources: EIA (1999), Lazzari (2003), U.S. Census Bureau (2003), and CBO (2002).

consumption could be made at a lower cost through a gasoline tax (CBO, 2002). Further, questions have been raised regarding the efficiency of subsidizing new, fuel efficient technologies, given the uncertainty inherent in choosing which technology will yield significant payoffs (Sutherland, 1999).

15. ***However, there also remains a role for market-oriented regulatory approaches.*** For example, the cap-and-trade emissions permit system already in effect for SO_2 emissions has generally been viewed as a success (CBO, 2000). By limiting the quantity of permits, these systems can directly affect the level of emissions. However, a drawback of these approaches is that there is no upper limit to the costs that polluters may be obliged to incur to achieve given quantitative targets. Approaches to deal with this problem include the facility to issue additional permits if permit prices exceed some ceiling, and to grant a percentage of free permits instead of auctioning them (Goulder, 2002).

D. Macroeconomic Effects of Energy Taxation

16. ***The impact of energy taxation on demand and fiscal revenue depends importantly on the price elasticity of demand.*** Most studies suggest that energy demand is considerably more price elastic in the long run than in the short run. For example, short-run elasticities for energy and fuel demand are estimated in the range of -0.13 to -0.26, compared to long-run elasticities in the range of -0.37 to -0.46 (OECD, 2001a). A detailed survey of 97 econometric studies of the elasticity of demand for gasoline found that the short-run elasticity averaged -0.26, compared to an average long-run elasticity of -0.86 (Dahl and Sterner, 1991).

17. ***These findings suggest that taxes could have a substantial impact on consumption, while at the same time raising significant government revenues.*** For example, the CBO estimates that a 15-cent hike in gasoline taxes could have raised $16 billion in additional budget revenue in 2003, more than doubling existing revenues (CBO, 2002). The OECD suggests that an increase in fuel taxes of 40 cents per gallon could be justified given the range of externalities associated with road use, but also notes that roughly three quarters of U.S. carbon emissions are not taxed at all. A carbon tax of $100 per ton would have yielded $110 billion in 1999 (OECD, 2001b).

18. ***The impact of energy taxes on the price level, real wages, and income distribution depends on the use that is made of the additional tax revenue.*** For example, the adverse effects on output can be alleviated if the revenue is used to lower taxes on labor or investment (Nordhaus, 1993; Bovenberg and Goulder, 1996). Similarly, there is scope for addressing the impact on income distribution if revenues are used to compensate those population segments most vulnerable to tax increases (e.g., rural versus urban households; CBO, 2002).

19. ***Staff simulations suggest that the output effects of higher energy taxes, which are redistributed to consumers, may be modest.*** A version of the staff's Global Economy Model (GEM), calibrated to the U.S. economy, suggests that a 10 percentage point increase in taxes

on petroleum products used as intermediate production inputs would reduce long-run U.S. GDP by 0.03 percent (Table 1). A larger loss of output—0.11 percent—would occur if the tax was also levied on the final consumption of petroleum products, reflecting the broader scope of the tax and the lower elasticity of substitution that applies to energy consumption.

20. ***These simulations also illustrate that the large size of the U.S. market influences the output effects of energy taxes.*** Because U.S. petroleum imports represent almost 20 percent of the world market, part of the burden of higher U.S. taxes is shifted to the rest of the world through lower prices and an appreciated U.S. dollar. Indeed, the simulations suggest that the short-run effects of a U.S. tax on energy used in production could even be positive, due to the different speeds of adjustment for producer and consumer prices.[7] The simulations also illustrate the importance of the elasticity of substitution—the higher the degree of substitutability between petroleum products and other goods and services, the more likely will the domestic tax cause world prices to fall and mitigate U.S. output declines. This exercise, however, does not take into account possible responses by world energy producers to the change in market conditions.

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[7] See Chapter VI for further details of the GEM.

Table 1. Simulated Impact on the U.S. Economy of Energy Taxes

(Percent deviation from baseline)

	After 1 Year	After 5 Years	Long Run
10 percent tax on energy used in consumption			
Real GDP	-0.03	-0.02	-0.08
Consumption	-0.03	0.01	-0.04
Investment	-0.30	-0.30	-0.22
Consumption price of energy	7.69	8.33	9.38
Goods producers' price of energy	-2.09	-1.51	-0.56
Oil producers' price of energy	-2.59	-1.87	-0.67
Real exchange rate	0.16	0.23	0.22
10 percent tax on energy used in production			
Real GDP	0.02	0.02	-0.03
Consumption	0.03	0.05	0.00
Investment	0.00	-0.01	-0.13
Consumption price of energy	-0.30	-1.00	-2.23
Goods producers' price of energy	9.67	8.91	7.62
Oil producers' price of energy	-0.38	-1.26	-2.79
Real exchange rate	0.12	0.11	0.26
10 percent tax on all energy			
Real GDP	-0.01	-0.01	-0.11
Consumption	0.04	0.06	-0.04
Investment	-0.30	-0.32	-0.35
Consumption price of energy	7.39	7.27	7.02
Goods producers' price of energy	7.39	7.27	7.02
Oil producers' price of energy	-2.95	-3.09	-3.45
Real exchange rate	0.37	0.34	0.47

Source: Fund staff calculations.

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Recent Energy Policy Initiatives

	Administration[1]	House[2]	Senate[3]
Tax Provisions	Proposes tax incentives costing $8 billion over ten years for: development of clean coal technology; research and development of renewable energy resources; purchase of nuclear power plants; electricity produced using wind and biomass; purchases of solar panels for homeowners; purchases of hybrid gas-electric vehicles; and co-generation plants.	Calls for approximately $19 billion in tax breaks to promote energy production and conservation.	Calls for approximately $16 billion in tax breaks over ten years for renewable energy and conservation programs and the traditional fossil fuel energy producers.
Electricity	Implements restructuring of electricity sector to promote competition, and enhance reliability and efficiency. Repeals Public Utility Holding Company Act (PUHCA), which impedes ability of utilities to acquire and divest power assets. Reforms Public Utility Holding Company Holding Act (PURPA), which requires utilities to buy power from independent companies that produce low-cost power.	Allows the Federal Energy Regulatory Commission (FERC) to issue rules creating a national wholesale electricity market, known as "Standard Market Design" (SMD), while permitting states to continue to oversee retail markets. Repeals the PUHCA.	Opens wholesale market, but no provision for SMD. Repeals the PUHCA. Repeals the PURPA conditional on FERC findings.
Nuclear Power	Extends the Price-Anderson Act, which limits industry liability from a nuclear accident. Provides incentives for new nuclear plants.	Similar provision. Increased funding for nuclear research options.	Similar provision. Endorses new nuclear power plants.
Arctic Drilling	Opens Alaska's Arctic National Wildlife Refuge (ANWR) for oil and gas exploration.	Open ANWR to oil and gas exploration.	No provision.
Alaskan Natural Gas Pipeline	Supports the construction of a pipeline from the Alaska North Slope.	Similar provision, including an 80 percent loan guarantee for up to $18 billion.	Similar loan guarantee and tax provisions.

Recent Energy Policy Initiatives (concl.)

	Administration[1]	House[2]	Senate[3]
Alternative and Renewable Fuels	Supports ethanol mandate.	Establishes a fuel standard increasing the use of ethanol that requires blending 2.7 billion gallons of renewable fuel with gasoline in 2005.	Mandates an increase in the use of fuels such as ethanol and biodiesel to 5 billion gallons by 2012.
	Supports leaving the authority over the Renewable Portfolio Standards (RPS) mandate to the states.	Extends the renewable energy production tax credit through 2006.	Expands sources to include other types of power generation from waste. Requires power generators to produce 10 percent production from select renewable energy resources by 2020.
Federal Lands	Expedites study of impediments to oil and gas exploration on federal lands.	Provides incentives for federal leasing through cost reductions, reducing bureaucratic burdens and accelerating decisions.	Gives Interior Department authority to allow alternative energy projects.
Corporate Fuel Efficiency	Provides tax breaks and funds for fuel efficient technologies.	Directs the NHTSA to study the feasibility and effects of reducing the fuel use by model year 2012.	Requires the Secretary of Transportation, in setting fuel economy standards, to consider the effect on safety and employment.
Climate Change	Proposes to cut greenhouse gas intensity by 18 percent over ten years by employing a "voluntary" program and funding for research on climate change.	No provision.	Creates a White House Office of Climate Change Policy to formulate national strategy to stabilize GHG emissions, and establishes a new voluntary GHG emissions inventory.
Hydropower	Reforms hydropower licensing process to improve its efficiency.	Permits consideration of alternative conditions in licensing process. Provides incentives for the construction of new hydroelectric facilities.	Similar provisions, and broadens environmental standards for permits.

[1] Based on the Administration's National Energy Policy (NEP) plan released in May 2001.
[2] Based on H.R. 6, Energy Tax Policy Act of 2003, passed by the House on April 11, 2003.
[3] Based on S. 517, Energy Tax Policy Act of 2002, passed by the Senate on April 25, 2002.

