

Chapter 4

The Performance Relative to Other Instruments and Markets

This Chapter compares the performance history of U.S. stock market with those of other stock markets worldwide and with such other investment instruments as bonds, commodities and the real estate. After all, if history is to help guide our investment goals, strategies and expectations then, much like the need to understand the history of the U.S. equities market, we also need to know if the excellent historic performance of equities has been unique to the U.S., or can be generalized to all the equity markets.

This chapter therefore examines how, when adjusted for risks, do the returns on the U.S. stock market compare with those on the other assets and markets. The chapter is divided into three sections. The first two sections apply the insights gained from the last Chapter to the other investment alternatives: first section looks at the relative attractions of fixed income instruments and commodities vis-à-vis the U.S. stock market and the section examines the performance of non-U.S. financial markets and the macroeconomic factors. The last section then assesses these data conjunctively with the lessons drawn in the preceding Chapter.

The goal here is to see whether the investors' success in the U.S. equities market so far has been fortuitous or reflects the workings of some fundamental truths about the market's overall performance that cannot be dismissed as happenstance.

4.1 Bonds and the Other Investment Alternatives

4.1.1 The Resurgence of the Bond Market

One way to combat the risk associated with the stocks, so apparent in the preceding discussions, is to seek safer investment alternatives. Using the common stocks as investment instruments is a relatively recent practice, after all, as was noted earlier. Such fixed-income instruments as Government and corporate bonds and tangible assets like precious metals and real estate, and cash, have been the traditionally popular alternatives, in this respect. Besides, US financial markets are not the only alternatives available to investors, more so in today's globally interconnected marketplace. In this section, therefore, we examine how the first of these alternatives, the bonds and the commodities, have fared relative to the US stock markets.

Take Y2K's sexiest fixed-income investment instruments — bonds and bond funds. As shown in Exhibit 4.1, the average annual returns on taxable bonds in the year 2000 amounted to 6.3%, and 10.1% on the tax-free bonds. These figures contrast sharply with the -10.1% return for the year on S&P-500 index (-9.2% with the dividends) and -6.2% return on the Dow Jones Industrial Average (-4.7% in total returns). This contrast is particularly

striking because, all through the twentieth century, real annual returns on 3-month Treasury bills had averaged 1.2%, with a standard deviation of 4.8%, and the corresponding figures for long-term Treasury bonds, with 10 years and longer maturities, were 1.6% and 8.3%, respectively. Clearly, there were times in the last century when

Average Annual Total Return*		
	2000	1996-00
Long Government	14.1%	5.7%
Muni. National Long	11.1%	4.9%
Intermediate Government	10.8%	5.7%
Long (general)	9.6%	5.5%
Intermediate (General)	9.5%	5.5%
Emerging Market Bond	9.0%	10.2%
Short (General)	7.8%	5.5%
Short Government	7.5%	5.4%
Ultrashort	6.0%	5.4%
International Bond	3.0%	4.3%
Multisector	0.8%	4.7%
Convertibles	0.0%	13.3%
High Yield	-8.1%	4.1%
All Tax-Free	10.1%	4.8%
All Taxable	6.3%	5.7%

*Appreciation plus reinvestment of dividends and capital gains before taxes

Exhibit 4.1:

Y2K breathed new life into the bond market.

Source:
Business Week,
Feb 5, 2001

these bills and bonds gave negative real returns! Much like 2000, though, 1994 too was a good year for the bond market, and not so good a year for the stock market.

Bonds¹ are fixed income instruments because they carry predetermined rates of interest (or coupons) that last for the life of the individual securities. Changes in interest rates from time to time subject the prices of these instruments to market fluctuations, however. Their annual yields vary, therefore, when they change hands, as they do in the large secondary market. During 2000, interest rates rose in the first of the year and started falling in the second half. It would hardly seem surprising, in this volatile milieu, that the safer bonds were those with larger yields. Note that the returns on long and intermediate-term bonds in 2000 were not only the highest but were also often more than double the corresponding average annual yields for 1996-2000. Compared to these, returns on the international bonds were poorer than during 1996-2000, multi-sector and convertible bonds gave near-zero returns, and the high yield or junk bonds actually gave negative returns, much like the stocks.

The U.S. debt market is sizeable. As estimated by the Bond Market Association, it stood at \$15.8 trillion, as on December 31, 2000. Exhibit 4.2 gives the breakdown of this market. The Treasuries and the corporate bonds,

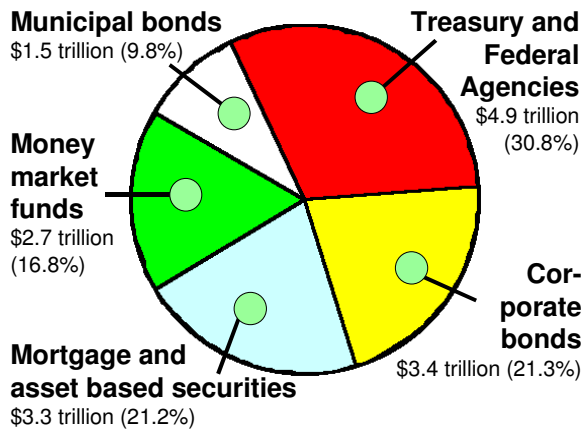


Exhibit 4.2:

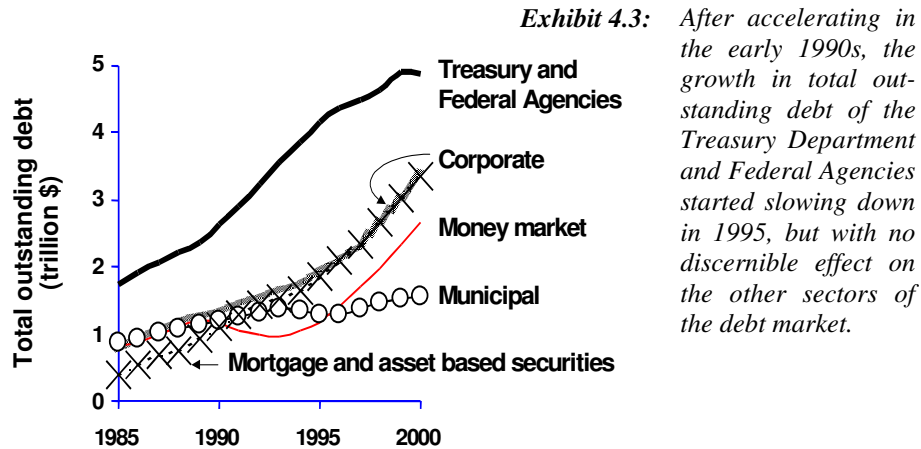
As of Dec 31, 2000, outstanding public and private debt in the U.S. stood at \$15.8 trillion. Treasuries, with \$3 trillion, and corporate bonds, with \$3.4 trillion, together accounted for over two-fifths of it.

Source:

The Bond Market Association

totaling about \$3 trillion and \$3.4 trillion in 2000, respectively, accounted for over two-fifths of the market. Overall, though, new issue activity was lower in 2000, than in 1999. As the Treasury Department continued reducing borrowing and paying down the outstanding debt, the supply of Treasury securities in 2000 was down by \$492.8 billion from its peak value of \$3.46 trillion in 1996. Measured relative to GDP, the Treasury Department's total

marketable debt is now at its lowest level since 1992, when it stood at \$2.75 trillion. Indeed, it can be seen in Exhibit 4.3 where we graph the total outstanding public and private debt in the U.S. since 1985, the growth of debt owed by Treasury and the Federal Agencies² has been steadily decelerating since 1995.



The issuance of corporate debt, mortgage and asset-based securities, and the money market instruments like commercial paper, large time deposits, bankers' acceptances etc. has accelerated since 1995, however. With the rise in federal budget surplus that the Congressional Budget Office estimated to total over \$5.6 trillion over the next decade, there was a real fear that the supply of the Treasuries could fall substantially farther. That would have raised the demand for the corporate bonds as individuals and pension funds rely on the long-term Treasuries to plan and schedule the annuity payments. As Treasuries carry no risk of default, whereas corporate bonds do, a good issue at this juncture would be to explore whether this would drive long-term investors from bonds to the stocks, even though the problem of disappearing Treasuries has now receded with the return of deficit financing.

Following the Marshallian supply-demand curve, it is easy to see why reduction in long-term debt issuance would make these instruments pricey. Suppose that the market is in equilibrium at a given point in time, when the supply matches demand. With the notations used

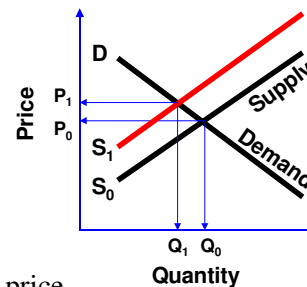


Exhibit 4.4
A reduced supply means increase in price

in Exhibit 4.4, for instance, this equilibrium quantity is Q_0 , and the corresponding equilibrium price is P_0 . Suppose that the supply schedule now shifts from S_0 to S_1 while the demand schedule remains unchanged. Obviously, this will lower quantity to Q_1 but raise the price to P_1 .

Does the observational evidence corroborate this contention? Exhibit 4.5 shows the changes in yield curves for government and corporate bonds during the year 2000. Note the substantial rise in yield differential between intermediate-term (3-5 years) and long-term (≥ 10 years) bonds in both cases. This is perplexing. After all, the pricier a bond gets the lower the yield should be. Based on Exhibit 4.5, the demand for intermediate-term bonds surged the most in 2000.

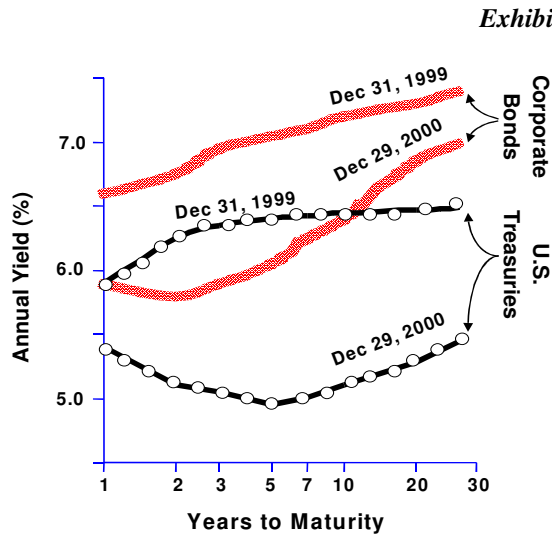


Exhibit 4.5: *The yield curves for the corporate bonds slope upwards, conforming to the lenders' expectation of higher yields for the longer maturities. When compared to 1999, this slope became steeper in 2000. The problem for the Treasuries has been rather complex. As was discussed earlier in the context of Exhibit 3.11, the Treasury yield curve got totally inverted in 2000, although it now seems to be reverting to its normal pattern.*

“My investing club has been meeting for four years. So far we’ve invested \$500 in stocks, \$100 in bonds and \$3000 in coffee and cake.”

