Public Policy Brief

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How Far Can Equity Prices Fall?

PHILIP ARESTIS AND ELIAS KARAKITSOS

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Preface

The U.S. stock market has recently recovered from lows experienced in the aftermath of the bursting of the "new economy" bubble. Some investors expect that the secular bear equity market is over and that the recent rally heralds the beginning of a new bull market. According to this brief by Philip Arestis and Elias Karakitsos, the rise in equity prices is temporary. It is highly probable, they say, that the U.S. economy will experience a double-dip recession as a result of a property market crash and asset and debt deflation.

In an asset and debt deflation, the process of reducing debt by saving and curtailing spending takes a long time, say the authors. Current imbalances and poor prospects for spending in the private sector affect the balance sheets of the commercial banks. The downward spiral between the banks and the private sector induces a credit crunch that adversely affects the U.S. economy, which is vulnerable to exogenous shocks and lacks the foundations for a new, long-lasting business cycle.

According to the authors, the 2001 recession differed from all other recessions of the post–World War II era since it was caused not by monetary tightening, but by excessive inventories accumulated during the euphoria of the new economy bubble. Lower interest rates have increased the lag between an equity and property market crash, and have fueled a property market bubble. A substantial fall in real personal disposable income will ultimately trigger a collapse in property prices, they say, and the equity markets have not priced in this event in combination with recession.

This brief analyzes how far equity prices could fall during the current asset and debt deflation process. The authors use a macro and financial model

of the U.S. economy and three scenarios to estimate the effect of a double-dip recession and a property market crash on the S&P 500 Index. Their most likely scenario—a deep recession and a severe property market crash—shows a 33-percent drop in equity prices within the next two years. Net wealth as a percentage of personal disposable income declines significantly and triggers a rise in the saving ratio, which deepens the recession as personal consumption dissipates. GDP, investment in equipment and software, and corporate profits fall. Average price-earnings ratios and dividend yields return to their long-term mean values. The U.S. dollar depreciates 30 percent from its mid 2002 value so that profits and corporate earnings can recover. (Dollar depreciation of this magnitude is already well underway.)

The authors find that there are only three important factors that influence the equilibrium value of the S&P 500: the exchange rate, industrial production, and credit risk. Their analysis also finds that at the peak of the new economy bubble, the S&P 500 was overvalued by 122 percent, but three years of falling equity prices have essentially eliminated any overvaluation. An overall sensitivity analysis shows that the equilibrium value of the S&P 500 is approximately 600, plus or minus 10 percent. Using an approach that emphasizes current and expected earnings as well as the equity risk premium, the S&P 500 is estimated to be fairly valued at 901. These values are significantly below the current level of the index.

This brief indicates that, contrary to investor expectations, equity markets may move to much lower levels and the U.S. and world economies may not have seen the worst yet, in terms of recession.

As always, I welcome your comments.

Dimitri B. Papadimitriou, *President*
July 2003

Asset and Debt Deflation in the United States

Introduction

U.S. equity prices have been falling since March 2000. In terms of magnitude, the current bear market resembles the mid-1970s plunge in equity prices, but it differs in terms of causes and the factors that should be used to monitor its progress. The 1970s bear market (a supply-led business cycle) was the result of soaring inflation caused by a surge in oil prices that eroded household real disposable income and corporate profits. Today's bear market, however, is caused by asset and debt deflation, which triggered the bursting of the "new economy" bubble.

There have been three asset and debt deflation episodes that have led to recession in the 19th and 20th centuries:[1] the depression of 1876–90 (associated with the railway bubble), the depression of 1929–40 (associated with the electricity and automobile bubble), and deflation in Japan that began in 1989 (associated with the electronics bubble) and has not yet ended. In all three cases it took more than a decade to eliminate the serious imbalances in the economy. As shown by the recent experience in Japan, there are sharp, short-lived rallies in a secular bear market, giving rise to false hopes that the bear market has ended. In an asset and debt deflation environment, the nonbank private sector retrenches when the huge debt acquired during the rosy years of rising asset prices is inconsistent with falling asset prices. The process of reducing debt by saving and curtailing spending is long and results in a secular bear equity market. This process of asset and debt deflation, in this instance associated with the telecommunications and Internet bubble, is exactly what is happening today in the United States.

The 2001 recession, which was the result of an inventory correction associated with the bursting of the new economy bubble, was very mild. However, the U.S. economy could fall into a double-dip recession as the poor prospects of the corporate component of the private sector affect the real disposable income of the personal component of the private sector. The forces that could drive the economy back into recession are related to imbalances in the corporate and personal components that affect the balance sheets of the commercial banks. The final stage of the asset and debt deflation process involves a spiral between the banks and the nonbank private sector as banks cut lending and induce a credit crunch, thereby worsening the economic health of the nonbank private sector, a factor which further deteriorates the banks' balance sheets.

This brief examines how far U.S. equity prices could fall during the current asset and debt deflation process. It begins by reviewing how equities are valued and then discusses the impact that a double-dip recession and property market crash could have on equilibrium equity prices as represented by the S&P 500 Index.