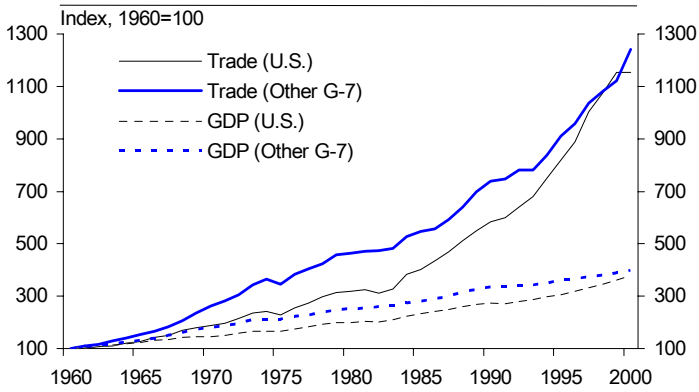
VIII. Globalization and Business Cycles in the United States[1]

1. ***The synchronized economic slowdown in the United States and other industrialized countries has heightened questions regarding the impact of trade and financial linkages on business cycle spillovers across countries.*** This chapter documents the growth in linkages between the United States and other G-7 countries and examines the relative importance of global versus domestic factors in driving business cycles since the 1960s. The results suggest that global factors have become more important during the past decade, and that a rebound in U.S. economic activity could also have significant beneficial effects on other G-7 economies.

A. Rising Global Linkages and Recent Studies

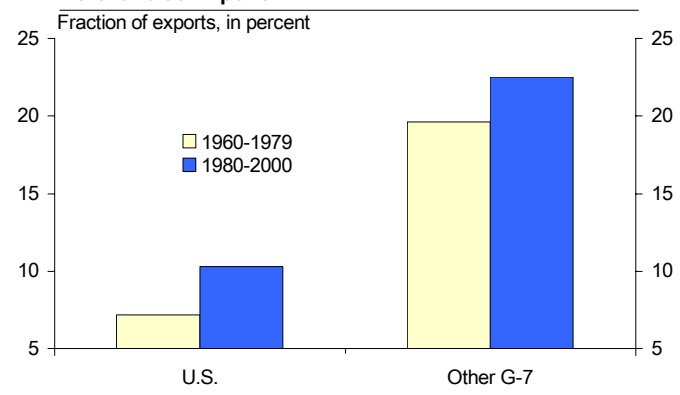
2. ***Trade linkages among the G-7 have increased tremendously during the past four decades.*** U.S. trade (i.e., the sum of exports and imports) has grown roughly three times faster than output since 1960, reaching about 20 percent of GDP in 2002 (Figure 1). Trade growth has been even more rapid among the other G-7 economies, which have traditionally had larger trade volumes relative to GDP than the United States.

Figure 1. G-7 Countries: Trade and GDP Growth



3. ***Trade based on vertical specialization has also increased significantly.*** For example, the share of exports that have been processed from imports has increased for both the United States and other G-7 countries (Figure 2). Vertical specialization explains 30 percent of the growth in industrialized countries' exports from the 1970s to the 1990s (Hummels, Ishii, and Yi, 2001), suggesting that increased trade in intermediate goods and the existence of supply chains that stretch across many countries may have made international trade a powerful channel of business cycle transmission.

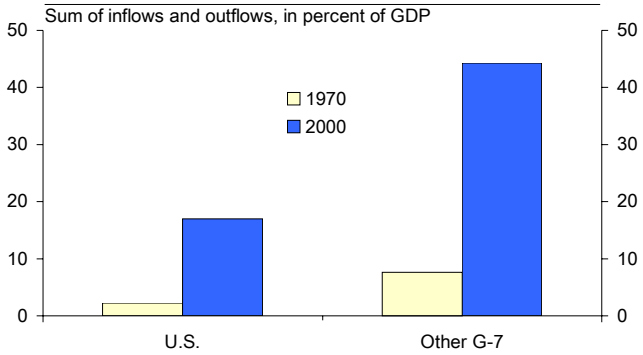
Figure 2. Processed Imports as a Share of Merchandise Exports



[1] Prepared by Ayhan Kose.

4. ***Global capital markets have also become significantly more integrated over the past two decades.*** In the case of the United States, the sum of inflows and outflows of foreign direct investment and other private capital flows has surged from less than 3 percent in the early 1970s to more than 18 percent of GDP in 2000. For other G-7 countries, gross capital flows have on average reached nearly 45 percent of output (Figure 3).

Figure 3. Gross Private Capital Flows



5. ***At the same time, however, economic theory does not provide a definitive conclusion regarding the effect of increased trade on the co-movement of business cycles.*** Increased trade in goods would normally be expected to heighten both demand- and supply-side spillovers across countries. However, this result may not hold if increased trade promotes greater inter-industry specialization across countries, especially if industry-specific shocks are important in driving business cycles.

6. ***The effect of financial linkages on business cycle correlations is also ambiguous***. Increased capital mobility would typically be expected to increase business cycle synchronization, as shocks are transmitted more easily across countries. However, the globalization of financial markets could also facilitate the ability of countries to specialize in production and thereby insulate themselves from shocks in other countries (Kalemli-Ozcan, Sorenson, and Yosha, 2003).

7. ***This ambiguity has been reflected in recent empirical studies.*** For example, Heathcoate and Perri (2003) show that the U.S. business cycle has become less correlated with the aggregate cycle of Europe, Canada, and Japan since the 1960s. Helbling and Bayoumi (2003) also find a decrease in output correlations between the United States and some other G-7 countries since 1973, but suggest that correlations across the other G-7 economies have remained relatively stable. Moreover, Doyle and Faust (2002) show that there has been no significant change in the correlations of the growth rate of GDP in the United States and in other G-7 countries since 1970. By contrast, some recent studies demonstrate that the business cycle linkages have become stronger over time, including Kose, Prasad, and Terrones (2003) and Kose, Otrok, Whiteman (2003a).

B. Synchronization and Changing Role of Global Factors

8. ***To examine the effect of globalization on the co-movement of business cycles, it is helpful to isolate the impact of common shocks—such as oil price increases—from that of globalization.*** To that end, three distinct sub-periods are considered: the Bretton Woods period of fixed exchange rates (1960:1–72:4); the common shocks period, during which the world economy was buffeted by severe shocks to oil prices and subsequent disinflation

(1973:1–86:2); and the globalization period (1986:3-2001:4), which coincided with dramatic increases in the volume of international trade and financial flows.

9. ***A comparison across these three periods suggests that business cycle linkages have increased.*** In particular, while the volatility of U.S. output fluctuations has fallen since the 1960s, the co-movement of U.S. output with that in other G-7 countries has generally grown. The standard deviation of U.S. real GDP growth has also declined significantly since the 1960s, which has been true for the rest of the G-7, except for Germany and Japan, where output volatility has increased in the past decade (Figure 4).[2] At the same time, the correlation between U.S. output and output in Canada, France, and the United Kingdom has increased, while the correlation between U.S. output and output in Germany and Japan has declined (Figure 5).

Figure 4. Volatility of GDP Growth in Different Periods

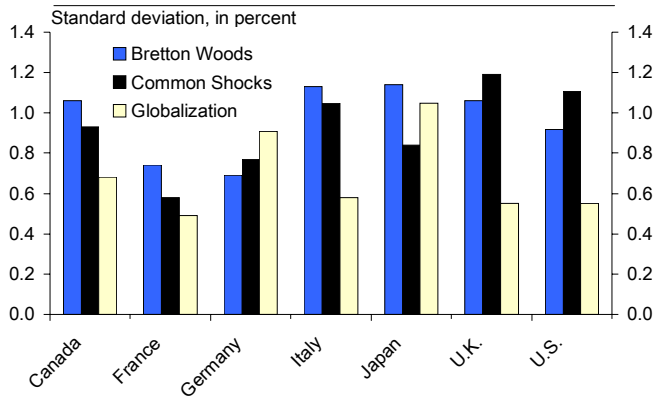
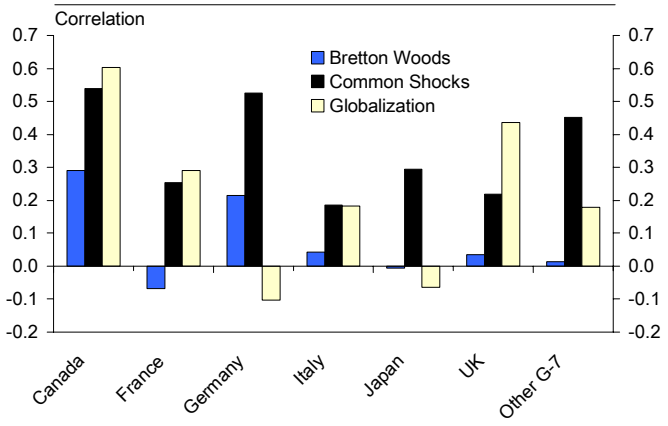