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4.1.2 Bond Pricing, Yield and Inflation

Bonds issued in the U.S. usually have a face value (also called *par* or *maturity* value) of \$1,000 and pay semiannual coupons³, although bonds with annual payments and zero coupons (i.e., no coupon payments) too exist. The pricing of such an instrument requires computing the present value (PV) of future cash flow. This can be formulated as:

$$\begin{aligned} \text{Price} &= \text{Present Value} \\ &= \frac{\text{Face Value}}{(1+r_{\text{period}})^n} + \sum_{i=1}^n \frac{\text{Coupon}}{(1+r_{\text{period}})^i} \end{aligned} \quad (4.1a)$$

In this equation, which basically restates Equation (2.1) as $P_0 = P_n/(1+r_{\text{period}})^n$ for n number of coupon payments and the interest rate per period as r_{period} , the first part discounts the face value to the present date while the second part is the n period annuity formula⁴ given by

$$\sum_{i=1}^n \frac{\text{Coupon}}{(1+r_{\text{period}})^i} = \text{PV}_{\text{annuity}} = \frac{\text{Coupon}}{r_{\text{period}}} \left\{ 1 - \frac{1}{(1+r_{\text{period}})^n} \right\} \quad (4.1b)$$

For the initial buyer holding the bond to maturity, the coupon value per unit price is the yield on the bond that is unaffected by the fluctuations in r_{period} , the market-determined discount rate, save for comparing the returns on other similar assets. But, for a buyer in the secondary market where the previous holder has already received some coupons, r_{period} is the yield to maturity⁵ that amounts to the internal rate of return on the investment and varies with time. Thus, pricing a bond in the secondary market is a two-stage process: cash flow is first discounted to the date of first coupon payment after the settlement, and this value is then discounted to the settlement date. If N is number of days from the last coupon date to the next and M the number of days to the next coupon from the date of settlement, then the entire right hand side of Equation (4.1a) needs to be discounted by the factor $(1+r_{\text{period}})^{M/N}$. Thus, the complete equation for a bond's price is

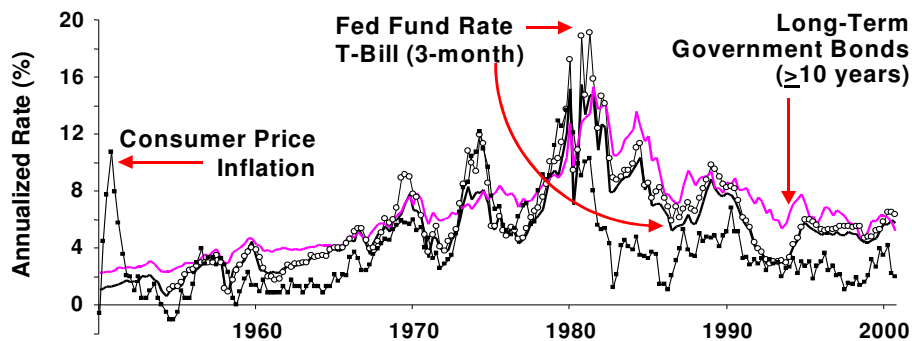
$$\text{Price} = \frac{1}{(1+r_{\text{period}})^{M/N}} \left[\frac{\text{Face Value}}{(1+r_{\text{period}})^n} + \frac{\text{Coupon}}{r_{\text{period}}} \left\{ 1 - \frac{1}{(1+r_{\text{period}})^n} \right\} \right] \quad (4.1c)$$

It is clear from this equation how the price of a bond and the yield on it vary with the market rate of interest and the time to maturity. As for the interest rate, the bond's yield to maturity r_{period} changes such that a bond whose coupon exceeds r_{period} will sell at a premium, in order to adjust its

yield to the current rate. Conversely, a bond whose coupon rate is less than r_{period} will sell at a discount, whereas the bond whose coupon rate equals r_{period} will sell on par. As for the time to bond's maturity, note in equation (4.1c) that the larger the value of n the more a change in r_{period} will affect the discount factor $(1+r_{\text{period}})^n$. This makes long-term bonds far more sensitive to the fluctuations in market rate of interest than short-term bonds. Suppose r_{period} changes by half a percentage point, say from a 5.5% annual rate to 5%. Then the discount factor $1/(1+r_{\text{period}})^n$ will change by 2.48%, from 0.765 to 0.784, if $n = 5$ years, by 4.96%, from 0.585 to 0.614, if $n = 10$ years, and by 9.9%, from 0.343 to 0.377, if $n = 20$ years. The bond prices drop as interest rates rise, and the prices rise as interest rates fall, of course. But notice how these changes are the most for the 25-year bond here, and the least for the 5-year bond. Also, all the bonds are priced on par when interest rate is the same as the coupon, sell at a premium when coupon exceeds the interest rate, and sell at a discount when interest rates exceed the coupon.

This makes it natural to expect the rates on long-term bonds to exceed those on bonds with shorter terms. But Exhibit 4.6, where we graph the yields on 3-month Treasury-bills and long-term Government bonds (≥ 10 year maturity) since January 1952, shows that this has held only generally, not invariably. Treasury yields are clearly seen to have moved with inflation here, particularly since 1980, but there have also been times when the yields on Treasury-bills have exceeded the yields on long-term bonds.

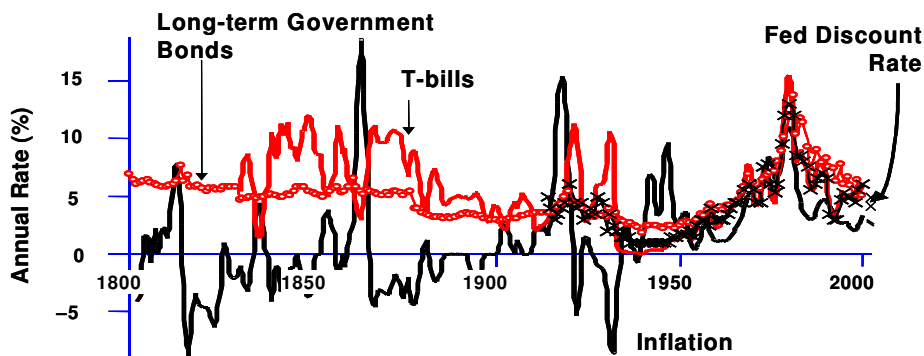
Exhibit 4.6: Yields on the Treasuries generally follow inflation, but the yields on long-term bonds do not always exceed those on the short-term bonds.



Now, while combating inflation by way of discount rates is the avowed task of a central bank⁶ as the Fed in the U.S., accomplishing it is seldom practicable. What renders it seemingly intractable is the fact that central banks seek to adjust interest rates in anticipation of inflation whereas

questions about the magnitude of inflation can be settled after inflation has already occurred. Nonetheless, Fed has done an excellent job of adjusting the monetary policy to moderate inflation ever since assuming, in 1980, the sole responsibility for combating inflation in the US. This comes out explicitly in Exhibit 4.7 where the time line of Exhibit 4.6 is extended back to 1800. The movements in interest rate and inflation were largely uncorrelated and occurred erratically relative to one another until 1980. This is the crux of *the*

Exhibit 4.7: *The two-century history of bond yields, Fed discount rate and inflation. Until 1980, the yields or interest rates tracked inflation only vaguely, at best.*



*Taylor rule*⁷, an empirical relation that first described the Fed Funds Rate during 1987-92 as a function of realized (π_T) and target (π^*) inflation rates and the output gap Y , i.e.,

$$\text{Fed Funds Rate} = r + \frac{1}{2}(3\pi_T - \pi^*) + \frac{1}{2}Y \quad (4.2)$$

Here π_T , the realized inflation, is the average GDP deflator for the preceding four quarters, r is the equilibrium real Fed Funds rate (or the natural rate consistent with full employment), and Y , the output gap, is measured in percentages as

$$\text{Output Gap} = 100 \times \frac{\text{Real GDP} - \text{Potential GDP}}{\text{Potential GDP}}$$

With target inflation rate at 2%, annualized rate of change in GDP deflator for 2000 as 2.3%, and the output gap⁸ as 2.4% for the fourth quarter of 2000, this gives the Fed Funds rate as $2\% + \frac{1}{2}(6.9\% - 2\%) + \frac{1}{2}(2.4\%) = 5.65\%$ if $r = 2\%$. Compared to this, the Fed Fund rate stood at 5.98% at the end of 2000. With inflation well above the target rate, a positive output gap

since the second quarter of 1997, and an unemployment rate below 5% since May 1997, one can understand why, throughout the year 2000, the Fed had a bias towards tightening. But, based on the Taylor rule, Fed Fund rate was high throughout that year when it averaged a 6.24% annual rate. This rule thus offers a simple explanation for what went wrong with the stock market in 2000: the Fed raised the rates earlier in the year, instead of either cutting them or leaving them alone, so upsetting the market's projections of future earnings and growth. But then, equally cogent arguments can be made that the Fed's not raising the rates earlier allowed the bubble's build-up in the first place. Both the views thus give the Fed the role that Adam Smith had assigned to the *invisible hand*. In reality, perhaps the best that the Fed can do is to react to the prevalent market conditions, as Laffer⁹ has argued, and the statistical tests¹⁰ show that the Fed has done so rather well, so far.

4.1.3 The History of Returns on Bonds

How has the bond market performed over time? This can be gauged from Exhibit 4.8 in which we summarize the statistics on real annual returns on different kinds of bonds in the 1802-2000 period, and for its different sub-periods. This is analogous to the stock market data of Exhibit 3.44.

Exhibit 4.8: *Statistics on real annual returns on Treasuries and Corporate Bonds since 1802 and for the sub-periods for which the corresponding returns on stocks are summarized in Exhibit 3.44.*

Period beginning January ... ending December	1802*	1802*	1900	1802*	1871	1926	1971
	-2000	-1899	-1999	-1870	-1925	-1970	-2000
<i>Treasury Bills</i>							
Mean Return	3.20%	5.40%	1.20%	5.10%	4.20%	0.50%	1.70%
Volatility	6.00%	6.70%	4.80%	7.70%	5.30%	4.90%	2.20%
Coefficient of variation	1.88	1.24	4.00	1.51	1.26	9.80	1.29
<i>Treasury Bonds</i>							
Mean Return	3.30%	5.00%	1.60%	4.80%	3.30%	1.10%	3.20%
Volatility	8.00%	7.40%	8.30%	8.30%	6.90%	5.90%	11.20%
Coefficient of variation	2.42	1.48	5.19	1.73	2.09	5.36	3.50
<i>Corporate Bonds</i>							
Mean Return	3.80%	7.10%	2.30%	5.40%	4.80%	1.70%	4.10%
Volatility	7.80%	6.70%	7.90%	10.30%	7.30%	5.80%	9.90%
Coefficient of variation	2.05	0.94	3.43	1.91	1.52	3.41	2.41

* Our data on the returns on corporate bonds only begin in 1857.

The results summarized in Exhibit 4.8, and their comparison with the results on stock market returns in Exhibit 3.44, lead to the following inferences:

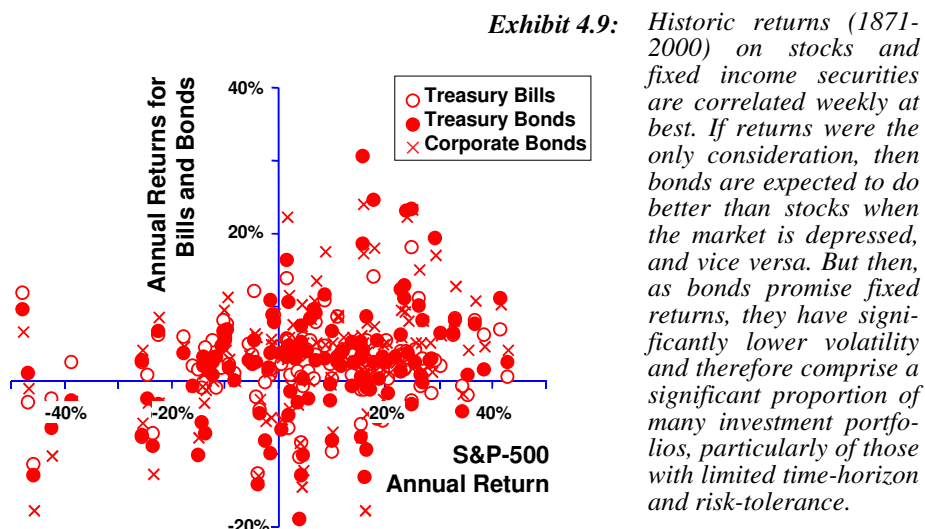
- Though always positive, the time-averaged real returns on bonds have fluctuated significantly over time, e.g., they were substantially poorer during 1926-70 than in the preceding and the following periods.
- Much like the case with stocks, seeking better returns on bonds requires accepting greater volatility. The comparison of Treasury and corporate bonds presents a confounding picture in this respect. Note that, through most of the period sampled here, the Treasury bonds seem to have been no more appealing than corporate bonds, particularly when we consider the variability of returns or the coefficient of variation.
- Despite an apparently inverse relationship between bond and stock returns (e.g., 1926-70 was the worst period in bonds' performance-history but the best period in the stocks' performance-history), their overall correlation is weakly positive, not inverse.