Valuing Equities

Since the current bear market has its roots in asset and debt deflation, traditional methods of valuing equity markets based on supply-side factors are inappropriate. The valuation method used in this brief, therefore, is based on the degree of imbalance in the personal balance sheet (i.e., the extent to which assets and liabilities or net wealth deviate from their means). Net wealth is defined as assets (tangible and financial) less liabilities (mainly mortgages and consumer credit). This definition of wealth has the property of reverting to its mean, since it is a stationary variable.[2]

Figure 1 shows household net wealth as a percentage of personal disposable income. Net wealth was higher than its mean in the golden years of the 1950s and 1960s, when business cycles were led by demand, and lower in the 1970s and the first half of the 1980s, when business cycles were led by supply (e.g., the oil shocks of 1973–74 and 1979). Net wealth bottomed at the end of 1974 at 413 percent of personal disposable income and did not start to recover until mid 1984. From then on, however, net wealth rose rapidly to 495 percent of personal disposable income, until the crash of

Figure 1 Household Net Wealth
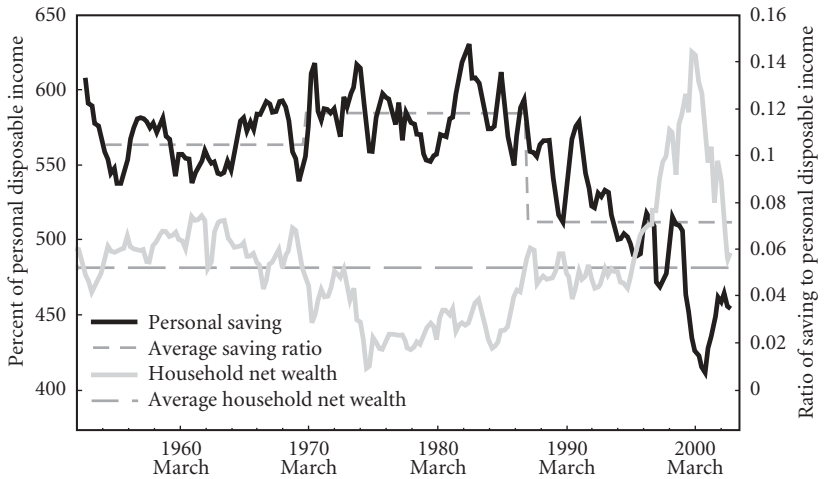
Sources: NIPA, Flow of Funds, and authors' calculations

1987, which reduced net wealth to 469 percent of personal disposable income. This loss was soon recouped, but the 1989 collapse in the property market and the ensuing recession eroded net wealth to 466 percent of personal disposable income by the end of 1994. Thereafter, during the new economy bubble, net wealth soared to 626 percent of personal disposable income by the fourth quarter of 1999. The bubble burst in March 2000, with the plunge of the Nasdaq, and net wealth fell to 491 percent of personal disposable income by the end of 2002. According to the Federal Reserve's flow of funds accounts (March 2003), the ratio of net wealth to personal disposable income consists of equity (282 percent), property (186 percent), other net wealth (129 percent), and liabilities (minus 106 percent). The dominance of equity in calculating net wealth is overwhelming.

The ratio of personal saving to personal disposable income, on a four-quarter moving average basis, is also shown in Figure 1. This brief adopts the thesis of Frowen and Karakitsos (1996), which states that the personal component has a target real wealth in the long run that is consistent with the Life Cycle Hypothesis of Savings. When asset prices rise more than expected, households more easily meet their target real wealth and, therefore, relax their effort to save. Consequently, saving, as a percent of personal disposable income, falls when real wealth rises more rapidly than anticipated, and vice versa. Since asset prices move procyclically, this

feature implies a negative relationship between real wealth (expressed as a percent of disposable income) and the saving ratio. Figure 1 strongly supports this view.

In this brief, the preferred method of valuing equities from a long-term perspective is to determine corresponding values when net wealth returns to its historical mean. This method assumes that the whole adjustment process is borne by equities for any given level of personal disposable income. Over time, however, as disposable income rises, the degree of fall in equity prices that is required to restore net wealth to its mean diminishes. In other words, there is no need for a plunge in equity prices. Even with level prices, imbalances will be eliminated over time and net wealth will be restored to its mean value through a gradual rise in disposable income. Unfortunately, equity prices never remain unchanged, since they reflect expected developments in the real economy. Hence, an imbalance is usually corrected with a fall in asset prices.