Figure 5. Correlation of G-7 and U.S. GDP Growth in Different Periods



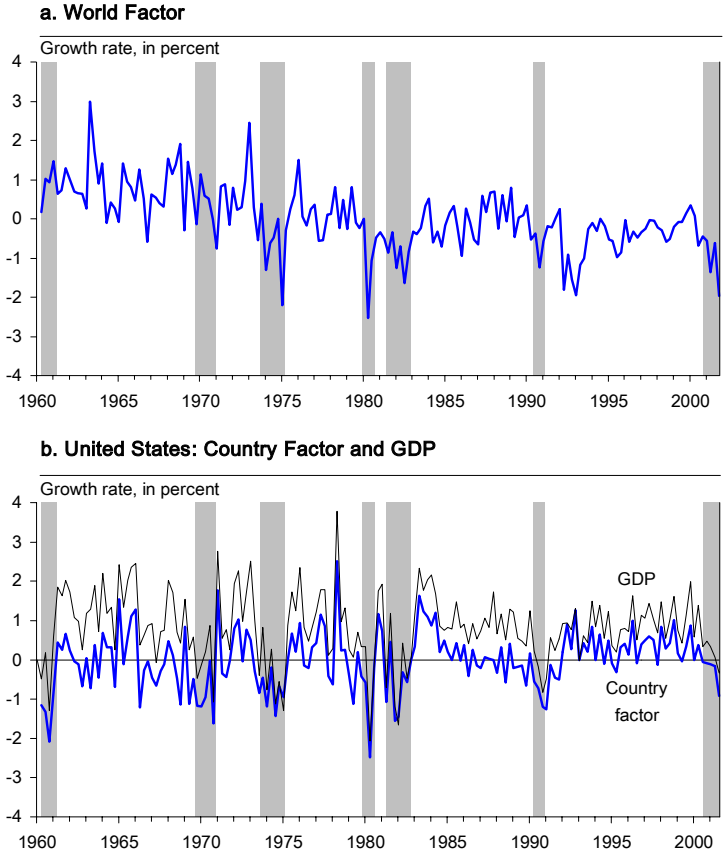
10. ***The apparent increase in co-movement across the G-7 can be confirmed using a dynamic latent factor model.*** This approach helps to take into account the potentially important role of dynamic relationships not captured by contemporaneous correlation measures, as well as cross correlations between different macroeconomic variables. Using the methodology employed in Kose, Otrok, and Whiteman (2003b), the model decomposes macroeconomic fluctuations among the G-7 into (1) a "world factor" that is common across all variables/countries; (2) country-specific factors, which are common across the main aggregates within a country; and (3) factors specific to total output, consumption, and investment (idiosyncratic errors). In particular, there are three types of factors in the econometric model: the single world factor (f^{world}), seven country-specific factors ($f_i^{country}$, one per country), and 21 factors specific to each variable ($\varepsilon_{i,t}$, the "unexplained" idiosyncratic errors). Thus for observable i:

[2] Explanations for the increased stability of U.S. output have centered on the increasing importance of the "new economy," the declining importance of industrial versus service sector activity, and the increased effectiveness of monetary policy (Blanchard and Simon, 2001).

$$y_{i,t} = a_i + b_i^{world} f_t^{world} + b_i^{country} f_{i,t}^{country} + \varepsilon_{i,t}, \quad E\varepsilon_{i,t}\varepsilon_{j,t-s} = 0 \text{ for } i \neq j$$

Output, consumption and investment data for each of seven countries are used as observables, so there are 21 time series to be "explained" by the eight factors, and there are 21 "regression" equations to be estimated.

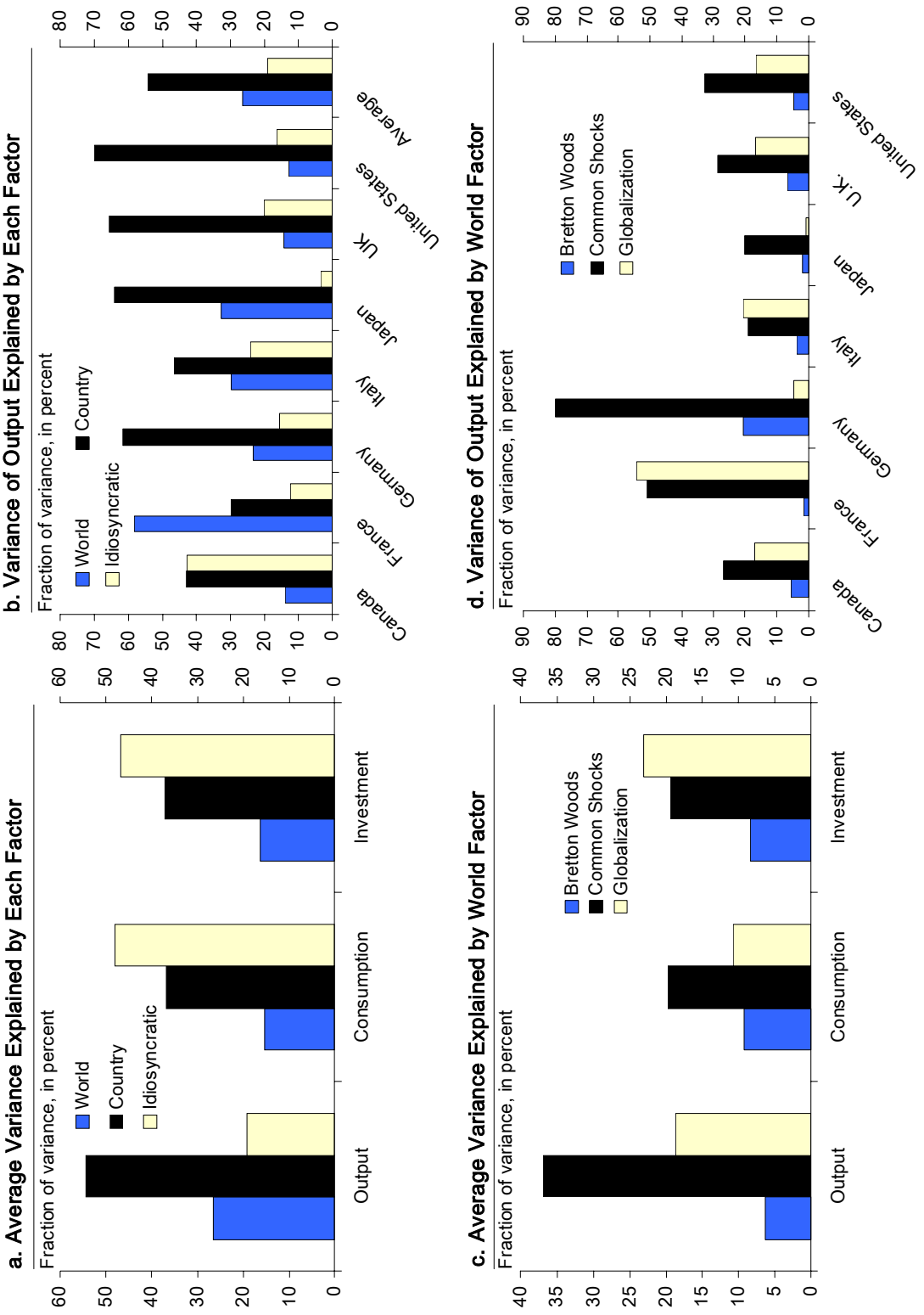
Figure 6. Model Results: World and U.S. Country Factors



11. ***Casual inspection of the results suggests that the world factor has been an important force behind most of the major business cycle episodes of the past 40 years***. In particular, the behavior of the world factor is consistent with the steady expansion of the 1960s and early 1970s, the recessions of the mid-1970s, the early 1980s, and early 1990s, and the expansion of the late 1980s (Figure 6a). Both the world factor and the estimated U.S. country factor capture some of the NBER reference cycle dates, including several booms and recessions in the 1970s and 1980s, as well as the highly synchronized and severe downturn in 2000 (Figure 6b). However, there is a notable difference between the world factor and the U.S. country factor during the 1990s, as the country factor captures the prolonged expansionary period in the United States whereas the world factor displays at least a couple of downturns. Most notably, the world factor appears to have acted as a significant drag on U.S. growth in the latter half of 2001.

12. ***For some countries, the world factor accounts for a sizeable fraction of output volatility since the 1960s.*** The world factor is responsible for more than 25 percent of G-7 output variation, and for more than 15 percent of the volatility of consumption and investment (Figure 7a). However, the importance of the world factor differs significantly across countries, accounting for roughly 60 percent of output variation in France, and less than 13 percent in the United States (Figure 7b).

Figure 7. Dynamic Factor Model: Variance Decomposition



13. ***The role of world factor in explaining the co-movement of business cycles across the G-7 countries has become more important during the globalization period.*** The share of output variance explained by the world factor increased from roughly 7 percent in the Bretton Woods period to 19 percent in the globalization period, and the share of investment variance tripled (Figure 7c). However, there was only a marginal increase in the average variance of consumption explained by the world factor, suggesting that there are consumption smoothing opportunities across countries that remain to be exploited.[3] By using international financial markets more effectively, domestic consumers could isolate themselves from the effects of country-specific shocks. This, in turn, could lead to a much larger share in the variance of consumption attributable to the world factor.

14. ***The world factor appears to have been less important in explaining output volatility in Germany and Japan*** (Figure 7d). This likely reflects the relative importance of domestic forces that have swamped the importance of globalization. The Japanese economy, in particular, has suffered from a sharp fall in asset prices and a severe banking crisis, while the German economy has been affected by the aftershocks of unification. Nevertheless, given the current export dependence of both countries' economies, global developments have again gained in importance in recent years.

C. Concluding Remarks

15. ***Global factors have played a larger role in explaining the dynamics of business cycles in the G-7 countries during the period of globalization.*** The exception to this finding is the behavior of cycles in Germany and Japan, where country specific and idiosyncratic factors appeared to have at least temporarily overshadowed the impact of trade and financial linkages. Key implications include:

- ***The U.S. role in the global economy has increased.*** Global factors have become more important in driving domestic business cycles during the past decade, and related research shows that the U.S. economy has been a major force for global growth.[4]

- ***A rebound in economic activity in the United States could have large spillover effects for other G-7 countries.*** This would be especially true for Canada and the United Kingdom, where global factors have become more important in explaining business cycle fluctuations in recent years.

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[3] Theory suggests that financial integration should lead to highly correlated consumption fluctuations, except for preference shocks and nontraded consumption goods. This is because it is possible to design an international portfolio allocation that could eliminate all risks associated with country-specific shocks.

[4] For example, Kose, Otrok, and Whiteman (2003a) use a 60 country sample and report that the correlation between the median world factor and U.S. output growth is 0.62.

- ***However, it is less likely that an increase in output in other G-7 countries would have as large an impact on the U.S. economy.*** Trade and financial linkages between the United States and other countries, although much larger now than in the past, are still too small to generate a "pure" export driven recovery in the United States. Despite the rapid growth in trade and financial flows, the volume of U.S. international trade and financial flows is still quite small relative to the size of its economy.[5]

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[5] There are only five other countries (Sudan, Brazil, Argentina, Japan, and Myanmar) with trade to GDP ratio smaller than that of the United States (Gruben, 2003).