Why did the bonds perform so poorly during the 1926-71 period? An equally important question is as to why the investors settled for such paltry returns when they could have done so much better in the stock market? The answer to both these questions lies in one word, demand. After all, inflation was as much the scourge of the twentieth century as it was of the nineteenth century and could not, therefore, have made this difference. But it was in the twentieth century when the two most severe recessions of the past two centuries occurred — first in the late 1920s and early 1930s and then immediately after World War II (Exhibit 3.31). We should also add here the twentieth century stock market's high volatility through (Exhibit 3.44), including the crash of 1929, and the patriotic fervor that the bonds issued for war preparations were able to tap into. It is easy to understand why the demand for bonds was so high. The greater the demand, the higher the prices are likely to be, and the lower the returns would be driven to in the process.

Turning to our second observation, that long-term government bonds have given persistently poorer returns but have comparable to greater volatility compared to the corporate bonds, a likely explanation is this. Corporate bonds have greater risk of default over the comparable Treasuries and therefore carry higher discounting and coupon rates. The reason for lower volatility of yields on corporate bonds then lies in the call provisions that bonds often carry. Callable Treasuries have not been issued since 1985, but

corporate debt usually lets the issuer call the bond prematurely at a predetermined price. The sensitivity of long-term bonds to interest rate fluctuations means that there are times when the market price of a bond matches or exceeds the call price. At such times, the issuer is clearly better off calling the bond¹¹. This caps the upper limit for a bond's price volatility at its call price.

Our third inference above relates to the relative performances of the bonds and stock markets. It is easy to see by comparing Exhibits 3.44 and 4.8 that the returns on these two sets of investment instruments are inversely related. Compare two periods, 1871-1925 and 1926-70, for instance. Real annual returns on the stocks were nearly 1% higher during 1926-70, than during 1871-1925, while those on the Treasuries and corporate bonds were 2.2-3.7% lower during 1926-70 than during 1871-1925. Interestingly, though, while this improvement in the stocks' performance came with the a price tag of about 50% increase in annual volatility, the volatility of bills and bonds did not drop in the same proportion to the drop in their returns. Clearly, investors did not abandon bills and bonds during 1925-70. The overall correlation of these returns, in Exhibit 4.9, thus shows a weakly positive pattern¹².

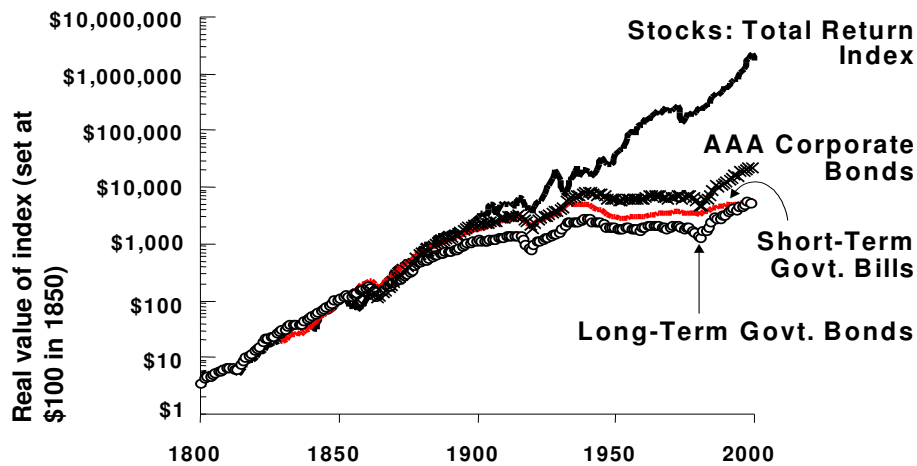


An important difference between the returns on stocks versus those on the bonds must be clarified at this juncture. As has been noted before and will be explored further later in this Chapter, the tendency for stock returns to return to the long-term mean, called mean reversion, gives us the ability to reduce the effect of their volatility on the individual portfolio by lengthening

the time-horizon. This is because the mean return over N number of holding periods is merely N times the return per period but the volatility over this holding horizon is \sqrt{N} times the per period volatility or standard deviation. The fixed income instruments like Treasuries and corporate bonds offer no such advantage. Their yields depend on the interest rates and seeking to identify any specific statistical distribution model in the data on interest rate changes is an exercise in futility. Thus, as Siegel¹³ has argued, the mean reversion property of stock returns contrasts with the mean aversion property of fixed income instruments.

It is not surprising, therefore, to find in Exhibit 4.10 that the real total return index for stocks has grown continuously whereas the index for bonds has stayed flat through much of the twentieth century. The Exhibits 4.8 and 4.10 also show that 1970s reverted the 1926-70 pattern of returns on bonds back to the situation that existed before. Thus examined, the high returns on

Exhibit 4.10: Comparing the growth of \$100, in real terms, invested in 1850 in the bills and bonds (Treasury Bonds and Corporate Bonds) vis-à-vis the stock market.



bonds in 2000, noted at the beginning of this section, appears to be as much the continuation of a trend that began in the 1970s as the reflection of the fact that bonds often do better during the periods when the stocks under-perform. We must caution, at this juncture, that our comparison of total return indexes for stocks and bonds in Exhibit 4.10 only serves the limited purpose of graphically evaluating the relative performance of stocks. It would be perfectly fine to infer from Exhibit 4.10 that a \$10,000 investment in whole market total return index in Jan 1982 would have grown almost eight-fold, in

real terms, to \$79,400 on Dec 31, 2000. In nominal dollars, this averages to an annually compounding nominal rate of 12.6%. But this Exhibit is not designed to tell you what you would get for investing the same \$10,000 in the other instruments compared here. Bonds are fixed income instruments, after all, so that what you get out of a bond depends on what you buy, when you buy and what you paid. For instance, the yields in September 1981 were 14.14% for long-term government bonds and 15.49% for Aaa corporate bonds. As for the Baa corporate bonds, the yields peaked at 17.18% in February 1982. A Treasury or corporate bond with 20 years or longer maturity would have thus been a better investment in 1981-82 than the stock market.

Two of the results in Exhibits 4.8 and 4.10 merit special mention at this juncture. The first of these is the fact that the Treasury bills seem to have become particularly “risk-free” since the 1970s. Harry Markowitz¹⁴ was the first to coin the phrase “risk-free” for the Treasury bills because of the small standard deviation of the yields on these instruments. As was shown in Exhibit 4.6, the smallest standard deviation that the yields on Treasury bills show for any of the sub-periods examined here was during 1971-2000. The second is the recent surge in bond returns, particularly since the 1980s. For the 1981-2000 period, the nominal yields on Treasury bonds have averaged 7.1% per year, with a standard deviation of 11.2%, and the corresponding numbers for corporate bonds are 7.7% and 8.4%, respectively. Compared to the Treasuries, corporate bonds thus offer slightly superior mean returns at appreciably lower volatility. This suggests that a universe without the long-term Treasury bonds, would have hardly become as unwelcome a situation as was feared until the recent return to the deficit financing of federal budget. Its effect on portfolio selection would have been largely inconsequential¹⁵.

The returns on stocks have historically exceeded those on bonds, by an amount called *equity risk premium*, reflecting their greater risks of loss. But this amount has changed over time. A particularly hot issue in financial research¹⁶ has therefore been to understand what factors affect the investors’ apparent aversion to the risk of owning stocks, seen in the high stock returns in the second and the third quarters of the 20th century when bond yields were low. Interestingly, the comparison of Exhibits 3.44 and 4.6 tells us that this premium is low during the times of comparable returns on stocks and bonds (e.g., both were moderate to low during 1871-1926 period and have been high since 1961-71) and high when the stock returns have been high but bond returns depressed (e.g., during the 1926-1981 period). Exhibit 4.11 summarizes these phases in the market’s history based on Dr. Bryan Taylor’s analysis of the 30-year holding data (<http://www.globalfindata.com>).

Exhibit 4.11: The history of equity risk premium for 30-year holding periods since 1871

	Holding period	Annualized Return on		Equity Risk Premium	Average Inflation Rate
		Stocks	Bonds		
Moderate stock returns & Moderate bond returns = Moderate risk premium	1871-1901	6.64%	4.37%	2.18%	-0.36%
	1881-1911	5.85%	3.24%	2.53%	0.60%
	1891-1921	5.88%	3.27%	2.53%	2.89%
	1901-1931	5.26%	3.42%	1.77%	2.18%
	1911-1941	5.23%	3.95%	1.23%	1.64%
High stock returns & Moderate bond returns = Moderate risk premium	1921-1951	9.47%	3.38%	5.90%	1.43%
	1931-1961	12.89%	2.68%	9.96%	2.43%
	1941-1971	13.34%	2.56%	10.51%	3.30%
	1951-1981	9.91%	3.06%	6.64%	4.31%
High stock & bond returns = Moderate risk premium	1961-1991	10.26%	7.45%	2.61%	5.22%
	1971-2001	12.25%	8.71%	3.26%	4.98%

Not surprisingly, therefore, the results of the Federal Reserve Board's triennial Consumer Finance Surveys, summarized in Exhibit 4.12, show that bonds occupy a decreasing proportion of the average American family's total financial assets. Stocks possibly account for a larger proportion than is seen in Exhibit 4.12. This is because stock funds account for 55-60% of the mutual fund holdings, based on the statistics from Investment Company

Exhibit 4.12: The results of Fed's triennial Consumer Finance Survey¹⁷ shows that bonds comprise a steadily smaller slice of the financial assets of an average American family.

Type of financial asset	1989	1992	1995	1998	2001
Transaction accounts	19.1%	17.5%	14.0%	11.4%	11.5%
Certificates of deposit	10.2%	8.0%	5.7%	4.3%	3.1%
Savings bonds	1.5%	1.1%	1.3%	0.7%	0.7%
Bonds	10.2%	8.4%	6.3%	4.3%	4.6%
Stocks	15.0%	16.5%	15.7%	22.7%	21.6%
Mutual funds (excluding money market funds)	5.3%	7.7%	12.7%	12.5%	12.2%
Retirement accounts	21.5%	25.7%	27.9%	27.5%	28.4%
Cash value of life insurance	6.0%	5.9%	7.2%	6.4%	5.3%
Other managed assets	6.6%	5.4%	5.9%	8.6%	10.6%
Other	4.8%	3.8%	3.4%	1.7%	1.9%
Financial assets as share of total assets	30.4%	31.6%	36.7%	40.7%	42.0%

Institute¹⁸ (Exhibit 4.13). Of the \$388 billion net new cash flow to the mutual funds in 2000, for instance, \$309 billion came into the equity funds and the bond funds suffered a net cash outflow of \$48 billion. The market's ongoing problems since March 2000 have drastically amended this picture, though.

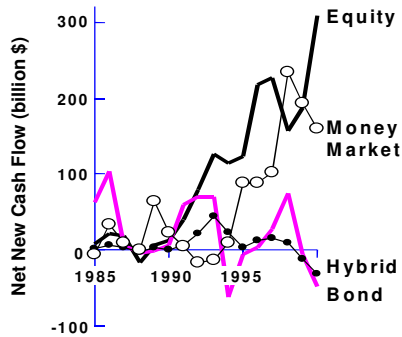


Exhibit 4.13
Net new cash flow to Mutual Funds during 1985-2000.

Source:
 Investment Company Institute

4.1.4 The Other Investment Alternatives

If bonds are poor investment alternatives to the stocks, as has been amply demonstrated in the preceding pages, such other traditional investment instruments as precious metals (e.g., gold and silver) and commodities have actually been the worst.

Take the case of gold. Much like bonds and real estate, gold and the related stocks and bonds have given excellent returns during this ongoing period of stock market's downturn (Exhibit 4.14). The fascination with gold

Exhibit 4.14: *The top 10 best performing stock mutual funds of 2002*

	% annual return through Dec 27, 2002			
	1 year	3 years	5 years	10 years
Van Eck International Investors Gold A	94.0	22.1	7.3	4.7
Tocqueville Gold	85.8	26.8		
American Century Global Gold Investor	77.4	21.9	8.9	3.9
Evergreen Precious Metals A	75.0	24.4		
USAA Precious Metals & Minerals	68.9	24.3	15.2	6.7
Scudder Gold & Precious Metals S	68.0	21.2	9.9	7.8
Fidelity Select Gold	67.2	20.4	11.2	7.7
Prudent Bear	64.4	32.2	2.2	
Rydex Venture 100	46.9			
Oppenheimer Gold & Special Minerals A	44.3	14.2	11.0	6.3

dates back 6,000 years, however. Stories about gold rush into California and Montana earlier in the history of the U.S., in the Amazon rain forest in recent

times, and similar adventures have filled pages after pages in the history books. Pioneering men and women have risked their lives and often broken the law in pursuit of gold. During the middle ages, nations undertook vast expeditions in its quest. As for the role of gold in the history of the world of finance and investments in the past two hundred years, 1816 is the first important date to note. That is when the British government first circulated the gold sovereign as its primary monetary unit. The United States was to pass the U.S. Coinage Act later, in 1873, which tied the dollar to gold. Thus began the age of the gold standard. By 1879, the price of gold was fixed at \$20.67 an ounce. Between 1879 and 1933, the price of gold remained set at \$20 an ounce, and was \$35 an ounce between 1933 and 1971. The role of gold as an official international currency effectively ended in 1971, however, when President Richard Nixon suspended the dollar's convertibility into gold.