Using quarterly data from 1996 to 2002, Figure 2 shows the results of applying the preceding valuation methodology to the S&P 500. The fair value of the S&P 500 increases through time as disposable income rises. However, the rate of increase in asset prices was much more rapid than the

Figure 2 **S&P 500 K-Model Long-Term Valuation**
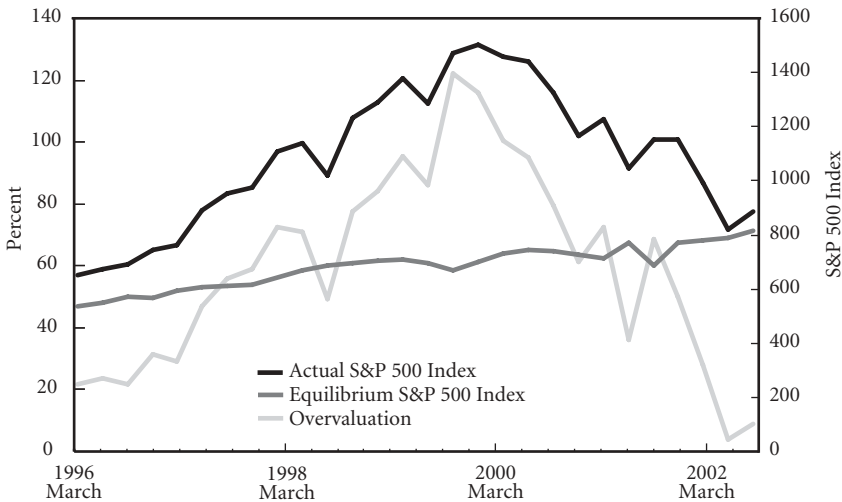
Sources: Bloomberg.com, Karakitsos (2002), and authors' calculations

rate of increase in disposable income and this disparity resulted in a bubble. At the peak of the bubble, in the fourth quarter of 1999, the S&P 500 was overvalued by 122 percent.[3] Subsequently, in spite of three years of falling equity prices, the S&P 500 was still overvalued by 9 percent at the end of 2002, when its fair value is now estimated to have been 810.

Using daily rather than quarterly data, the S&P 500 was slightly undervalued on two occasions during the summer and autumn plunge in equity prices in 2002. In the first quarter of 2003, the S&P 500 was again undervalued as a result of the expected economic consequences of the Iraq war, but it became slightly overvalued during the rally that followed the onset of war. Does this rally herald the beginning of a new bull market?

Consumer and business confidence may recover now that the Iraq war is over. The accommodating stance of monetary policy and the proposed retroactive fiscal package of the Bush administration may spur consumer spending and business investment in the months ahead. But these government policies may lead to only a short-lived cyclical recovery. Because of imbalances in the private sector, which affect the balance sheets of the commercial banks, the U.S. economy lacks the foundations for a new, long-lasting business cycle. Hence, the economy is vulnerable to exogenous shocks and could experience a double-dip recession.

The Case for Predicting a Double-Dip Recession and Property Market Crash

Figure 3 shows the underlying forces behind the personal component imbalance. Whereas the ratio of financial assets to personal disposable income fell from 515 percent in March 2000 to 375 percent by the end of 2002 (almost three years after the bubble burst), debt continued to soar to 106 percent of personal disposable income. The discrepancy between falling financial wealth and soaring debt is due to the widely held belief that the fall in equity prices is temporary. This belief has been bolstered by a rise in property prices that has cushioned the fall in equity prices.

The inevitable adjustment of debt to a sustainable level that is consistent with current asset prices, and of saving to a level that represents a higher proportion of disposable income, will be a long and painful retrenchment

process. Figure 1 shows that the process whereby a higher saving ratio is being triggered by lower net wealth has already started. Thus, retrenchment by the private sector could turn a double-dip recession into a protracted recession. The market has not yet discounted such a possibility—it has simply postponed an economic recovery from the second half of 2002 to the first half of 2003 and, again, to the latter half of 2003.

Figure 3 **Financial Assets and Debt of the Personal Component**
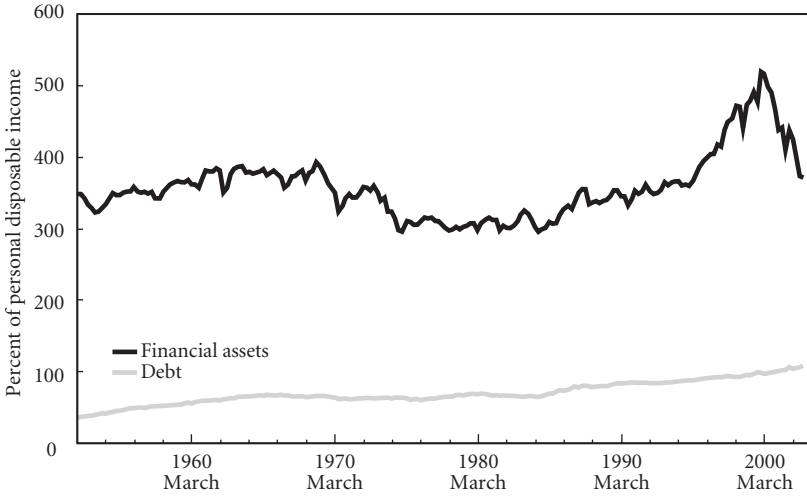
Sources: NIPA, Flow of Funds, and authors' calculations

Two avenues could return the economy to the path of asset and debt deflation and a secular bear market:

1. The end of the war with Iraq may trigger a recovery of consumer and business confidence, which, along with an easy fiscal and monetary policy, may cause a cyclical upturn that could last as little as a few months or until after the November 2004 presidential elections. If the cyclical upturn is strong, people will assume the worst is over and that the economy is on a sustainable path to recovery. However, the stronger the cyclical upturn, the more long-term interest rates will soar. This event would trigger a collapse of the property market and the economy would fall back into recession.