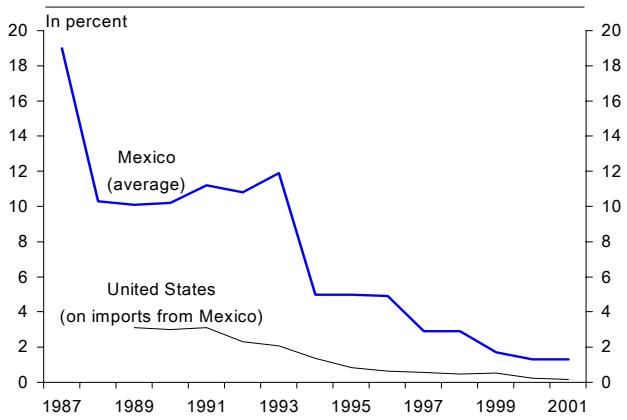
IX. Economic Integration in the Americas: Lessons from NAFTA[1]

1. ***In January 1994, Canada, the United States, and Mexico launched the North American Free Trade Agreement (NAFTA), creating the world's largest free trade area.*** The agreement helped spur a dramatic increase in trade and financial flows among the NAFTA partners and has contributed to making North America one of the most economically integrated regions in the world. This chapter briefly reviews the effect of the agreement on trade and growth within the region and considers the extent to which it has also affected business cycle dynamics in North America. Some lessons for future free trade agreements are then drawn.[2]

A. NAFTA and Regional Trade and Financial Flows

2. ***NAFTA was the first comprehensive free trade agreement between advanced countries and a developing economy.*** The agreement aimed at eliminating all tariffs and substantially reducing nontariff barriers between the member countries. NAFTA also included provisions covering investment flows, financial services, government purchases, protection of intellectual property rights, mechanisms for settlement of disputes, as well as side agreements covering labor and environmental issues. The agreement eliminates the majority of tariffs and other trade barriers in its first ten years and phases out most remaining tariffs by 2008. Since Mexico's tariffs were higher than those of other member countries, it implemented the largest reductions in tariff rates—the average Mexican tariff rate fell from 12 percent in 1993 to 1.3 percent in 2001, while U.S. tariffs on imports from Mexico fell from 2 percent to 0.2 percent during the same period (Figure 1).

Figure 1. United States and Mexico: Tariff Rates



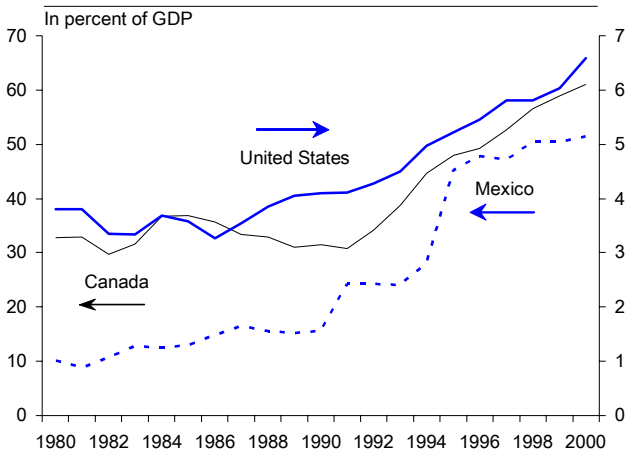
3. ***Trade in the region has increased significantly since the inception of NAFTA.*** For example, Mexico's exports to the United States and Canada tripled in dollar terms between 1993 and 2001, and Mexico's trade (the sum of exports and imports) with NAFTA partners

[1] Prepared by Ayhan Kose.

[2] The United States has recently signed free trade agreements with Chile and Singapore in 2003. It has also begun free trade agreement negotiations with Morocco; five nations in Central America (CAFTA); five nations in the Southern Africa Customs Union (SACU); and Australia. The most ambitious one among these agreements is the Free Trade Area of the Americas (FTAA), which would include the United States and 33 other countries in the Western Hemisphere in one of the world's largest free trade areas by progressively eliminating barriers to trade and financial flows. Market access negotiations have begun with the objective of concluding no later than January 2005.

rose from 25 percent of its GDP in 1993 to more than 50 percent in 2001 (Figure 2). Over the same period, Mexico became the United States' second largest source of imports, while U.S. exports to NAFTA partners climbed nearly 90 percent, twice the increase in its exports to the rest of the world. Total U.S. trade with its NAFTA partners increased by roughly half to reach almost 7 percent of GDP by 2001. Canada's exports to its NAFTA partners increased by twofold since 1993, and Canada's trade with other members reached more than 60 percent of its GDP in 2001.

Figure 2. Trade with NAFTA Partners



4. ***Recent studies suggest that the impact of NAFTA on the volume of trade in the region has been substantial.*** Using detailed commodity level data, Romalis (2002) finds that between 25 to 50 percent of the increase in U.S. imports from Mexico after 1993 was driven by NAFTA. The Congressional Budget Office (CBO) uses aggregate trade data and estimates that NAFTA boosted U.S. imports from Mexico by 8 percent in 2001 and raised U.S. exports to Mexico by just over 11 percent (CBO 2003).[3] Krueger (1999, 2000) finds that NAFTA is not a trade-diverting agreement, suggesting that the expansion of trade was not at the expense of other countries.[4] However, she also argues that most of the increase in Mexican trade after NAFTA was driven by other factors, including the collapse of the Mexican peso in 1994 and Mexico's unilateral reduction of tariffs following its entry into GATT in 1986.

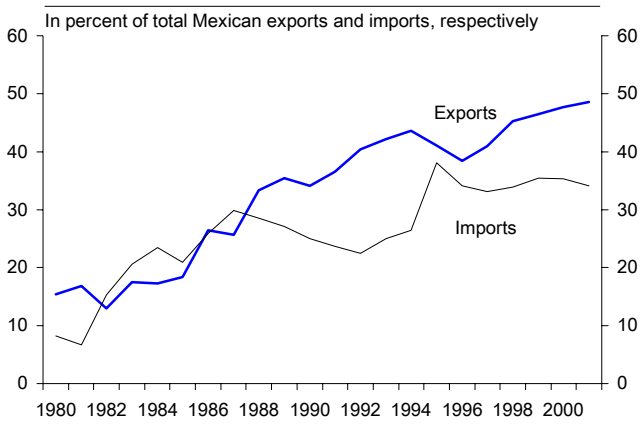
5. ***NAFTA has also significantly affected the nature of trade in the region.*** In particular, vertical specialization has increased, with member countries increasingly specializing in particular stages of the production process. The prime example has been the *maquiladora* trade along Mexico's northern border, where firms import inputs from the United States, process them, and re-export back to the United States. Maquiladora firms grew substantially after the early 1980s, and the share of maquiladora exports in total Mexican

[3] Other studies employing aggregate trade data also document large changes in regional trade flows driven by NAFTA. For example, Wall (2003) estimates that NAFTA played an important role in boosting Canadian exports to the United States and Mexico by 29 percent and 12 percent, respectively, during 1993–1997. Gould (1998) and USITC (1997) report that the impact of NAFTA on trade flows in the region was significant.

[4] To analyze the impact of NAFTA on trade flows, Krueger studies the changes in trade patterns and volumes between different groups of commodities and among NAFTA partners and the rest of the world using the data at the one-digit SITC level for the period 1990-1996. She concludes that the categories in which Mexican exports to the United States registered the largest increase overlap with those in which they rose most rapidly with the rest of the world, implying that the agreement was trade-creating. By contrast, Romalis (2002) uses more disaggregated data series, over a longer time period, and finds that NAFTA produced substantial trade diversion.

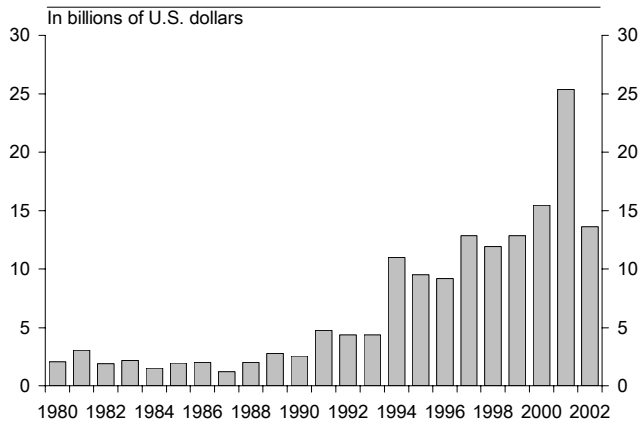
exports rose from 15 percent in 1980 to roughly 50 percent in 2001 (Figure 3). After the inception of NAFTA, the growth of maquiladora industry accelerated, with employment in maquiladora firms surging by 86 percent during the first five years of the agreement, compared with 77 percent growth in the previous five years (Gruben, 2001 and Hanson, 2002).

Figure 3. Mexico: Maquiladora Trade



6. ***Foreign direct investment (FDI) flows also strengthened in the region after NAFTA.*** The agreement contained important provisions that improved the relative standing of foreign investors in Mexico and expanded the sectors in which they could operate. This helped boost FDI flows to Mexico from $12 billion over 1991-1993 to roughly $54 billion in the 2000-2002 period (Figure 4). The share of NAFTA partners in total FDI flows to Mexico increased from 50 percent in 1994 to roughly 80 percent in 2000 (Lopez-Cordova, 2002). Recent research suggests Mexico's NAFTA membership raised its annual FDI inflows by roughly 40 percent (Waldkirch, 2003).