Over the long-term horizon of 20 years or more, gold is no longer as popularly used for investment, therefore, as it once was. This is because the price of gold largely depends on income levels, inflation rate and on the rates of return on alternative investment opportunities. The following result¹⁹ of a regression analysis amply exemplify this:

$$Y = -751.37 - 2.89 X_1 - 0.31 X_2 + 0.33 X_3 + 0.006 X_4 + 679.80 X_5 \quad (4.3)$$

- Here
- Y = Price of a troy ounce of gold
 - X₁ = Real interest rate = T-bill rate minus the rate of inflation lagged by one period to reflect expectations
 - X₂ = Rate of return on the S&P 500 Composite Index, used as a proxy for return on alternative investments
 - X₃ = Real income in the U.S., used as a measure of investable funds
 - X₄ = Average monthly foreign exchange holdings of major official participants in the gold market
 - X₅ = Monthly U.S. consumer price index, used to test the hypothesis that gold is a hedge vehicle against inflation

Note the negative coefficients of both, real interest rate (X₁) and rate of return on the stock market (X₂), in the above equation. These suggest that the price of gold rises when these rates drop, and vice versa, as has indeed been the case during these opening years of this new millennium.

That gold is at best an investment alternative to the equities during times of stress or inflation is also what is brought out in Exhibit 4.15. Note that, despite the recent upsurge in price, the gold indexes are barely as pricey as yet as in 1996. Clearly, had your invested here in 1996, the chances are that you are yet to recover that initial investment.

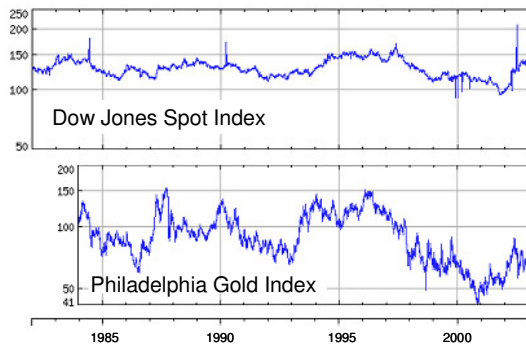
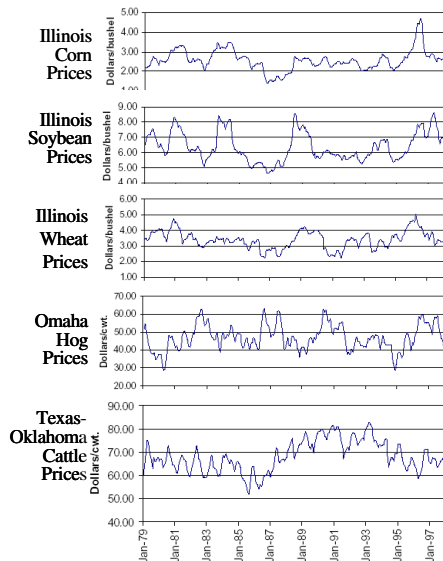
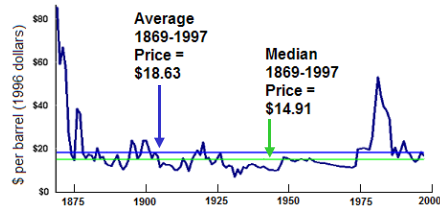
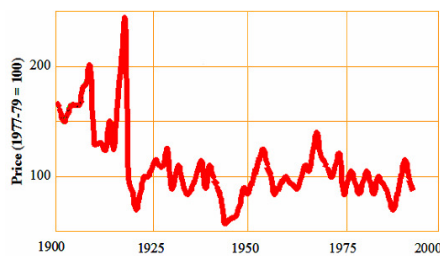


Exhibit 4.15:

The past 20-year history of Dow Jones Spot Index (top panel) and Philadelphia Gold Index (bottom panel) show that, despite the recent upsurge, gold has yet to return to its 1995-96 price level.

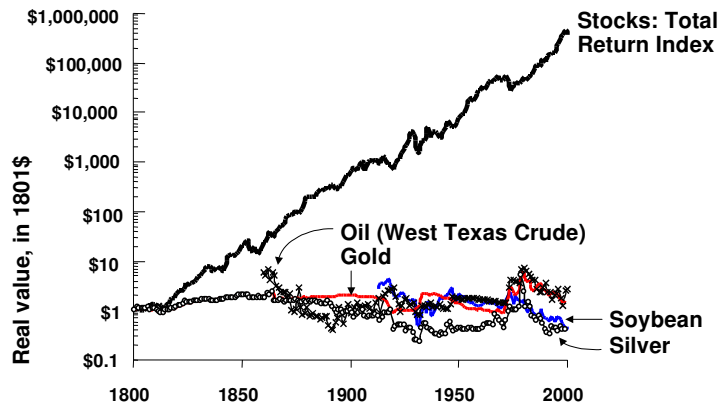
Investments in the other mineral, oil and agricultural commodities would have hardly fared better in the long run. This can be seen in Exhibit 4.16. Here the top panel graphs the twentieth century history of world prices of four nonferrous metals (aluminum, copper, tin and zinc), the middle panel shows the history of oil prices, and the bottom panel shows price histories of selected food items and agricultural commodities. Note how these prices have largely fluctuated about flat levels.

Exhibit 4.16: The commodity prices have largely remained flat. Of the panels on the left, the top panel shows long-run inflation-adjusted world prices of selected nonferrous metals (aluminum, copper, tin and zinc) and the bottom panel shows the history of world oil prices, in constant 1996 dollars, since 1869 (source: www.wtrg.com). The panel on the right shows the price history of selected food/farm items (source: www.ace.uiuc.edu/FarmIncome/lowprices.pdf).



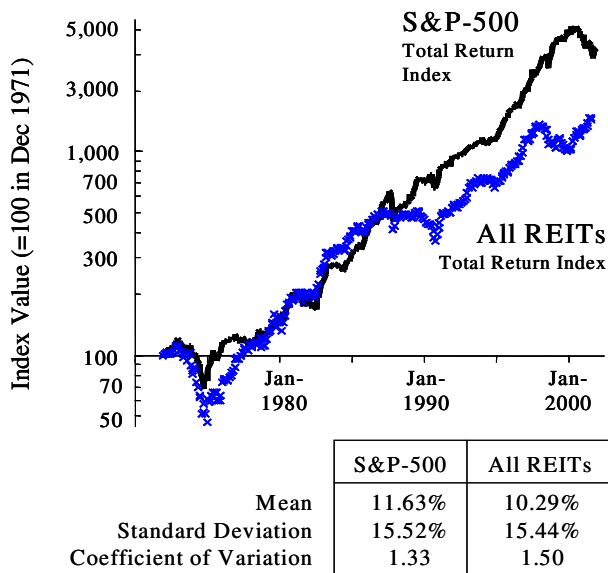
How about the pattern over the last two centuries that we are interested in examining? Suppose you had two investments of \$1 each in gold and the total market index in 1801. As Exhibit 4.17 shows, compared to about \$440,000 in real dollars that this initial investment in the stock market would have grown to in 2000, that investment in gold would have barely kept its value after adjustment for inflation. This is also what would have been the case with oil (petroleum) whereas a similar passive investment in silver and soybean would have lost in value.

Exhibit 4.17:
Comparing the growth of a \$1 invested in the commodities with that in the stock market.



How about investing in the real estate? As we saw in Exhibit 3.15, compared to buying a home as we are often prone to, buying into a real estate based stock index like the S&P Homebuilding index often proves to be a better investment choice. Recall, for instance, Peter Minuit’s \$24 purchase of Manhattan Island in 1626. It proved to be an excellent investment, of course, but still fetched less than 6% per year in nominal dollars. That real estate investing too gives good returns through an index or an index-tracking fund is corroborated by the results summarized in Exhibit 4.18. Compared in this Exhibit are total return index for REITs (Real Estate Investment Trusts) with that of our familiar S&P-500 index. Note how well the REIT index²⁰ has moved. The annualized statistics computed from monthly returns data for the Dec 1971 – Aug 2001 period show comparable rates of returns and volatility for the two datasets. Strictly speaking, though, the wisdom of seeking in the REITs an effective alternative to the S&P-500 index makes little sense: the REIT index offers 1.34% less in annual returns than the S&P-500 total return index, with about the same volatility which makes its coefficient of variation slightly larger. But its total returns have a correlation coefficient of 0.55 with those of the S&P-500 index. As will become clear when we discuss portfolio theory in the next chapter, this makes the REIT index ideally suited for diversifying your investment portfolio for a higher return at a lower risk.

Exhibit 4.18: REITs have given the best returns, in the long run, compared to the other real estate investment alternatives, largely because of their need to distribute all earnings as dividends. Return statistics tabulated below are annualized from monthly data for the period of Dec 1971 to Aug 2001. Source data from <http://www.nareit.com>



As for the housing market itself, Exhibit 4.19 shows the median new home prices of Exhibit 3.15 together with their relative median prices (i.e., the prices of new homes relative to those of existing homes) and the changes in mortgage rates. This highlights a troubling aspect of home pricing. Note that new home prices have appreciated faster than those of existing homes, particularly since the fall in mortgage rates that began in the 1980s. Clearly, the real gains from interest rate drops did not really go to the buyers.

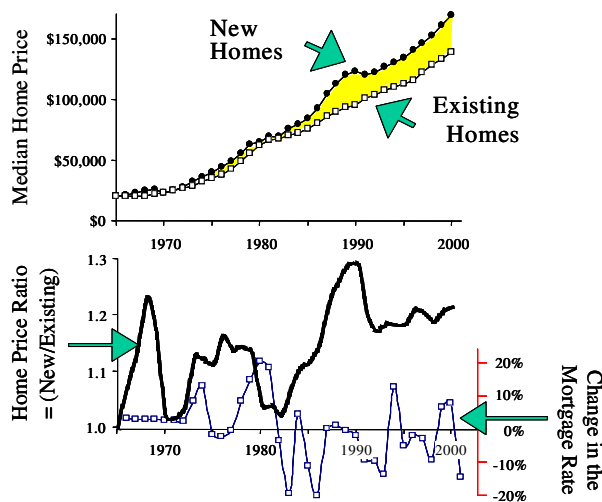


Exhibit 4.19: New home prices have appreciated faster than those of existing homes (top panel), particularly since the drop in mortgage rates that began in the 1980s.

The above arguments should not make investment in housing seem an exercise in futility. First, adjusted for inflation, home prices nationwide have retained their value. Second, interest payment on the home mortgage carries its own tax advantages. Third, the joy of living in your own home is something hard to price. Investment opportunities too abound here. For instance, buying a house in California's silicon valley, say even in 1990, would have certainly given far superior returns in ten years than what the overall stock market has done in the soaring 1990s.

Likewise, the surge in the oil prices in the 1970s and early 1980s and in the precious metals prices in the late 1970s and early 1980s appear as tiny blips in Exhibit 4.18, but recall the chaotic effect they had on the global economy. As for the U.S. economy, their impact is clearly seen in the interest rate data. Fortunes have been made oftentimes, and lost many more times, through such spurts. Rather than seeking such windfalls to build the fortunes, Exhibit 4.18 only shows how the stock market could have helped accomplish the same goals through investment in any of the 'wealth-builders'. For instance, for an average investor interesting in investing only in the real estate market, the stock market offers such varied choices as the S&P Homebuilding index (Exhibit 3.15) and the real estate investment trusts. You could likewise focus on other specific sectors, either in the S&P or in the NASDAQ indices, for metals, energy or the like, if a specific sector rather than the broad market is what you are looking for. The reason why we have focused on the broad market is that it encompasses all these sectors. Thus, a passive investor benefits from the periodic rises in individual sectors while softening the declines that individual sectors experience from time to time. Such declines seldom occur in all the sectors at the same time. While this admittedly slows down the march towards a prospective prosperity, it also leaves much less to the vagaries of chance.