2. In spite of an end to the war, there is no cyclical upturn and the economy continues to teeter on the edge of recession. Disappointment with the lack of a recovery could trigger another collapse in equity prices and

retrenchment by the private sector, which would also collapse the property market.

Either avenue leads to the serious possibility of a recession combined with a collapse in the property market. Whether earlier or later, the next recession will probably be much deeper than the last one.

Property prices recovered to 186 percent of disposable income between 1994 and 2002 (*see* Figure 4). If the forthcoming recession is deep, the likelihood of a substantial fall in property prices is very high. A fall in property prices is usually caused by two factors: high and rising interest rates, and low and falling growth in real personal disposable income. In most business cycles, the former factor causes the latter. The central bank tightens monetary policy to curb inflation and this action causes a recession that lowers real disposable income. Higher interest rates make it more difficult for households to service their debts, but households endure these higher costs until their real disposable incomes begin to fall. An equity market crash, on the other hand, occurs as soon as investors perceive that a rise in interest rates will cause a recession. A property market crash lags one or two years behind an equity market crash because it takes time for tight monetary policy to erode real personal disposable income. Moreover, the shift from equity to property, after an equity market crash, contributes to the lag.

Figure 4 **Tangible Assets and Real Estate**
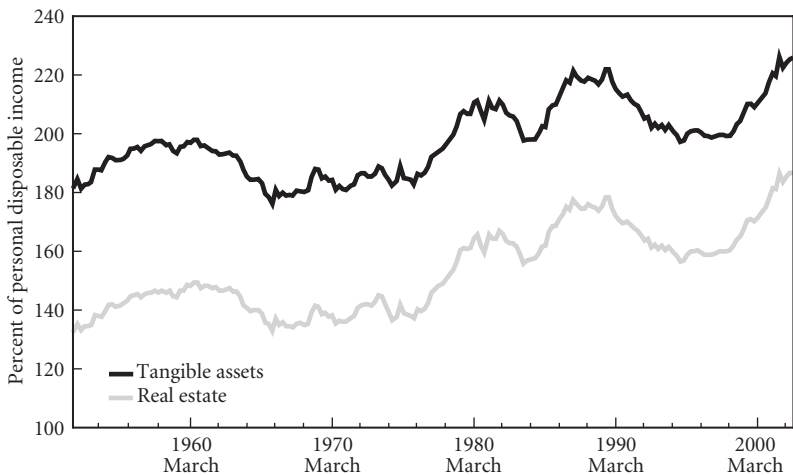
Sources: NIPA, Flow of Funds, and authors' calculations

Figure 4 shows that there has been a property market decline with every recession. Small price declines were associated with the recessions of 1952 and 1958, and a significant decline was associated with the 1960s recession, during which real estate fell 16 percentage points (from 149 percent to 133 percent of personal disposable income from December 1960 to March 1966). In the 1973–75 and 1980–82 recessions, real estate fell 9 and 14 percentage points, respectively. However, as a result of the 1990–91 recession, real estate fell 22 percentage points (from 178 percent to 156 percent of personal disposable income between the end of 1989 and December 1994). This decline was significantly higher than the recession average of 13 percentage points.

The 2001 recession differs from all other recessions of the post–World War II era in that it was caused not by monetary tightening but by excessive inventories accumulated during the euphoria of the new economy bubble. In fact, interest rates declined sharply. The U.S. monetary authorities did not simply react to an inventory correction, they correctly envisaged the risks of asset and debt deflation when the Nasdaq collapsed in March 2000. Lower interest rates not only increased the lag between an equity market crash and a property market crash, they also fueled the property market bubble as portfolios shifted from equities to property. Nevertheless, in spite of the presence of lower interest rates, which cushioned consumers who were servicing their debts, a substantial fall in real personal disposable income will ultimately trigger the collapse in property prices that will characterize the next recession. Thus far, the equity markets have not priced in the combined effects of a deep and protracted recession and a simultaneous decline in property prices.

The method for evaluating equities that was outlined in the previous section is not suitable for evaluating the dynamic relationship of the effects of a recession and property market crash on the equilibrium value of the S&P 500; it is suitable only for a steady-state analysis. The dynamic relationship between the equity and property markets has been formalized in a model of the U.S. economy (Karakitsos 2002). This model was used to estimate the effect of a double-dip recession and a property market crash on the equilibrium equity prices of the S&P 500 Index. The model used monthly data for the February 1988 – March 2003 period and the E-Views computing package for estimation and simulation purposes. The properties of the model are discussed later in this brief (*see* Sensitivity of Scenario I Simulation).

The Impact of a Double-Dip Recession

Using the full macro and financial model in Karakitsos (2002), three scenarios were simulated to assess the likely impact of a double-dip recession on the equilibrium value of the S&P 500: a deep recession and a severe property market crash, a modest recession and a typical property market crash, and a mild recession with no property market crash. The results of these simulations are summarized in Table 1.