Figure 4. Mexico: Inflows of Foreign Direct Investment



7. ***NAFTA has changed the dynamics of economic growth in Mexico.*** Contributions of exports and investment to GDP growth have increased more than two-fold following the introduction of the agreement (Figure 5a). Schiff and Wang (2002) estimate that NAFTA increased total factor productivity in Mexico by 5.5–7.5 percent. As a result, Mexican GDP growth rose from an annual average of 2 percent in 1980-1993 to an annual average of roughly 4 percent in 1996-2002 (Figure 5b). Studies employing computable general equilibrium (CGE) models report that NAFTA has had a large impact on the growth performance of the Mexican economy. For example, Kouparitsas (1997) finds that the agreement increased Mexico's steady state level of GDP by roughly 3.3 percent, consumption by 2.5 percent, and investment by more than 5 percent. CBO (2003) estimates that the NAFTA-induced increase in exports to the United States raised Mexico's GDP by 1.7 percent in 2001. Compared with several other emerging market countries, the average growth rate of investment has been particularly impressive, as it rose almost eightfold during the period 1996-2002 (Figure 5c).

Figure 5. Mexico: Economic Developments Pre- and Post-NAFTA

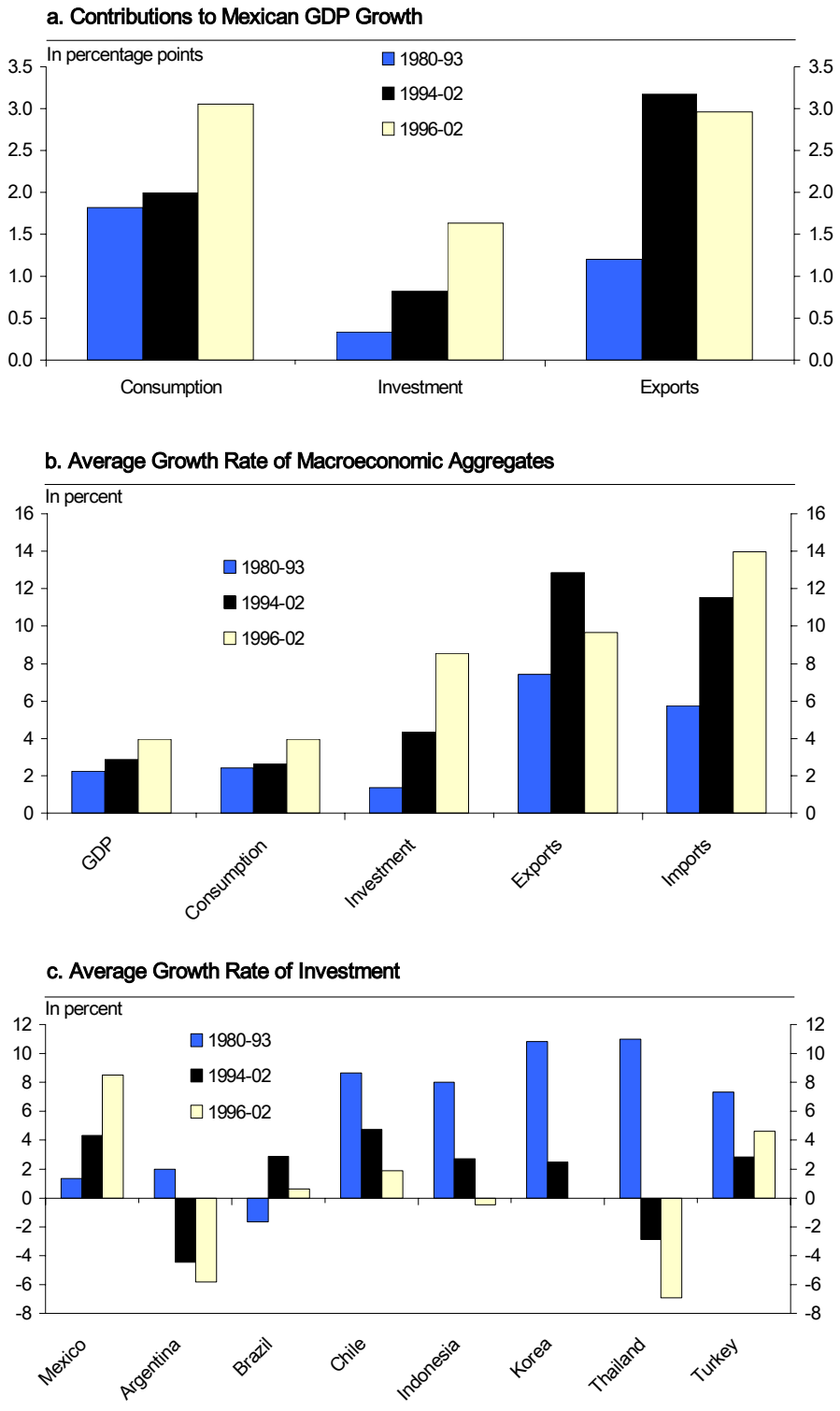
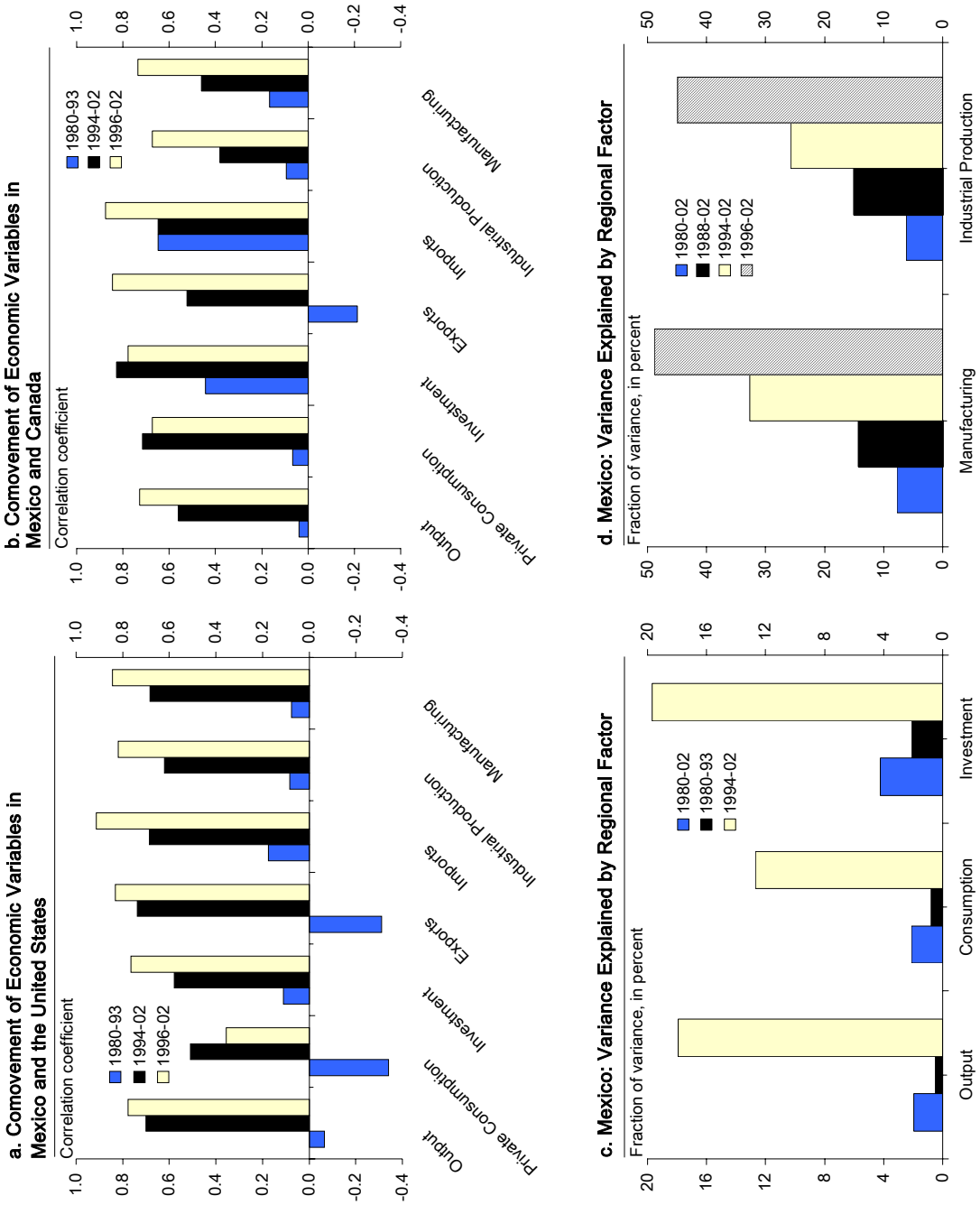


Figure 6. NAFTA Members: Indicators of Economic Integration



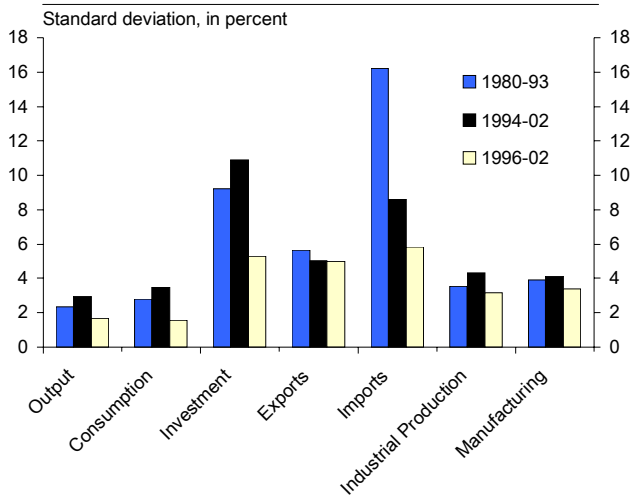
8. **NAFTA's effect on U.S. trade has been small but significant, reflecting the size of the U.S. economy compared with its NAFTA partners.** The CBO (2003) estimates that the boost to U.S. exports was only around 0.12 percent of GDP in 2001. Moreover, NAFTA raised imports by about 0.1 percent of GDP, broadly in line with estimates of the ITC (1997) and Gould (1998). The potential long-term increase in the level of U.S. GDP due to NAFTA has been estimated in the range of 0.02 percent to 0.5 percent (CBO, 2003).