4.2 Global Comparisons and Macroeconomic Factors

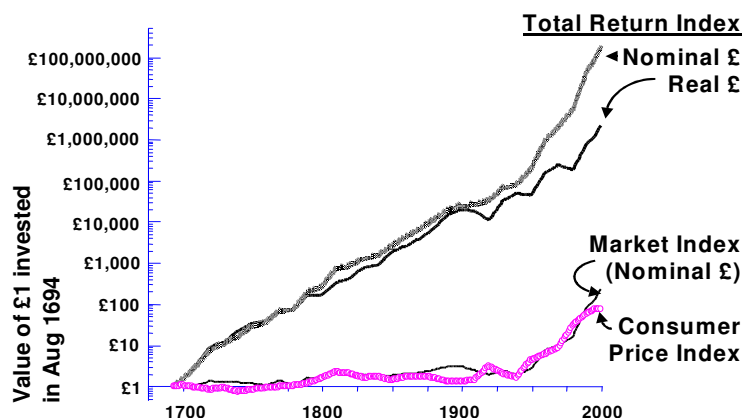
4.2.1 The U.K. Stock and Bond Markets

Obviously, history amply demonstrates the superiority, over time, of stock market returns over the returns that are available from such other investment tools as bonds and commodities. We now examine if this has been unique to the U.S. market or is true of the stock markets in general. Two other issues finally arise, and are also examined here: how the market's performance relates to that of the economy at large and what the investors can and should now look forward to.

Perhaps the most notable long-term history to look at, in this context, would be the performance of British stock market. Exhibit 4.20 below does precisely that: it shows that £1 invested in August 1694 would have grown to £193.8 million in December 2000, after dropping from its August 2000 peak of £203.2 million. This corresponds to an average monthly compounding rate

Exhibit 4.20:

The history of long-term performance of the overall British stock market.



Source data: <http://www.globalfindata.com>

of 0.52%, or an annualized rate of 6.22%. Though slightly slower than the U.S. stock market's 8.22% annual growth rate since 1802, this performance has been registered over a considerably longer, actually more than a century, period. It is also superior to the annually compounding rate of 5.96% that we estimated for Peter Minuit's purchase of the Manhattan Island! This further corroborates our earlier inference, therefore, that investments in the stock market indeed yield robust returns over time. Exhibit 4.20 also shows that the corresponding market index, as opposed to the total return index, would have barely kept pace with inflation. The reinvestment of dividends clearly made the difference here, in much same way as we found for the U.S. market.

Examining the nominal returns over a protracted interval, in excess of three centuries, makes little sense, however, because inflation rates are unlikely to have remained the same throughout. Indeed, as the British consumer price index in Exhibit 4.20 shows, price changes there particularly accelerated since the 1930s. Thus, a sizeable proportion of the acceleration in nominal total return index since 1930 can be directly ascribed to price inflation. The result of adjusting for inflation, also presented in this Exhibit, shows that the £1 investment of August 1694 in the total return index grew to £2.85 million at the end of 2000, at the average annually compounding rate of 4.85%. Notice also, in Exhibit 4.20, how the nominal and real values of total return index have diverged particularly in the twentieth century. But the fact that consumer price index in the U.K. was largely flat through the eighteenth and nineteenth centuries does not mean that British economy experienced placid conditions during this period. Rather, these were the times when the economy experienced periodic bursts of inflation, deflation as well as stagflation. As consumer price index presents a cumulative picture, it tends to obscure this volatility.

Has the U.K. fixed-income market performed as spectacularly relative to the stock market, over time, as the U.S. stock market has? Judging from Exhibit 2.62, where we compare the inflation-adjusted total return indexes for the U.K. stock market and the British government's short-term bills and long-term bonds, history since 1930s clearly favors the stock market. Total return index for long-term government bonds would have grown over 11,000-fold between 1700 and 2000 after adjusting for inflation, for instance, but would have still been about 1/250th of that of the stock market. As for the short-term government bills, our time series begins only in 1800 and, since then, the real total return index for these instruments has grown a little over 100-fold. If we set these three indexes at 1 on January 1800, as is done in Exhibit 4.21, then the stock market index rises to 15,880 whereas the corresponding numbers for the other indexes are 148 for the government bonds index and 107.7 for the government bills index. These British data thus corroborate our earlier findings from the U.S. data that, over time, stocks vastly outperform the short-terms bills and long-term bonds.

This superiority of long-term performance of stocks over bonds is hardly as categorical as it may seem, however. Exhibit 4.22 compares the statistics on real annual returns on stocks, bills and bonds for the entire 1694-2000 period as also for the individual centuries. These statistics parallel those for the U.S. financial markets that we have discussed earlier, in the contexts of Exhibit 3.44. Notice how poorly the short-term government bills and long-term government bonds fared, through most the twentieth century, in both the markets, U.K. and the U.S. The two markets also gave comparable returns on these kinds of investment instruments in the 19th century. Judging from the

data in Exhibit 4.22, British government bills and bonds proved to be decidedly superior investment instruments in the nineteenth century, than the U.K. stock market. Notice how low the volatility on their returns was during that period.

Exhibit 4.21: Much like the performance of the U.S. stock market, real total returns on the British stock market have greatly exceeded the returns of government bills and bonds. This has been particularly true since the later half of the twentieth century. All the indices here have been set at 1 in January 1800.

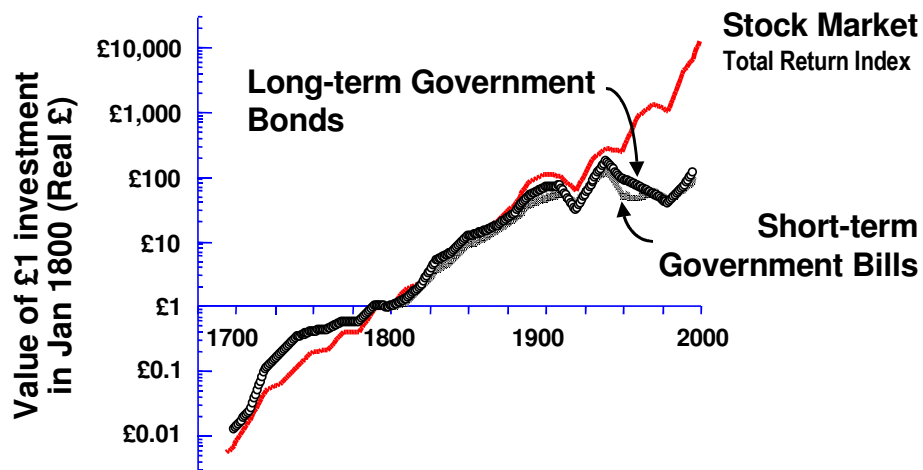


Exhibit 4.22: Compared to any other time in the history, bonds performed better than stocks in the U.K. in the 19th century, when they also had a remarkably low volatility.

		1694-2000	1700-1799	1800-1899	1900-1999
Stocks, Total Return Index	Mean Return	4.85%	4.60%	4.76%	4.97%
	Volatility	12.21%	10.89%	6.91%	15.33%
Short-term Govt. Bills	Mean Return	2.28%	—	3.85%	0.65%
	Volatility	3.88%	—	1.59%	4.80%
Long-term Govt. Bonds	Mean Return	3.08%	4.34%	4.23%	0.58%
	Volatility	4.85%	4.42%	2.22%	6.18%

One can well understand why the British bond market has survived through the twentieth century, despite its abysmal returns. As was discussed earlier, in the case of the U.S. stock market, the experience of the 1929 stock

market crash kept many American investors in the bond market. Since this crash was global, it is not surprising that the same fear also kept the British government bills and bonds popular with the investors. But that raises the question how British stock market survived the eighteenth and nineteenth centuries, when its returns were comparable to the bonds but the volatility of these returns was so much greater.

The answer to this puzzle perhaps lies in the lingering memory of the “South Sea bubble”²¹ of 1720. Basically, it started with the London-based South Sea Company’s plan to assume British national debt in exchange for the interest on that debt and for monopoly trading rights to the South Seas. It was a bold move, and would have perhaps worked, had Spain not already controlled these

trading rights! Despite this assumption of additional national debt, and the fact that Britain’s 1718 peace with Spain brought no new rights or agreements that would raise the Company’s profits, the Company’s share price spiraled from £128 on January 1, 1720 to £1050 on June 24 that year. They finally crashed down to £128 in December 1720. Box 4.1 quotes the words of the poet and essayist Alexander Pope on this episode. Included amongst those who paid dearly for the experience was Sir Isaac Newton, the famous scientist and the master of the Royal mint. He first made 100% profit by selling his £7,000 stock in April but then reentered the market at the top and lost £20,000. “I can calculate the motions of the heavenly bodies,” he said, “but not the madness of people.”

Box 4.1

The South Sea Bubble

*How goes the Stock, becomes the gen’ral Cry.
Rather than fail we’ll at Nine Hundred Buy.
Instead of Scandal, how goes Stock’s the Tone.
Ev’n Wit and Beauty are quite useless grown.
No ships unload, no Looms at Work we see.
But all are swallow’d by the damn’d South Sea.*

Alexander Pope
(1688-1744)

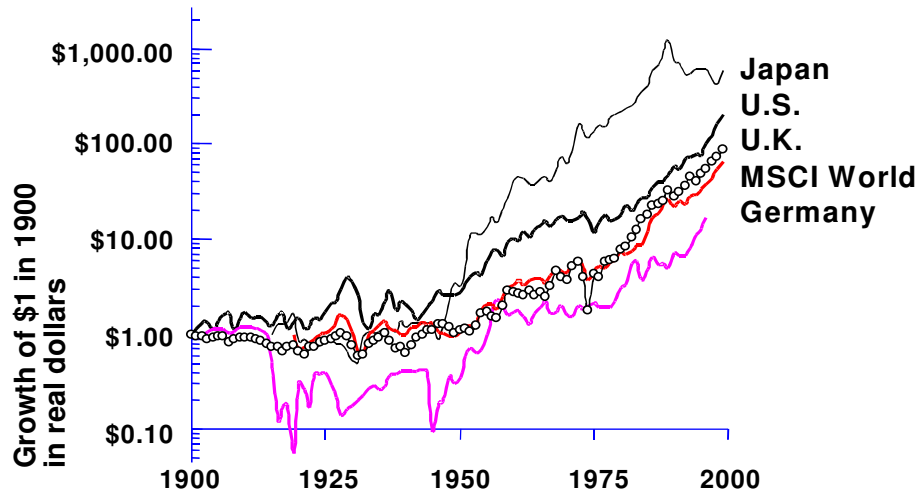
4.2.2 Some Other Stock Markets Worldwide

The performance of other stock markets has been equally robust and impressive. Exhibit 4.23 compares the real total return indices for Japan, Germany and the World (MSCI: Morgan Stanley Capital International) with those for the U.S. and U.K. Notice how all of them show appreciable acceleration in the second half of the twentieth century. This phenomenon has apparently not been limited to the U.S. and U.K. markets alone. Also note how impressive the performance of Germany and Japan, so totally

devastated during World War II, has been. Interestingly, most of the growth in Japan's total return index came in the immediate aftermath of World War II. At the time of its official launch on May 16, 1949, the Nikkei 255 index opened at 176.21. This was about the same as the value of 175.2 that the Dow closed at on the previous trading day. At the close of trading on December 29, 2000, Nikkei was 13,785.69 when the Dow was 10,787.99. But Nikkei has been declining since closing at its peak of 38,916 on December 29, 1989 whereas the Dow reached its peak closing value of 11,287.10 on April 11, 2000. Clearly, despite its continuing downward spiral, Nikkei has done better than the Dow, when we consider its 50-plus years of performance, and did exceptionally better than the Dow when it reached its peak. Note also that the exchange rate was ¥360 per \$1 in 1949 but was less than one-third as much, at ¥114.50 per \$1 on December 29, 2000.