Scenario I: A Deep Recession and a Severe Property Market Crash

According to this scenario, real estate would fall by 25 percentage points of personal disposable income (from 186 percent to 161 percent), and would remain 8 percentage points higher than its 50-year historical mean (153 percent). The fall would be similar in magnitude to the 22-percentage-point plunge in property prices that occurred in the first half of the 1990s. The model suggests that net wealth would decline by 73 percentage points, to 418 percent of personal disposable income, in little more than a year after the shock in property prices (*see* Figure 5), and would approach the all-time low, which occurred in 1974 (*see* Figure 1). The decline in net wealth would be a multiple of the plunge in property prices, since it would capture the effect of the fall in property prices on financial wealth.

A decline in net wealth would trigger a rise in the saving ratio when consumers realized that the fall in equity prices would be permanent, lost hope of a recovery, and attempted to pay back their debts. According to the model, the saving ratio would rise to 8.4 percent of disposable income in little more than a year after the shock in property prices (*see* Figure 6). The relationship between net wealth and saving would be crucial because it describes the way in which the personal balance sheet would return to equilibrium after a serious imbalance.[4] As already shown in Figure 1, there is a negative relationship between net wealth and the saving ratio.

In the 1950s and 1960s, when net wealth was higher than average, the saving ratio fluctuated around its mean value of 10.5 percent of personal disposable income. In the 1970s and the first half of the 1980s, when wealth was below its mean value, the saving ratio fluctuated around a higher mean value (11.8 percent). From the latter half of the 1980s to 2000, the saving ratio fell as net wealth rose. Now, only a few months after net wealth peaked, the saving ratio

Table 1 Impact of a Double-Dip Recession on the S&P 500 Index

|	Base Equilibrium	Scenario I	Scenario II	Scenario III	Sensitivity of Scenario I							
	Current Values	Severe Property Crash (1990s style)	Typical Property Crash (1980s style)	No Property Crash	Industrial Production	Investment	Liquidity	Corporate Profits	Exchange Rate	Credit Risk	Treasury Note Yield	Inflation
Percent of Personal Disposable Income												
Real Estate Wealth	186	161	171	186								
Net Wealth	491	418	443	491								
Saving	3.5	8.4	7.5	3.5								
Percent (Year over Year)												
GDP	1.4	-2.9	-2.1	-0.7	-3.5							
Industrial Production	0	-7	-5	-2								
Investment in Equipment & Software	3.3	-9	-7	-1		-4.5						
Liquidity (M2)	7.1	5	6	7.5			2.5					
Corporate Profits	1.1	-23	-16	-11				-11.5				
$U.S. Exchange Rate (trade weighted)	94.3	70	85	85					99.3			
Percent												
Credit Risk	3.25	3.25	2.75	2.25						2.25		
10-year Treasury Note Yield	4.00	4.58	4.77	5.00							5.58	
Federal Funds Rate	1.25	0.5	0.75	1.00								
CPI (inflation)	3.0	0.1	0.6	1.0								1.1
Equilibrium S&P 500	**901**	**600**	**675**	**805**	**660**	**603**	**592**	**611**	**526**	**669**	**561**	**634**
Percent of Scenario I Equilibrium			12.5	34.2	10.0	0.5	-1.3	1.8	-12.3	11.5	-6.5	5.7
Percent of Base Equilibrium		-33.0	-25.0	-11.0								
Equilibrium S&P 500 with 0.5% higher credit risk			623	720								
Percent of Main Scenario Equilibrium			3.8	20.0								

Sources: NIPA, Flow of Funds, Bloomberg.com, Karakitsos (2002), and authors' calculations

Figure 5 Net Wealth

Sources: NIPA, Flow of Funds, Karakitsos (2002), and authors' calculations

Figure 6 Personal Saving Ratio
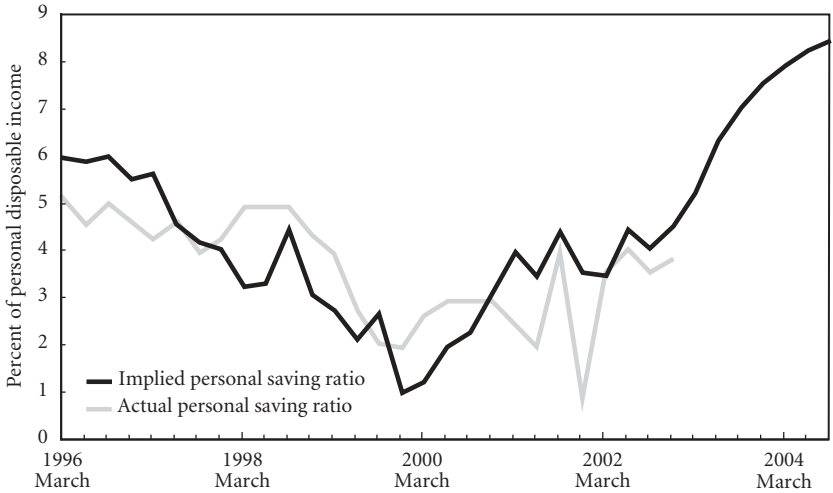
Sources: NIPA, Flow of Funds, Karakitsos (2002), and authors' calculations

has begun, once again, to rise. Therefore, the model prediction that a rise in the saving ratio from 3.5 percent to 8.4 percent would accompany a severe property market crash of 25 percentage points is reasonable and of the same relative magnitude as the early 1990s recession (when the saving ratio rose from 7.2 percent to 11.4 percent).