B. NAFTA and the North American Business Cycle

9. ***NAFTA appears to have been associated with significant changes in North American business cycle dynamics.*** For example, the agreement appears to have fostered an increased synchronicity of business cycles among its members.[5] This can be seen from the marked increase in cross-country correlations of the major macroeconomic aggregates, including output, consumption, and investment (Figures 6a and 6b).[6]

10. ***Macroeconomic volatility in Mexico has also declined markedly after the inception of NAFTA.*** This can be seen in the uniform and sizeable decline in the variance of several macroeconomic aggregates between the 1980-1993 and 1996-2002 periods (Figure 7). As discussed above, the decreased volatility may have been partly a result of vertical specialization in the NAFTA period but may also have reflected the increased importance of more stable regional factors in driving the Mexican business cycle, as well as the imported stability of domestic macroeconomic policies.

Figure 7. Mexico: Volatility of Macroeconomic Aggregates



11. ***Staff estimates of a dynamic factor model suggest that regional factors have become more important in driving business cycles in Mexico with the advent of NAFTA.*** Using the methodology described in Kose, Otrok, and Whiteman (2003), the model seeks to capture the dynamic comovement in output, consumption, and investment among the NAFTA partners. Macroeconomic fluctuations are decomposed into: (1) a regional factor that is common across all variables/countries; (2) country-specific factors, which are common across the main

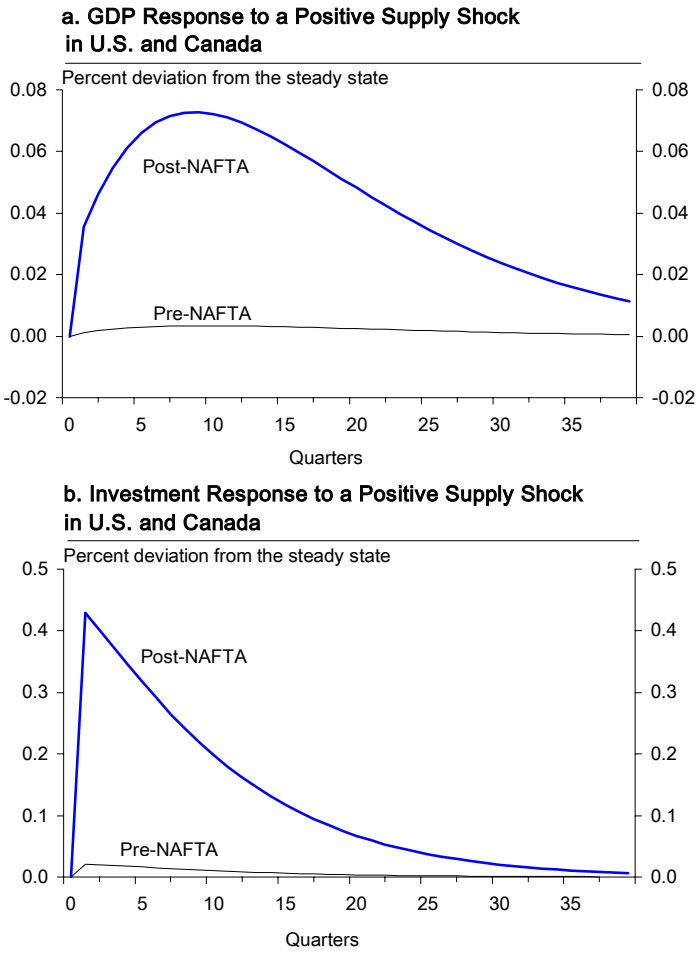
[5] This finding is consistent with the general increase in the degree of business cycle comovement in the G-7 countries in recent years (see Chapter VIII).

[6] In most cases, the increases in correlations are statistically significant. Cuevas, Messmacher, and Werner (2002) also study the impact of NAFTA on the degree of business cycle synchronization in the region.

aggregates within a country; and (3) factors specific to each variable. The results indicate that the proportion of output volatility explained by the regional factor rose from less than 1 percent in the period 1980-1993 to more than 19 percent in 1994-2002 period, while the variance of investment accounted for by the regional factor increased almost tenfold during the same period (Figure 6c). The regional factor has also played a more important role in explaining the volatility of manufacturing and industrial production over time (Figure 6d).

12. ***To illustrate the channels through which trade agreements can lead to business cycle spillovers among its participants, a dynamic stochastic multi-country business cycle model was also constructed.***[7] In the model, imports from Mexico are used as intermediate inputs to produce final consumption and investment goods in the United States and Canada. The impact of NAFTA is simulated by changing the level of trading frictions between the member countries, which are assumed to proxy for tariffs as well as non-tariff barriers among participants. Pre- and post-NAFTA simulations illustrate the substantial increase in Mexican exports that results from the lowering of tariffs after the advent of the agreement. The results also demonstrate that Mexico's output and investment respond much more strongly to temporary supply shocks in partner countries during the post-NAFTA period than they do in the pre-NAFTA period (Figures 8a and b).

Figure 8. Mexico: Impulse Response Functions



[7] The model extends the two-country, free trade, complete market model by Backus, Kehoe, Kydland (1994) by having three countries, trading frictions, and allowing for international financial autarky. For details, see Kose and Yi (2003).

C. Conclusions

13. ***As many authors have noted, it is difficult to quantify the impact of NAFTA on its member countries, especially given the other shocks they experienced.*** For example, following the agreement, the U.S. economy experienced a major boom, followed by the 2000 stock market collapse and subsequent recession. The Mexican economy also suffered the *tequila* crisis and recession in the mid-1990s, which led to a substantial decline in foreign investment. Subsequently, the devaluation of the peso and the strength of the U.S. economy played an important role in boosting Mexican exports.[8]

14. ***Nonetheless, the discussion above suggests that NAFTA had an important effect on growth and business cycle dynamics among its members.*** Mexico, in particular, benefited from a substantial increase in the volume of international trade and financial flows, as well as stronger growth. In addition, business cycles among the NAFTA partners became considerably more synchronized, with a substantial increase in the degree to which Mexican output volatility was driven by regional versus domestic factors.

15. ***This experience suggests that the Free Trade Area of the Americas (FTAA) could have potentially significant effects on its developing country members***.[9] Care is undoubtedly needed in drawing too strong a lesson from Mexico's experience under NAFTA, given that Mexico benefited from the depreciated peso, the strength of the U.S. economy, and a common border with the United States. Nonetheless, the analysis above does suggest that, in addition to boosting economic efficiency, the increased foreign investment flows and deeper trade and financial linkages under an FTAA could also help promote greater macroeconomic stability in the region.

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[8] Mexico had joined the General Agreement on Tariffs and Trade (GATT) in 1986 and began reforms to liberalize its trade regime. A comprehensive privatization and deregulation program was also undertaken during the period 1988-1994.

[9] Chapter X contains a more detailed discussion of recent U.S. free trade agreements.

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X. THE UNITED STATES AND THE NEW REGIONALISM/BILATERALISM[1]

1. ***The currents underlying trade liberalization are at an important juncture—midway between an ambitious round of multilateral trade negotiations and a sharp rise in efforts to forge regional free trade zones.*** The United States, for example, has tabled bold proposals at the WTO for global reductions in tariff and nontariff barriers, while simultaneously launching discussions for free trade areas with partners in the Americas, Africa, the Pacific, and the Middle East. The push toward bilateral and regional free trade areas has been evident elsewhere in the world with the EU and Asian nations also pressing hard in this area.[2]

2. ***This paper examines a number of issues related to the U.S. emphasis on regional and bilateral trade links.*** Following a review of the scope of current and proposed arrangements, the key issues implications of this strategy are analyzed. Stylized simulations of the welfare gains of these arrangements are presented, followed by some concluding observations.

A. Recent Developments

3. ***Regional and bilateral trading arrangements have become a major focus of U.S. trade policy.*** A free trade arrangement (FTA) with Israel in 1985 was followed by an FTA with Canada in 1989, which subsequently included Mexico as the North American Free Trade Area (NAFTA) in 1994. More recently, an FTA was concluded with Jordan in 2001, and arrangements have been signed (but not yet ratified) with Singapore and Chile. The United States is also aiming for FTAs with Morocco, the Central America Free Trade Area (CAFTA), Australia, the Southern African Customs Union (SACU), and negotiations are underway to complete a Free Trade Area of the Americas (FTAA) by 2005.[3] The U.S. Administration has also announced a strategy—which would include FTAs—to enhance trading relations with the Middle East.[4]

4. ***U.S. interest in these arrangements appears based on a range of considerations.*** Besides providing greater market access for U.S. exporters, FTAs are viewed as a complement to broader geopolitical and security goals. The United States also considers

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[1] Prepared by Alvin Hilaire. The GTAP simulations were conducted by Yonghzeng Yang and research assistance was provided by Dustin Smith.

[2] For example, in the last five years, the EU has completed negotiations for FTAs with South Africa, Mexico, Chile, Croatia, Former Yugoslav Republic of Macedonia, and a number of Mediterranean partners, while negotiations continue with Mercosur, Syria and the Gulf Cooperation Council (Lamy, 2002).