Exhibit 4.23: An international comparison of the real total returns on the U.S. and other selected stock markets.

Data source: Global Finance Data (www.globalfindata.com)



The data in Exhibit 4.23 highlight a basic challenge that the investors and financial managers face continuously, particularly in this era of the globalization of trade, commerce, supply and production. One, it makes a powerful case for diversifying the equity investments internationally. That can help cushion a market's downtrend if the asset price movements in two markets do not synchronize. But globalization has set in the trend towards increasing convergence, rather than divergence, of the markets. Exhibit 4.24 illustrates this by presenting the correlation coefficients among monthly returns of 18 major stock markets, after converting them to the U.S. dollar,

for two 10-year periods, 1977-86 and 1987-96. Note that the correlation coefficients for 1987-96 are generally higher than those for 1977-86. As a result, the average values of these correlation coefficients are 0.34 for 1977-86 and 0.46 for 1987-96. The progress towards the convergence of Europe's economy that culminated in the launch of Europe's new currency, the euro, on January 1, 1999, has only helped further this convergence. For instance, the correlation coefficient for daily returns on French and German stock market indexes reached 0.78 during the one-year period ending July 21, 1999. Likewise, for this one-year period, the correlation coefficient for daily returns on Frankfurt's DAX and London's FTSE indexes stood at 0.70. Curiously though, judging from the results of a recent study²², international equity market correlation appears to increase in bear markets, not in bull markets. This finding is of particular significance because, as we will examine in the following chapter, diversifying amongst assets with poorly to negative correlated returns is a desirable risk-reduction strategy.

Two, as exchange rates hardly remain fixed over time, their volatility presents arbitrage opportunities in the short-run but an investment dilemma in the long-run. Using the figures given above, for instance, Nikkei would seem to have offered a better opportunity to an American investor than the Dow has offered to the Japanese investor. That would be a rather simplistic inference, however. Based on the results of their recent study on the performance of global stock markets in the twentieth century, for instance, Jorion and Goetzmann²³ have shown that longevity or survivorship of a market significantly contributes to that market's overall performance over time. Their results, summarized in Exhibit 4.25, show that U.S. equities have given the best annual returns since 1920, arguably because U.S. has proven to be the most successful capitalist system in the world. Reflecting this, the foreign participation in U.S. equities and bond markets has only been rising, not declining, over time.

As we noted earlier in the context of the American (Exhibits 3.28 and 3.30) as also the British (Exhibit 4.21) stock markets, dividends have contributed significantly to the total returns. But dividends have been generally declining. As for the U.S. market, this is evident in Exhibit 4.26, in which we summarize the payout and plowback ratios for the S&P-500 index. Suppose that, as discussed in section 3.1 earlier, we denote a firm's earnings per share by E, and its dividends by D. Then,

$$\text{and Payout Ratio} = \frac{\text{Dividend paid (D)}}{\text{Total earnings (E)}} \quad (4.4)$$

$$\text{Plowback Ratio} = \frac{\text{Retained Earnings (E-D)}}{\text{Total Earnings}} = 1 - \text{Payout Ratio}$$

Exhibit 4.24:

Correlation coefficients amongst the monthly returns of selected major stock markets in the MSCI (Morgan Stanley Capital International) index*. Shaded regions pertain to the 1987-96 period, unshaded regions to the 1977-86 period.

		AU	AS	BE	CA	DE	FR	GE	HK	IT	JA	NE	NO	SI	SP	SW	SZ	UK	US
Australia	AU		0.25	0.43	0.65	0.14	0.43	0.33	0.62	0.23	0.25	0.49	0.51	0.68	0.50	0.49	0.38	0.60	0.56
Austria	AS	0.09		0.35	0.22	0.26	0.42	0.62	0.34	0.36	0.14	0.44	0.36	0.40	0.39	0.34	0.45	0.38	0.18
Belgium	BE	0.23	0.52		0.52	0.32	0.71	0.63	0.49	0.35	0.41	0.65	0.50	0.54	0.52	0.45	0.53	0.56	0.56
Canada	CA	0.55	0.18	0.27		0.19	0.46	0.35	0.65	0.34	0.29	0.60	0.49	0.63	0.46	0.42	0.43	0.59	0.77
Denmark	DE	0.28	0.31	0.46	0.27		0.42	0.40	0.16	0.36	0.42	0.38	27.00	0.26	0.43	0.25	0.32	0.38	0.18
France	FR	0.27	0.49	0.58	0.36	0.30		0.68	0.42	0.40	0.42	0.65	0.45	0.47	0.53	0.43	0.54	0.59	0.55
Germany	GE	0.24	0.62	0.60	0.25	0.47	0.54		0.38	0.49	0.25	0.67	0.47	0.45	0.50	0.49	0.57	0.52	0.42
Hong Kong	HK	0.31	0.19	0.22	0.22	0.22	0.19	0.29		0.25	0.19	0.55	0.38	0.78	0.52	0.45	0.38	0.58	0.61
Italy	IT	0.23	0.21	0.35	0.30	0.31	0.43	0.28	0.33		0.41	0.33	0.35	0.36	0.44	0.43	0.28	0.33	0.23
Japan	JA	0.25	0.28	0.44	0.20	0.30	0.42	0.43	0.27	0.40		0.36	0.26	0.37	0.47	0.45	0.39	0.45	0.26
Netherlands	NL	0.33	0.43	0.58	0.52	0.48	0.52	0.64	0.42	0.33	0.40		0.55	0.59	0.52	0.52	0.60	0.74	0.65
Norway	NO	0.41	0.26	0.47	0.46	0.37	0.45	0.34	0.30	0.19	0.11	0.52		0.52	0.50	0.57	0.45	0.58	0.52
Singapore	SI	0.30	0.03	0.20	0.26	0.23	0.07	0.12	0.37	0.09	0.14	0.26	0.22		0.58	0.54	0.48	0.66	0.66
Spain	SP	0.25	0.26	0.29	0.22	0.22	0.33	0.30	0.19	0.38	0.39	0.29	0.15	0.04		0.62	0.49	0.59	0.53
Sweden	SW	0.29	0.24	0.33	0.29	0.40	0.25	0.30	0.28	0.26	0.31	0.39	0.31	0.20	0.28		0.54	0.60	0.50
Switzerland	SZ	0.36	0.56	0.63	0.42	0.52	0.56	0.77	0.32	0.30	0.42	0.68	0.48	0.20	0.25	0.41		0.59	0.47
United Kingdom	UK	0.44	0.27	0.46	0.54	0.38	0.49	0.43	0.32	0.36	0.31	0.59	0.40	0.24	0.33	0.30	0.51		0.67
United States	US	0.35	0.09	0.27	0.66	0.26	0.37	0.24	0.13	0.24	0.16	0.51	0.38	0.31	0.15	0.32	0.38	0.40	

*Adapted from David Eiteman, Arthur Stonehill and Michael Moffett: *Multinational Business Finance* (Addison-Wesley, 1998)

	U.S. Index	Global Index	Non-U.S. Index
<u>Nominal Return in U.S. \$</u>			
Return	8.04%	7.76%	7.28%
Volatility	16.19%	12.14%	12.08%
Ending Wealth	211.2	171.2	146.2
<u>Real Annual Return</u>			
Return	5.48%	4.59%	3.84%
Volatility	15.83%	11.05%	9.96%
Ending Wealth	27.3	21.9	13.1

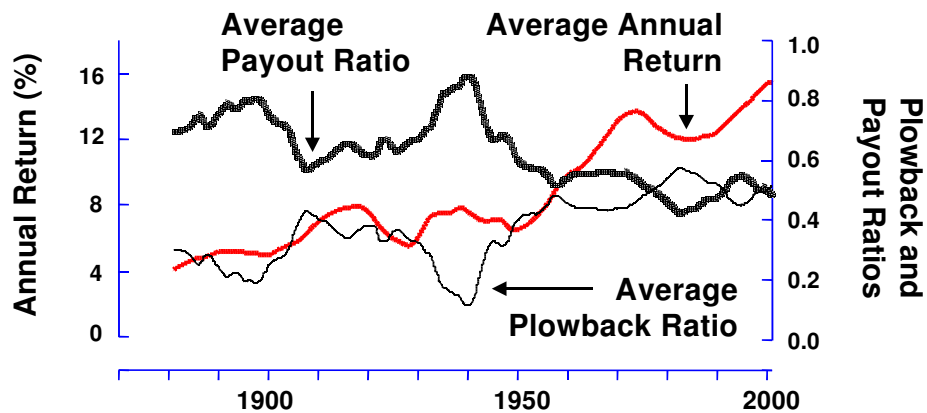
Exhibit 4.25:

The performance of global stock indexes (1921-96), as reported by Jorion and Goetzmann. Ending wealth here is December 1996 value of \$1 invested in December 1920. The Global Index includes U.S.

Note that the overall pattern in Exhibit 4.26 is one of a progressive decline in the average payout ratio and a concomitant rise in the average plowback ratio. An increase in the plowback ratio means that the firms are retaining increasing larger proportions of their earnings to finance future growth. Likewise, a decrease in the payout ratio means that the investors are accepting increasing proportions of their returns through capital appreciation. If this translates into growth then the firms would be certainly justified, and the investors satisfied, with this practice. That this is most plausibly the case is what the rising trend in average annual return data, also shown in Exhibit 4.26, suggests.

Exhibit 4.26: Average payout and plowback ratios, and the annual returns, for the firms comprising the S&P-500 index. The data presented here are annual averages of 10-year data, shown in annually rolling bands.

Data source: http://aida.econ.yale.edu/~shiller/data/ie_data.htm



It matters little, in perfect capital markets, whether investor receives the returns by way of capital gains alone or partly through capital gains and partly through dividends. After all, as we saw earlier, the pricing of a firm's share involves both, dividends as well as the part of the earnings that a firm retains in order to finance its future growth. The firms like IBM and AT&T pay quarterly dividends, for instance, whereas Microsoft does not. This is the famous MM postulate, so named after Miller and Modigliani who first argued, in their classic 1961 paper²⁴, that a firm's dividend policy would have no relevance in a universe free of taxes, transaction costs, and other market imperfections. But the fact that the payout ratio has steadily declined over the 130-year life of the S&P-500 index, so readily apparent in Exhibit 4.26, suggests that market imperfections exist aplenty. Several reasons have contributed to this decline. Earlier, particularly until the Tax Reform Act of 1986, individuals were taxed more favorably on the capital gains than on dividends. Many firms therefore transmuted dividends into capital gains²⁵. Also, as we mentioned in section 3.1, Fama and French²⁶ have recently explored the issue of disappearing dividends by examining if this reflects changing firm characteristics or the firms' increasing reluctance to pay dividends. Their statistics show that only 20.8% of the firms paid cash dividends in 1999, compared to 66.5% who did so in 1978. Part of the reason, they argue, is that the newer listings of publicly traded firms increasingly include firms that are often unlikely to pay dividends — small firms with low profitability but strong growth opportunities. While this can account for almost one-half of the decline in payout ratio, an equally important reason, according to this study, is that the perceived benefits of dividends may well have declined with time. Even the traditional dividend-paying type firms (e.g., large and profitable firms with fewer investments) have become increasingly less likely to pay dividends.

The evidence from global equity markets corroborates this. Of the 39 countries examined in the Jorion and Goetzmann study mentioned earlier, the equity indexes of 11 countries with continuous histories extending back to the 1920s showed 5.09% average annual growth due to dividends whereas, when all the countries are considered, this average drops to 3.11%. Clearly, firms in the newer markets pay lower dividends. As older economies are also likely to have more mature firms, and the more mature a firm the fewer its avenues for growth, this also raises the possibility that shareholders of such firms demand and secure the payout, to the extent law can help them do so, because of the fear that plowback may encourage wasteful squandering by the management. A recent study²⁷ has thus found that the firms in countries where law is more lenient towards the management tend to pay smaller dividends than those where the laws are less relaxed.