A rise in the saving ratio would deepen the recession, as previous support of the economy from personal consumption dissipated. The macro model suggests that the depth of the recession would reduce GDP by approximately 2.9 percent and industrial production by 7 percent. Investment in equipment and software would plunge by 9 percent (*see* Figure 7) and corporate profits would fall by 23 percent (*see* Figure 8), figures similar to the 2001 recession. The dollar is forecast to depreciate 30 percent from its mid 2002 value. In spite of the huge increase in liquidity engendered by the Federal Reserve, the growth rate of the money supply would decline to 5 percent as the commercial banks' deteriorating balance sheets forced them to cut lending, thus creating a credit crunch. Inflation would fall to zero. The average price-earnings ratio of the stocks in the S&P 500 would fall to 18.7 (its mean value for the past 20 years), while dividend yields would rise

Figure 7 **Real Nonresidential Investment in Equipment and Software in the Last Business Cycle**
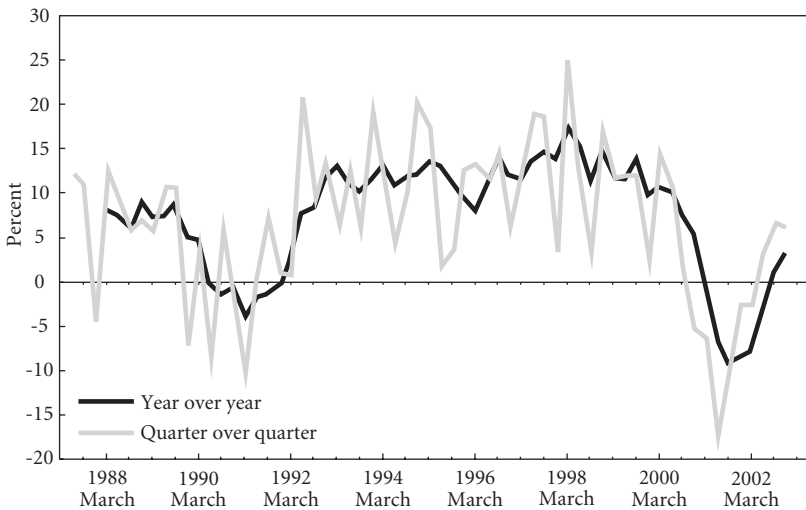
Sources: NIPA, Flow of Funds, and authors' calculations

Figure 8 Unit Profit
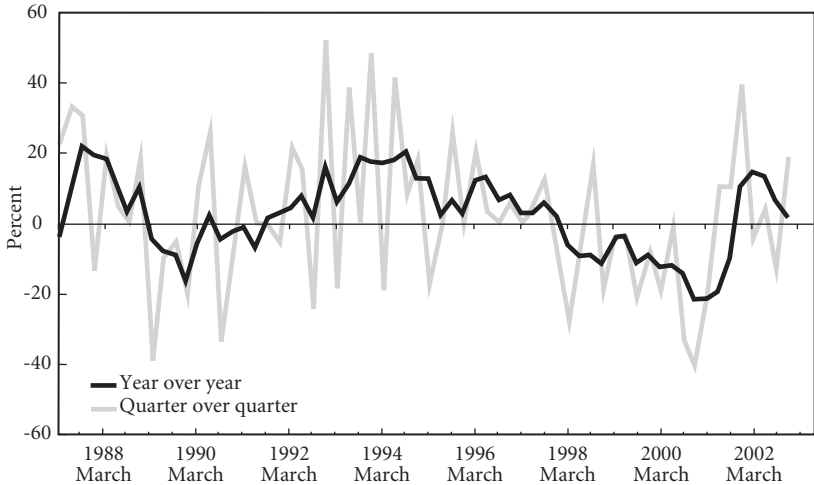
Sources: NIPA, Flow of Funds, and authors' calculations

to their mean value of 3.2 percent. Credit risk would remain at its current high level (3.25 percent). The 10-year Treasury Note yield would rise to 4.58 percent in spite of the recession, as a result of the depreciation of the dollar and the deteriorating federal deficit. Under this scenario, the S&P 500 equilibrium value is estimated to fall to 600.

Sensitivity of Scenario I Simulation

The plausibility of the first scenario depends on the sensitivity of the equilibrium value of the S&P 500 to its determinants. The results of a sensitivity analysis are shown in Table 1. For the purposes of comparison, each determinant was perturbed (drastically changed) by 50 percent of its value. However, since a standardized perturbation may be implausible for some determinants, the results in Table 1 may seem counterintuitive. For example, corporate profits have a smaller effect than the exchange rate. In order to foster an appreciation of the results of the sensitivity analysis, this brief proceeds to outline certain aspects of the model.