[3] Details are provided by the Office of the U.S. Trade Representative (USTR, 2003a).

[4] Key components of the Middle East strategy include: (a) expanding the U.S. Generalized System of Preferences (GSP) to the poorer countries of the region; (b) assisting with WTO accessions of Middle Eastern countries; (c) completing the FTA with Morocco and possibly "docking in" other countries to the treaty; (d) launching new FTAs with selected countries—initially Egypt and Bahrain; and (e) eventual establishment of a free trade agreement between the Middle Eastern countries (as a bloc) and the United States.

bilateral and regional agreements helpful in spurring progress toward liberalization among nonparticipants and at the multilateral level, a process that has been termed "competitive liberalization."[5]

5. ***Reflecting this broader view, U.S.-sponsored FTAs have not been limited to countries with strong merchandise trade links with the United States.*** Except in the case of NAFTA members, U.S. exports of goods to FTA partners have typically represented well under 3 percent of total U.S. exports (Table 1). At the same time, however, the United States often represents an important export market for FTA partners (Table 2). Even where this is initially not the case, the increase in the share of Jordan's exports going to the United States, from 1 percent to 10 percent between 1999 and 2001, illustrates the potential effect of FTAs on trade flows.

6. ***In addition to merchandise tariff reduction, recent U.S. FTAs have emphasized liberalization in services, as well as other aspects of trade and investment flows.*** For example, rules on trade in services, as well as issues related to intellectual property rights, environmental standards, labor standards, and provisions for uninhibited capital transfers, are now common features of U.S. FTAs. For many participants, the potential stimulus to foreign direct investment is viewed as even more important than market access in goods, especially as many of these countries already have preferential access to the U.S. market, including under the GSP, Caribbean Basin Initiative, and African Growth and Opportunity Act (AGOA).

B. Issues Arising from the New Regionalism

7. ***The U.S. emphasis on regional and bilateral FTAs is typically seen in a positive light, but concerns have been raised.*** These can be grouped into six key issues.

- ***Trade diversion.*** One concern is that preferential trade arrangements may cause trade to be diverted away from lower-cost suppliers that are not members of the arrangement.[6] If this were to occur, welfare losses would result, since the importing country buys from a costlier source and global resources are shifted toward less efficient producers. However, even if these costs occur, they may be outweighed by the benefits of trade creation, as tariff reductions cause imports from partners to supplant costly local production.

- ***The impact on multilateral liberalization.*** Concerns have been raised regarding the possibility that regional and bilateral FTAs may dilute the momentum toward multilateral trade liberalization. Especially in light of difficulties in meeting the deadlines for the Doha Round, the fear is that countries may save their offers for

[5] See USTR (2003b).

[6] Panagariya (1999) describes a number of studies in which the trade diversion effect accompanying preferential trading arrangements is documented; some evidence also emerges from our simulations in Section C below.

Table 1. United States: Existing and Proposed Free Trade Arrangements[1]

		U.S. Exports to Partners		Partner Exports to the U.S.	
	Year of agreement	In millions of dollars	In percent of U.S. exports	In millions of dollars	In percent of partner country exports
Israel	1985	7,482	1.0	11,096	38.2
NAFTA	1994	265,234	36.3	369,287	88.0
Canada		163,725	22.4	228,991	87.6
Mexico		101,509	13.9	140,296	88.5
Jordan	2001	343	0.1	235	10.2
Singapore	2003	17,692	2.4	18,755	15.4
Chile	2003	3,131	0.4	3,428	18.5
Morocco	2003	286	0.0	287	4.0
CAFTA	2003	9,024	1.2	8,668	50.2
Costa Rica		2,496	0.3	2,810	41.4
El Salvador		1,771	0.2	228	18.8
Guatemala		1,877	0.3	2,497	56.4
Honduras		2,437	0.3	2,953	69.6
Nicaragua		443	0.1	179	30.2
Australia	2004	10,945	1.5	6,126	9.7
SACU	2004	2,962	0.4	2,338	10.8
Bahrain	2005	433	0.1	410	5.0
Egypt	2005	3,778	0.5	345	8.3
FTAA	2005	323,418	44.3	430,693	70.3
of which:					
Argentina		3,928	0.5	2,900	10.9
Brazil		15,928	2.2	14,379	24.7

Source: IMF, *Direction of Trade Statistics.*

[1] Data refer to 2001.

Table 2. Evolution of Trade: United States and Free Trade Partners

(Exports to the United States, in percent of total exports)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Israel	29	30	30	31	32	30	31	32	36	36	37	38
NAFTA	74	77	79	82	83	81	83	84	87	88	88	88
Canada	75	76	78	81	83	80	82	83	86	88	87	88
Mexico	69	80	81	83	85	84	84	86	88	88	89	89
Jordan	1	1	1	1	1	1	1	1	1	1	5	10
Singapore	21	20	21	20	19	18	18	18	20	19	17	15
Chile	17	18	16	17	17	14	14	13	14	18	17	18
Morocco	2	2	3	3	3	3	3	3	4	5	5	4
CAFTA	41	42	42	47	42	36	36	43	45	53	51	50
Costa Rica	46	47	48	55	43	40	37	48	48	51	44	41
El Salvador	34	34	34	30	49	18	19	19	21	21	24	19
Guatemala	39	38	35	38	32	31	37	46	52	56	57	56
Honduras	53	54	50	50	47	48	45	42	39	69	69	70
Nicaragua	10	19	26	44	40	38	39	42	38	39	40	30
Australia	11	10	9	8	7	6	6	7	9	10	10	10
SACU	7	6	7	7	5	5	5	6	7	8	11	11
Bahrain	2	5	3	4	4	3	2	2	2	3	4	5
Egypt	9	8	9	14	11	15	13	11	12	12	13	8
FTAA	57	59	60	63	62	61	62	63	67	70	71	70
of which:												
Argentina	14	10	11	10	11	7	8	8	8	11	12	11
Brazil	25	20	19	21	21	19	19	17	19	22	24	25

Source: IMF, Direction of Trade Statistics.

ongoing negotiations of FTAs or that the United States may reserve preferences for FTAs. To some extent, this concern is mitigated by the United States' ambitious WTO proposals for trade in industrial and agricultural goods, which would reduce the relative attractiveness of FTAs.

- ***The costs of non-participation.*** Some analysts have cautioned that while some countries may prefer the multilateral route, they may be spurred into FTAs simply to avoid being "left behind." The proposed FTAs with Chile and CAFTA have already sparked interest among nonparticipants in the hemisphere, including Colombia, in having their own bilateral agreements with the United States.[7] The risk is that the U.S. approach could catalyze other regions to establish competing, and possibly protectionist, FTAs.[8]

- ***Administrative costs.*** Overlapping trade agreements, and related differing rules of origin and preference margins, could be costly to negotiate and police.[9] These administrative costs would need to be weighed against the fact that preference benefits may be short-lived, especially in view of the scheduled liberalization of the global textile market at end-2004, the Doha Round, and the growth of FTA participants.

- ***Stability of the multilateral system.*** Some commentators have raised concerns that a series of bilateral and regional arrangements leaves open the possibility that preferences could be withdrawn, for political or other reasons.[10] According to this view, a multilateral reduction of trade barriers within a set of common rules would yield a more stable and fairer system.

- ***Scope of agreements.*** The fact that U.S. FTAs have tended to span a wide range of issues including labor, the environment, intellectual property rights and capital

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[7] A Report commissioned by the Australian Department of Foreign Affairs (CIE, 2001) sums up the situation: "The FTAA will constitute a powerful inducement for US investors to invest in Latin American markets. Australia has a keen interest in ensuring that Latin American countries do not secure an advantage over Australia in access to the US market. Especially given the likelihood of the US negotiating more FTAs in the future with more of Australia's competitors, an Australian-U.S. FTA constitutes a potentially vital piece of negotiating insurance."

[8] Gordon (2003) considers the strategy a "high-risk" one, which could severely damage U.S. foreign policy and trade if restrictive trade blocs are erected in East Asia and other areas in response.

[9] For example, Leith and Whalley (2003) point out that a wide variety of trade and regulatory practices exist among members of SACU, and negotiation of a U.S.-SACU FTA and harmonizing the various laws and administrative practices within this region would pose a considerable challenge. More generally, Bhagwati (2002) cautions on the potential "spaghetti bowl" effect of crisscrossing FTAs arising from different transition timetables and differing rules of origin.

[10] Panagariya (2002) uses the examples of the GSP and AGOA to argue that preferential trade schemes not subject to WTO discipline can create damaging uncertainty.

movements has raised questions about whether the agreements have become overburdened.[11] Unless carefully designed and managed, the inclusion of labor, intellectual property, and environmental standards could work to restrict trade, especially in countries where legislation and enforcement are weak.

8. ***Nonetheless, regional agreements appear to provide helpful opportunities to promote trade liberalization, especially when political and other factors impede unilateral or multilateral approaches.*** The key to ensuring that these arrangements have favorable effects, however, is to ensure that partners in the agreement strive toward maintaining relatively low external barriers—i.e., "open regionalism"—in order to minimize trade diversion. Typically, regional agreements are likely to offer the greatest benefits, and entail less trade diversion, if they have the following characteristics:

- ***Regional diversity.*** Export diversity may be associated with greater complementarity of product ranges across countries, and greater trade with advanced countries may bring advantages to developing countries through increased investment flows and technology transfers.[12] This suggests, for example, that the benefits of North-South arrangements exceed those of South-South arrangements.

- ***Comprehensive coverage of products.*** FTAs are likely to bear greater fruit if they are extended beyond manufactured trade, and include agricultural products and services. Even more benefits can occur under comprehensive approaches that liberalize foreign direct investment, strengthen competition policy and improve regulatory frameworks.