4.3 Reducing risk through dollar-cost-averaging and long-term investing

4.3.1 Slow and Steady Wins the Race!

The lesson to learn from the history of U.S. and global stock markets is rather harsh, therefore. The dividends that have as yet been the main reason why returns on the stock market have been so robust may now become truly irrelevant. This may well be because, with investments coming in more from individuals and mutual funds than from the traditional sources like investment banks, we are perhaps approaching what Miller and Modigliani visualized as the perfect markets!

Such a prospective universe of non-dividend paying stocks is likely to be volatile. Capital gains are not always positive, after all, as has become all too apparent in these first few years of the new millennium. As dividends can be either zero or positive, they cap the downside of capital gains that result from the market's gyrations.

From the perspective of investing, on the other hand, the problem of price volatility has a simple solution — dollar cost averaging. The idea here, first proposed by Wilford Eiteman and Frank Smith²⁸ almost half a century ago, is that if you invest a certain amount periodically — whether once a month, or fortnightly or weekly — the number of shares your fixed amount will buy will be less when the market is up but more when it is down. In the process, then, you have captured the average.

Exhibit 4.27 illustrates this. This Exhibit shows the growth by early 2000 of two investments, both in monthly installments of \$100 in real 1970 dollars, if both the investments began at the end of 1970 and one was made in the S&P-500 index and the other in the NASDAQ Composite Index. The S&P-500 index, a proxy for the overall stock market, includes a large proportion of dividend-paying companies whereas the technology-weighted NASDAQ mostly comprises firms that pay little or no dividends. Thirty years later, the two investments would have still reached about the same value in real dollars, although the route taken by NASDAQ would have been somewhat jagged. This is because, as mentioned earlier, dividends have the effect of reducing the negative effect of volatility in prices.

The adverse effect of volatility is also greatly diminished when we hold the stock for an adequately long time. One way to estimate what length of time would be really “adequate” here is look at the past returns. Exhibit 4.28 shows the annualized real total returns on the total market index for 10, 20 and 30-year holding periods through the past two centuries. Note how the

volatility (standard deviation) as also variability (coefficient of variation) of the returns gets greatly reduced as when we extend the holding period. Note also that at no time in the 20th century has a 20-year or longer holding period ever produced negative returns. Based on these results, it is clear that the market's normal price fluctuations would have themselves insured your investment against losses during these past two centuries if you had held on for at least 20 years.

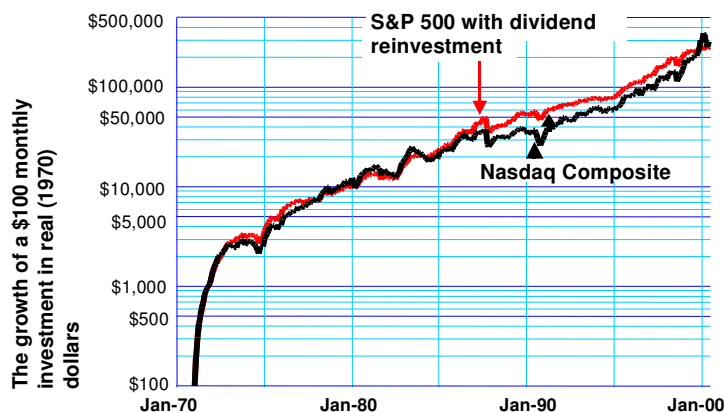


Exhibit 4.27:

Growth of a \$100 monthly investment in S&P-500 and NASDAQ Composite indexes

The characteristics of normal distribution, discussed in section 3.3 earlier, offer an alternative way to estimate what duration would be adequate. Suppose we define the holding period as the minimum number of years that an investment in the given equities market needs to be held, with dividends continually reinvested and based on the historic performance, in order to ensure with 95% confidence that the investment will retain its value. This holding period can be now estimated from the market's historic returns and volatility. Take the returns on the U.S. market, for instance. With an annual mean return of 6.43% in real dollars, and a standard deviation of 17.06%, the negative returns have z-values less than 0.3769 (= 6.43 ÷ 17.06). As 14.67% of the normal curve lies between z = 0 and z = 0.3769, this gives a 35.33% chance that the real total returns in any given year will be negative.

Clearly, the smaller the standard deviation relative to mean, a task that requires our extending the holding period (e.g., Exhibit 4.28), the smaller will be the probability of negative returns. To this end, the following two properties of our statistical distribution become appropriate:

- (a) cumulative return over n periods is merely n times the average single period return²⁹, i.e.,

$$\tilde{r}_{n\text{-period}} = n \times \tilde{r}_{1\text{-period}} \text{ or } \tilde{r}_{\text{annual}} = 12 \times \tilde{r}_{\text{monthly}}; \text{ and}$$

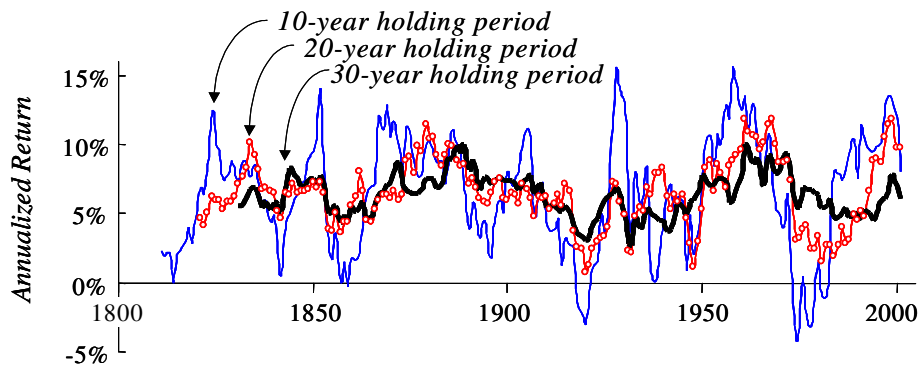
(b) volatility or standard deviation over n periods³⁰ is the single period standard deviation times square root of n , i.e.,

$$S_{n\text{-period}} = (\sqrt{n}) S_{1\text{-period}} \text{ OR } S_{\text{annual}} = (\sqrt{12}) S_{\text{monthly}}.$$

Exhibit 4.28:

Over the past two centuries, no 20-year or longer holding has produced negative total returns (real). Indeed, the longer the holding period the smaller the volatility and variability of returns.

Holding Period	10 years	20 years	30 years
Return	6.45%	6.44%	6.38%
Volatility	4.17%	2.44%	1.51%
Variability	0.65	0.38	0.24



Now, for normal distribution, 95% of the values lie to the right of $z =$ mean $- 1.645 \times$ standard deviation (Exhibit 3.26). Combining this with (a) and (b) above, we thus find that there will be 95% chance of being able to avoid negative return in a given year if we seek the value $\tilde{r}_{n\text{-period}}$ such that

$$\tilde{r}_{n\text{-period}} = 1.645 \times S_{n\text{-period}} \tag{4.5a}$$

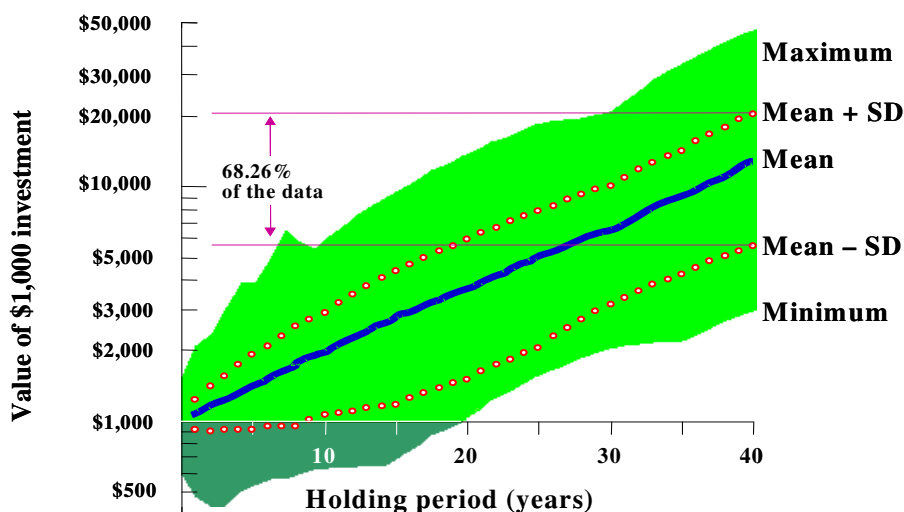
$$\text{OR } n \times \tilde{r}_{1\text{-period}} = 1.645 \times (\sqrt{n}) S_{1\text{-period}} \tag{4.5b}$$

$$\text{Hence } n = \left(\frac{1.645 \times S_{1\text{-period}}}{\tilde{r}_{1\text{-period}}} \right)^2 \tag{4.5c}$$

For the U.S. data, plugging-in the values $\tilde{r}_{1\text{-period}} = \tilde{r}_{1\text{-year}} = 6.43\%$ and $S_{1\text{-period}} = S_{1\text{-year}} = 17.06\%$ in equation (4.5c), we thus obtain the value $n = 19.05$ years for our holding horizon. How reasonable is this estimate? After all, the assumption of normal distribution for the stock market returns is itself an approximation, as we discussed earlier in the context of Exhibits 3.33 and 3.37. Exhibit 4.29 therefore graphs, for different holding periods, the mean

returns, the corresponding bands at 1 standard deviation level, and minimum and maximum values of annual returns for each holding period. Note that no negative annual returns occur for any 20-year or longer holding periods. This estimate of 19.05 years is clearly a reasonable one, therefore.

Exhibit 4.29: Based on 1802-2000 performance of the U.S. stock market, the cumulative real returns are essentially positive for all the values of holding period ≥ 20 years.



This match between the estimates made from the normal distribution based equation (4.5c) and the empirical data in Exhibit 4.29 amply attests to the robustness of normal distribution model for long-term returns. The reader may also recall here our inference, drawn in the context of Exhibit 3.4, that the real returns for 20-year and longer periods have been always positive.

We can also look at the historic data by directly computing path of wealth from the historic record. As shown in Exhibit 4.30, this path is more impressive for the 40-year holding period than when the holding-period is one-half as long. This is only to be expected. After all, as the *rule of 70* tells us, a 7% real annual growth rate makes the 40-year cumulative return four times the 20-year return, not double! The advantage that Exhibit 4.29 has over the computations based on equation (4.5c) and Exhibit 4.27 is that it shows how the gains from investing in the U.S. stock market have varied since 1802. The narrow spikes in Exhibit 4.30 show that investors who got out of the market in 1958-59 after holding steady for a 40-year period received the best returns that the U.S. total return index has offered in its entire history!

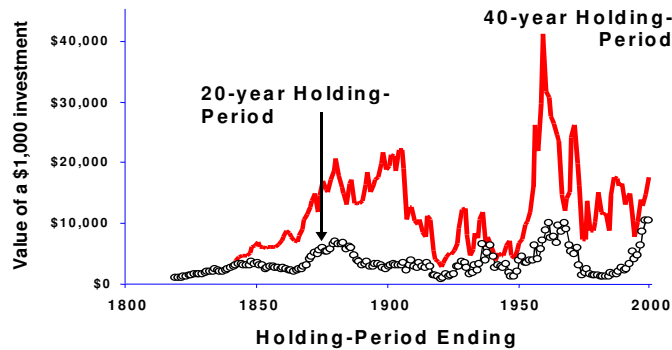


Exhibit 4.30:

The real value of a \$1000 initial investment for 20- and 40-year holding periods

Exhibit 4.31 extends this analysis to the international arena, by looking at the statistics for inflation-adjusted annual returns on some of the stock markets worldwide with long survival history. Though not an exhaustive list, it is representative enough of the stock markets worldwide in general and gives us an idea of how positive their long run returns have been, no matter what the socioeconomic history, so long as the conditions conducive of a free market's functioning exist. Also given in this Exhibit are the values of the "holding period". The pattern that these data reveal is this: the greater the volatility, and the smaller the return, the longer the holding horizon needs to be.