The many variables affecting the equilibrium value of the S&P 500 can be combined into two groups: current and expected corporate profits, and the equity risk premium. The effect of current corporate profits is small: A

50-percent improvement, which is well within the normal range, lifts the equilibrium S&P 500 value by only 1.8 percent. The effect of expected corporate profits, which are captured by the exchange rate, industrial production, investment, and inflation, is more important than current profits. The exchange rate indirectly captures the effect of expected corporate profits, since dollar depreciation leads to higher corporate profits (in terms of repatriated profits for U.S. subsidiaries located outside the United States) and increased competitiveness (in terms of higher exports, lower imports, and higher profits for domestic companies). A fall in the dollar, therefore, raises the equilibrium value of the S&P 500.

The model property of a negative relationship between the exchange rate of the dollar and the equilibrium S&P 500 Index should be contrasted with the market view of a positive relationship. The difference between the model and the market belief reflects the difference between a partial and total derivative of the model. The negative relationship reflects the partial derivative of the model (what would happen to the S&P 500 if the exchange rate depreciates, all other things being equal) whereas the market view reflects the total derivative of the model (what would happen if the other variables are allowed to change simultaneously).

In the first scenario, a dollar depreciation of 30 percent is necessary for corporate earnings to recover. Such a huge depreciation may seem paradoxical, but it is necessary for a profit recovery. The market's view that a strong dollar is associated with a strong equity market stems from the relationship between the equity market and the growth of GDP. A rally in the equity markets raises the net wealth of the private sector and leads to higher growth in the economy as a result of increased consumption, which does not require dollar depreciation. Similarly, the effect of industrial production captures the effect of future corporate profits. An increase in industrial production leads to expectations of rising profits and to a higher S&P 500.

More inflation also leads to higher corporate earnings. It does so by raising the pricing power of companies and by reducing the opportunity cost of holding equities (higher inflation lowers the real interest rate and the return on money, which is a substitute for equities). More investment in equipment and software also leads to higher corporate earnings by increasing the growth rate of the economy.

A rise in the equity risk premium lowers the equilibrium S&P 500. In the model, the equity risk premium is estimated using the yield gap, excess equity return, credit risk, and yield curve (the spread between the long bond yield and the three-month Treasury Bill rate). Credit risk is the most important determinant of the equity risk premium. A 1-percentage-point fall in credit risk, which is very plausible in terms of actual fluctuations, leads to approximately an 11.5-percent increase in the equilibrium value of the S&P 500.

The sensitivity analysis shows that there are only three important factors that influence the equilibrium value of the S&P 500: the exchange rate, industrial production, and credit risk. A reasonable move in the currency, of about 10 percent, would have a limited effect on the S&P 500, so a huge dollar depreciation would be necessary for higher profitability and for the economy to recover. If industrial production were to fall by half, which is well within the normal range, then the equilibrium S&P 500 would improve by 10 percent. As noted above, a 1-percentage-point fall in credit risk raises the equilibrium S&P 500 by 11.5 percent. In the first scenario, credit risk does not fall from its current level. It seems unreasonable, however, to assume that if the economy plunges into another recession, credit risk will abate. Rather, it most likely would rise, so the equilibrium value of the S&P 500 would be even lower. The overall sensitivity analysis suggests that the equilibrium value of the S&P 500 is approximately 600, plus or minus 10 percent.

Scenario II: A Modest Recession and Typical Property Market Crash

The preceding sensitivity analysis, while useful in showing the robustness of the first scenario with respect to its determinants, is only a partial equilibrium analysis, because it is based on partial rather than total derivatives. The following alternative scenarios, because they are based on total derivatives, complement the sensitivity analysis.

The alternative scenario of a modest recession and a typical property market crash would lead to an equilibrium value, for the S&P 500, of 675, a 13-percent improvement. In this scenario, the property market crash would be approximately 15 percentage points, a figure typical of real estate declines in the 1960s and 1980s. In the 1980s, the drop in property prices was caused by high interest rates that made mortgage debt servicing very difficult. In the early-1990s recession, real estate fell approximately 22 percentage points, which is similar to the first scenario. The second scenario can, therefore,

only be defended using the assumption that lower interest rates would cushion the property market crash, thereby creating a situation in which net wealth would fall to 443 percent of disposable income rather than to the 418 percent predicted in the first scenario. The modest recession (GDP declines by 2.1 percent) would be deeper than the early-1990s recession, but shallower than the recessions in the 1970s and 1980s. A critical factor in this second scenario is that credit risk would fall by a 0.5 percentage point compared with its current value. If this fall did not materialize, the S&P 500 would be 623, an improvement of only 4 percent over the first scenario.

Scenario III: A Mild Recession and No Property Market Crash

In this scenario, the recession would be so mild that there would be no property market crash. The recession would be caused by corporate sector weakness with no investment recovery. The personal component of the private sector would suffer as its real disposable income weakened, owing to fewer jobs and lower wages. The personal component would not retrench, however, because the effects of the mild recession would be offset by lower interest rates. It is assumed that the recession would be half as deep as the recession in the early 1990s, thereby avoiding a property market crash. It is estimated that the equilibrium value of the S&P 500 would be 805, an improvement of 34 percent over the first scenario.