- ***Reform momentum.*** FTAs may play an important role in helping lock in broader reform agendas among participating countries. For example, FTAs appear to have been helpful in encouraging reforms in the area of investment protection and customs administration. At the same time, however, care is needed to ensure that reforms are consistent and appropriate for the countries' stage of development.

9. ***The U.S. model for bilateral and regional trade arrangements meets many of these criteria.*** For example, as part of the negotiation of the FTAA, timetables are to be established for removal of all trade restrictions on manufactured goods, agriculture, and services. Hemisphere-wide rules would be established for intellectual property rights, subsidies, antidumping, countervailing duties, government procurement, investment, competition

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[11] For example, in the U.S.-Chile Agreement, limits and penalties are established on restrictions of capital transfers and there is no balance of payments safeguard clause. In principle, bilateral efforts that proscribe the temporary imposition of capital controls in crisis could undermine the effectiveness of any broader capacity to impose emergency measures on transactions. The U.S.-Canada FTA, NAFTA, and the GATS—which were the first comprehensive attempts at liberalizing controls on the cross border provision of services and investment—all provide for emergency measures.

[12] For example, Krueger (1999) finds that NAFTA has not led to trade diversion in Mexico-U.S. trade. Olarreaga, et al. (2003) also illustrate the benefits of North-South trade-related R&D flows on productivity.

policy, and dispute settlement. The challenge remains, however, to ensure that these efforts do not undermine momentum for multilateral liberalization, which would still be the first-best alternative.

C. Simulations of Free Trade Arrangements with the United States

10. ***The welfare and other effects of three FTAs are examined below.*** The estimates—which cover United States-Chile, United States-Central America (CAFTA); and United States-Australia—were constructed using the Global Trade Analysis Project (GTAP) framework and assumed the removal of all tariffs on goods as well as textile and clothing quotas between the partners in the arrangements.[13]

11. ***In considering these results, it is important to recognize in advance the shortcomings of the analytical framework, which may cause the estimates to understate the benefits of FTAs.*** First, the GTAP framework does not fully take into account the dynamic gains that might result from trade liberalization, which some studies suggest could be twice as large as the static gains. Second, the model is unable to consider the effects of non-goods-related provisions of the FTAs (including with regard to services, investment, and intellectual property), which could have even larger effects.[14] Third, the analysis also does not take into account the potential spillover effects between FTAs or the effects of multilateral liberalization.

United States-Chile FTA

12. ***The United States is already an important trading partner of Chile.*** Nearly 20 percent of Chilean exports are destined for the United States, and 20 percent of Chilean imports come from the United States. Chile has a low and mostly uniform MFN tariff of 6 percent, and is an active participant in other regional and bilateral arrangements.[15]

13. ***The simulation results—which focus solely on the effects of liberalizing goods trade—suggest that the FTA would yield modest welfare gains for both Chile and the United States*** (Table 3). Chilean exports of processed foods, and to a smaller extent basic crops and textiles and clothing, would receive a particular boost. The modest welfare gain and the small drop in Chile's GDP reflect trade diversion as imports of U.S. machinery and

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[13] The GTAP model used in this paper is a comparative static, general equilibrium model based on neo-classical trade theory.

[14] See, for example, Brown and Stern (2001).

[15] Chile has already concluded separate treaties with Canada, Mexico, and Central America and has comprehensive market opening agreements with Bolivia, Venezuela, Colombia, Ecuador, and Peru. Chile is an associate member of MERCOSUR and signed an FTA with the European Union in 2002. Free trade arrangements with South Korea, Japan, and Singapore are also reportedly under discussion.

Table 3. Simulations of Effects of Free Trade Arrangements with the United States

(Percent change unless otherwise noted)

	United States-Chile		United States-CAFTA		United States-Australia	
	Equivalent Variation[1] (In millions of US$)	GDP	Equivalent Variation[1] (In millions of US$)	GDP	Equivalent Variation[1] (In millions of US$)	GDP
United States	**218.2**	**0.000**	**964.1**	**0.007**	**404.0**	**0.001**
European Union	-96.3	0.000	-990.6	-0.004	-155.2	0.000
Japan	-31.6	0.000	-511.6	-0.002	-137.9	-0.001
Canada	-24.3	0.000	-270.0	-0.003	-50.9	0.000
Australia	-3.7	0.000	-36.5	-0.001	**-1.2**	**-0.034**
Brazil	-59.8	-0.004	-123.4	-0.008	-15.4	-0.001
Mexico	-23.1	0.000	-267.7	-0.006	-15.1	0.001
Argentina	-15.5	-0.002	-32.0	-0.002	-4.2	0.000
Chile	**4.1**	**-0.071**	-26.8	-0.007	-4.1	-0.001
CAFTA	-13.5	-0.005	**3858.9**	**1.491**	-19.9	-0.008
Rest of Latin America	-20.9	-0.003	-231.0	-0.028	-11.3	-0.002
Asia (excl. Japan)	-63.3	-0.001	-1672.2	-0.029	-209.5	-0.002
Mid-East/North Africa	-13.7	-0.001	-180.4	-0.005	-22.0	-0.001
Sub-Saharan Africa	-4.4	0.000	-27.6	0.000	-3.4	-0.001
Rest of the World	-6.6	0.000	-232.9	-0.004	-13.5	0.000
World	-154.4	0.000	220.2	-0.004	-259.6	0.000

Source: Fund staff estimates from GTAP simulations.

[1] Measure of welfare change.

equipment would replace lower cost imports from the EU, Japan, and the rest of Asia.[16] The results, which are similar to those recently prepared by the USITC (2003), illustrate the merit of the Chilean strategy of also establishing free trade arrangements with its other major trading partners in order to reduce potential trade diversion.

United States-CAFTA

14. ***The United States represents a key market for Central American exports.*** For example, around 70 percent of Honduras' exports are destined for the United States. Many products already enter the United States under preferential arrangements, but barriers are relatively high in textile products and agriculture.

15. ***The simulations suggest that an FTA would have important welfare benefits for Central America.*** GDP would increase by as much as 1.5 percent, with smaller gains for the United States. The benefits would stem mainly from the boost in sales of textiles and clothing and processed food, which more than offset trade diversion from Japan, the rest of Asia, and Europe in machinery and equipment and textiles. Welfare gains would also result from trade creation—imports of basic manufactured imports from the United States would supplant higher cost CAFTA production, which would mean lower intra-CAFTA (duty-free) trade in these products. Because of the size of the region and the higher initial trade barriers, an agreement between the United States and CAFTA would have a greater impact on the rest of Latin America than a United States-Chile FTA.

16. ***However, the simulations do not take into account the effects of the scheduled global liberalization of textile and clothing quotas or the planned FTAA.*** Indeed, with the expiration of the Multifibre Agreement in 2005 and the FTAA expected to include hemisphere-wide liberalization, the sustained benefits to CAFTA of the FTA would be lower than estimated. This suggests the importance of CAFTA ensuring that the FTA preferences are used to spur efficiency enhancements in advance of these later trade policy developments.

United States-Australia FTA

17. ***Australia already has important trade ties with the United States.*** About 10 percent of Australian exports are destined for the United States, while Asia Pacific Economic Cooperation (APEC) countries account for 72 percent of its exports. Applied MFN tariffs currently average 4.3 percent, although tariffs on textile items are closer to 15 percent.

18. ***Reflecting already low existing tariff rates, an Australia-United States agreement would have a relatively small overall welfare and output effects.*** **The staff simulations suggest that** Australia's GDP would drop slightly owing to the diversion of imports of

[16] There is little diversion from Argentina—which is a major supplier of Chile—because its exports compete less directly with the United States. To the extent that there is trade diversion, it is concentrated in manufactured goods. The GTAP database utilizes data as of 1997 and, therefore, does not include the Chile-EU agreement; thus, the results may overestimate trade diversion from the EU.

machinery and equipment, basic manufactured products, and textiles from Japan, Asia, and the EU. The impact on other countries would also be small. Nonetheless, Australian producers of textiles and processed crops and animal (meat and dairy) products would reap significant gains. These results, based on a static model, are qualitatively similar to those presented by ACIL (2003), which show that full bilateral liberalization would reduce Australian GDP by 0.09 percent by 2010. In contrast, the Center for International Economics (2001) estimates that Australia's GDP would rise by 0.33 percent by 2006 and 0.4 percent by 2010, assuming a 0.35 percent boost to services sector productivity as a result of a U.S.-Australia FTA.

D. Conclusion

19. ***The foregoing discussion and simulations suggest a number of cautionary notes.*** As noted previously, the estimates may underestimate the gains from FTAs, given that the dynamic benefits and the effects of liberalization in non-merchandise trade are not taken into account. At the same time, however, the estimates suggest that welfare gains for the United States are small but positive and that partner countries could suffer losses related to trade diversion. Especially where initial trade barriers are low (as in Chile and Australia), the gains from further liberalization in goods are limited. In all cases, nonmembers are adversely affected, including countries such as Mexico and Canada, which have prior FTAs with the United States. Countries that would benefit from FTAs could see these gains eroded as more such agreements come into force.

20. ***Thus, the estimates underscore some of the broader caveats that were raised above.*** The U.S. emphasis on FTAs is likely to be most beneficial if agreements are designed in a manner that minimizes trade diversion, and if the agreements do not dilute the momentum toward multilateral trade liberalization, spur competing regional trade blocs, or impose excessive administrative burdens. The simulations focused solely on merchandise trade, and to the extent that additional elements are introduced—such as labor, the environment, intellectual property rights, and capital flows—these should be designed in a manner that supports the broader thrust toward liberalization.

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