Credit risk would decline by 1 percentage point compared with the first scenario and a 0.5 percentage point compared with the second scenario. If credit risk were to fall by only a 0.5 percentage point, then the S&P 500 would decline to 720, an improvement of 20 percent over the first scenario. However, some of the beneficial effects of the lower credit risk would be negated by a decrease in dollar depreciation.

Summary and Conclusions

Using quarterly data and the long-run (steady-state) personal balance sheet, the S&P 500 is estimated to be fairly valued at 810 by the end of 2002. Using monthly data and a different approach that emphasizes current and expected earnings as well as the equity risk premium, the S&P 500 is estimated to be fairly valued at 901. At the peak of the bubble, the S&P 500 was overvalued by 122 percent. Three years of falling equity prices,

however, have eliminated any overvaluation and the S&P 500 was slightly undervalued several times during the course of 2002.

The equity markets may move to lower levels in the next two years. For example, investors hoping for an economic recovery in the second half of 2002 have simply postponed their expectation. In addition, the markets have not priced in the possibility of a double-dip recession or a property market crash.

A double-dip recession could occur in two ways:
1. Despite the end of the Iraq war, the economy fails to recover and goes straight into recession.
2. The economy experiences a cyclical upturn lasting, possibly, until the end of 2004 (after the presidential elections) and then falls into recession in 2005. Imbalances in the economy result in a jobless recovery with very low investment (Arestis and Karakitsos 2003a, 2003b).

How far can equity prices fall in the event of a double-dip recession within the next two years? In the first, most likely, scenario, recession would trigger a severe property crash of approximately 25 percentage points of personal disposable income and the S&P 500 would fall to 600. This means that there could be a 33-percent drop (from 901) in equity prices this year or in 2005. Although this drop appears excessive, it is based on neutral rather than pessimistic assumptions.

A sensitivity analysis shows that the critical factors underlying these conclusions are the depth of the recession, the exchange rate of the dollar, and credit risk. The dollar is assumed to depreciate 30 percent from its value in mid 2002. If that assumption did not materialize, the fair value of the S&P 500 would drop to 526, because dollar depreciation is deemed essential to increased profitability and economic recovery. It is assumed that credit risk would remain at its current high level of 3.25 percent. This assumption is reasonable, since it is difficult to justify the lowering of credit risk during a deep recession. A sensitivity analysis of the first scenario, based on these assumptions, shows that the fair value of the S&P 500 is 600, plus or minus 10 percent.

The overall conclusion is that the U.S. economy and, by implication, the world economy may not have seen the worst yet, in terms of recession. Under certain conditions, a double-dip recession is highly probable.

Notes

1. Throughout the 17th and 18th centuries, there were many recessions caused by asset and debt deflation. Most notable are the "tulipmania," which occurred in the middle of the 17th century, and the Mississippi and South Seas bubbles of the early 18th century (Garber 2000).

2. A variable is stationary if its mean and standard deviation do not change over time. Net wealth as a percentage of disposable income is a stationary variable, since it is the difference of two nonstationary variables of order one.

3. In an earlier working paper, the peak of the Internet bubble was located as occurring in March 2000, which coincides with the bursting of the Nasdaq bubble. However, the extensive July 2002 revision of NIPA data, back to 1999, accounts for the transfer of the peak to an earlier quarter and for other differences between this brief and Working Paper no. 368. It should be noted that although such revisions amount to rewriting history, they reflect the discrepancy between data available as events unfolded and the more realistic figures that became available later.

4. The relationship between net wealth and the saving ratio describes the stationarity condition of the personal balance sheet.

References

Arestis, P. and E. Karakitsos. 2003a. "The Conditions for a Sustainable U.S. Recovery: The Role of Investment." Working Paper no. 378. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

———. 2003b. "How Far Can U.S. Equity Prices Fall under Asset and Debt Deflation?" Working Paper no. 368. Annandale-on-Hudson, N.Y.: The Levy Economics Institute.

Frowen, S. F., and E. Karakitsos. 1996. "Monetary and Fiscal Policy Under Conditions of Globalised Money and Capital Markets: Lessons for the U.K. Personal Sector." *Public Finance,* 51:3: 305–324.

Garber, P. M. 2000. *Famous First Bubbles: The Fundamentals of Early Manias.* Cambridge, Massachusetts: The MIT Press.

Karakitsos, E. 2002. "A Macro and Financial Model of G4." London: Trafalgar Asset Managers Ltd.

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Philip Arestis is Institute Professor of Economics at The Levy Economics Institute. Previously, Arestis was professor and chair of economics departments at a number of universities in the United Kingdom, and secretary of the standing Conference of Heads of University Departments of Economics (CHUDE). His recent publications have addressed, among other topics, current monetary policy, fiscal policy, the relationship between finance and growth and development, the regime-switching approach to the European Monetary System, capital stock in wage and unemployment determination, the "Third Way," inflation targeting, threshold effects in the U.S. budget deficit, and the role of Minskian economics and financial liberalization in the southeast Asian crisis. His recent work has appeared in the *Cambridge Journal of Economics, Eastern Economic Journal, Economic Inquiry, Economic Journal, International Review of Applied Economics, Journal of Money, Credit and Banking, Journal of Post-Keynesian Economics, Manchester School,* and *Scottish Journal of Political Economy.*

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