Market	Period	Real Annual Return	Volatility	Holding horizon (years)
U.S.	1802-2000	6.43%	17.06%	19.05
U.K.	1694-2000	4.85%	12.21%	17.15
Japan	1921-2000*	7.23%	18.95%	18.59
Germany	1924-2000*	7.24%	22.30%	25.67
Sweden	1921-2000	5.60%	16.65%	23.92
France**	1921-2000	7.76%	25.50%	29.22
Netherlands**	1921-2000	5.85%	16.50%	21.53
Portugal**	1930-2000*	11.61%	29.49%	17.46
Canada**	1921-2000	6.88%	18.17%	18.87
Austria**	1925-2000	7.22%	21.49%	23.97
Belgium	1921-2000	5.77%	21.80%	38.63
Denmark**	1926-2000	6.10%	14.36%	15
Switzerland	1926-2000	4.35%	14.73%	31.24

Exhibit 4.31:

The statistics on real total annual returns for selected stock markets worldwide. The last column shows the "holding horizon", defined as the time needed to ensure, at the 95% level of confidence, that real cumulative returns are positive.

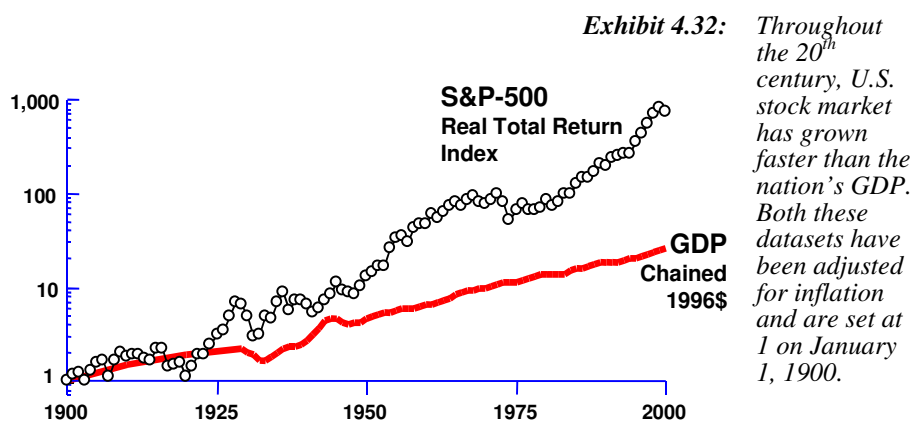
These statistics have been updated from the Jorion and Goetzmann study.

* Denote interruptions, e.g., Germany from Aug 1944 to Dec 1949; Portugal from May 1974 to Feb 1977; Japan from June 1944 to March 1949.

** Real returns computed in the U.S. dollars

4.3.2 Is it really the economy, stupid?

The cyclicality evident in Exhibits 4.28 and 4.30 reflect the long-term cyclicality seen in the annual return data in Exhibits 3.28 and 3.30. The source of these fluctuations is hard to identify, however. Earlier, in the context of Exhibit 3.31, we had noted that capital markets can hardly remain immune to macroeconomic constraints. After all, markets perform well for the investors when the firms are not only profitable but increasingly so. But this demands that economy grow exponentially. The question is whether that is really possible, and the economy can really grow continually, without occasional foray into the negative territory. So far, and at the macro level, the evidence from overall growth of the U.S. economy has been supportive of this possibility. This can be seen in Exhibit 4.32 where we compare the U.S. GDP³¹, in chained 1996\$, with the CPI-adjusted S&P-500 total return index, for the entire twentieth century. For ease of comparison, the two datasets have been normalized at 1 on January 1, 1900. The GDP data for 1900-1928 are from Angus Maddison's compendium³² on the world economy, and the subsequent data are from U.S. Department of Commerce.



As the quote from Professor Tobin in Box 4.2 explains, GDP — the total domestic output of all goods and services — is a simple but elegant measure of the nation's economic well-being that guides planning as much for the government as for the corporations. The stock market is a leading indicator of the economy, after all. Comparing the growth of GDP and the stock market as in Exhibit 4.32, it would seem as if the stock market has indeed fueled the growth of the GDP.

Box 4.2: Why GDP Matters?

GDP! The right concept of economy-wide output, accurately measured. The U.S. and the world rely on it to tell where we are in the business cycle and to estimate long-run growth. It is the centerpiece of an elaborate and indispensable system of social accounting, the national income and product accounts. This is surely the signal innovative achievement of the Commerce Department in the 20th century. I was fortunate to become an economist in the 1930's when Kuznets, Nathan, Gilbert, and Jaszi were creating this most important set of economic time series. In economic theory, macroeconomics was just beginning at the same time. Complementary, these two innovations deserve much credit for the improved performance of the economy in the second half of the century.

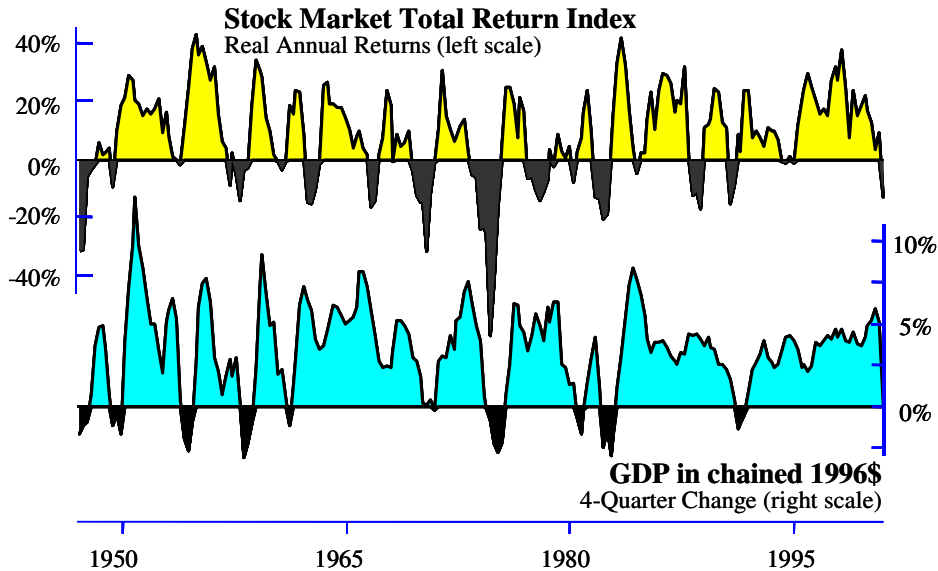
James Tobin

Nobel Laureate and Yale University Professor Emeritus of Economics
(<http://www.bea.doc.gov/bea/aw/0100od/maintext.htm>)

As Exhibit 4.33 shows, fluctuations in the stock prices occur far more frequently than the changes in GDP. Not all the downturns in the market translate into corresponding drops in GDP, nor do all the market's upturns herald rises in GDP. The most notable example of this is the market's 29% drop on October 19, 1987. It produced a -23% real total return for the month of October 1987, while GDP rose by 1.74% in that quarter. As Professor Paul Samuelson, a Nobel Laureate in Economics, quipped in a Newsweek magazine article³³ 35 years ago, stock market has accurately "*predicted nine out of the last five recessions*"! This is particularly explicit in Exhibit 4.33 where annual data on real total returns on the market during 1947-2000 are compared with the corresponding data on GDP changes. As can be seen here, real total returns on the overall stock market dropped by 10% or more on 12 occasions since January 1947, but GDP depreciated on only 10 of these occasions.

Perhaps one should examine the other factors that can predict GDP growth and how they might help predict the stock market's overall behavior. The results of a recent study by John Stock and Mark Watson³⁴ are instructive here. It examined the performance of different predictor signals over time, only to find that the signals such as these work more effectively in hindsight than in foresight, i.e., the signals that have worked well in the past do rather poorly in the future. Exhibit 4.34 compares the performances of three of the signals examined by these authors. As can be seen here, the yield spread on short-term and long-term Treasuries improved the GDP growth forecasts by an average of 52% during 1971-84 but almost wrecked these forecasts during the next 15-year period! Perhaps this reflects the dynamics of the economy — the successful indicators of the past lose their predictive power when economic policy absorbs their signals as the economy evolves.

Exhibit 4.33: The annual data for the 1947-2000 period, graphed in quarterly intervals, show far more frequent dips in the total returns on stock market than in the GDP changes.



do rather poorly in the future. Exhibit 4.34 compares the performances of three of the signals examined by these authors. As can be seen here, the yield spread on short-term and long-term Treasuries improved the GDP growth forecasts by an average of 52% during 1971-84 but almost wrecked these forecasts during the next 15-year period! Perhaps this reflects the dynamics of the economy — the successful indicators of the past lose their predictive power when economic policy absorbs their signals as the economy evolves.

Indicator	1971-84	1985-99
Stock prices	10%	-12%
Yield spread on the corporate versus government bonds	44%	-88%
Yield spread on the short-term versus long-term Treasuries	52%	-59%

Exhibit 4.34

The effect of selected indicators on the accuracy of the GDP growth forecasts.

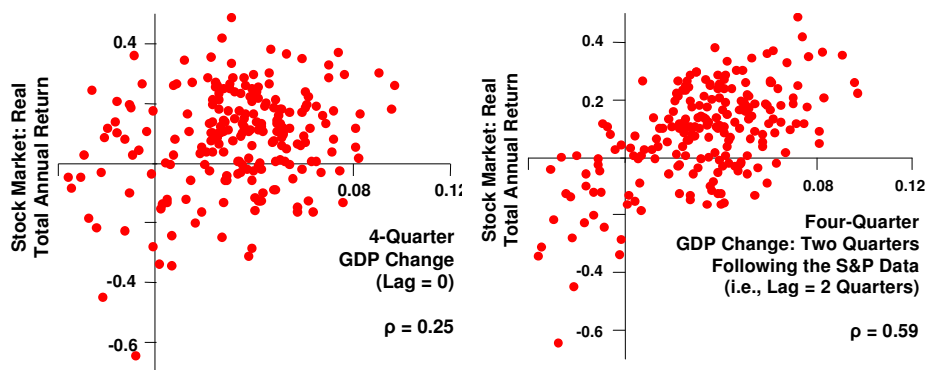
Source:

The study by James Stock and Mark Watson

Does this make predicting business cycle's ups and downs from those of the stock market a futile exercise? Certainly not, as is quite obvious from a closer look at Exhibit 4.34. Investors are more immediately concerned with the market's, and not the economy's, prospective performance. Their interest³⁵ in the GDP is oblique at best, particularly in the short run, based on the premise that the market is more likely to do better when the economy is rising than when it is declining. Exhibit 4.33 merits a closer examination, therefore, because it is unreasonable to expect a direct correlation between the two variables presented here if the change in one of them (the stock market) can be a leading indicator of the change in the other (the GDP). A direct correlation would make the stock market a "coincident", not a leading or lagging, indicator of economy's direction. The question, therefore, is the time by which the change in the market either lags or leads that of GDP. Exhibit 4.35 presents the results of this analysis.

Note how scattered the graph in the left panel of Exhibit 4.35 is! Clearly, with a statistically insignificant correlation coefficient (ρ) value of 0.25 (left panel), changes in the S&P-500 total return index and the GDP show no discernible relation whatever. But, on lagging the GDP data by two quarters relative to the stock market data, their correlation dramatically improves, to a statistically significant $\rho = 0.59$ (right panel). This makes the stock market an effective leading indicator of the nation's economic output by two quarters.

Exhibit 4.35: Correlation analyses of the graph in Exhibit 4.33. The "same-time" S&P and GDP changes are poorly correlated (left panel) but their relationship improves significantly when GDP time-series lags the S&P time-series by two quarters (right panel).



While the stock prices are likely indicators of the economy, the converse is not necessarily true. We therefore compare the pattern of changes in stock prices with two other variables, yield spread (= yields on long-term

treasury bonds less the federal fund rate) and GDP gap (= real GDP less the potential GDP), for the 1954-2000 period, in Exhibit 4.36. It presents the correlograms for changes in the S&P-500 total return index (labeled ΔSP here), for different quarterly lags, with these two variables. The variables that correlate for positive lags would then be the leading indicators for the stock market, while those that correlate best for the negative lags would be lagging indicators. For instance, yield spread has the highest positive correlation with market changes at a lag of two quarters. This makes yield spread a leading indicator of the market by two quarters. Likewise, the correlation of ΔSP and GDP-Gap is positive at a -3 quarters lag, and negative at a lag of 3 quarters. Obviously, the more real GDP is above its potential, the more negative the GDP gap and the greater the danger signal for the market.

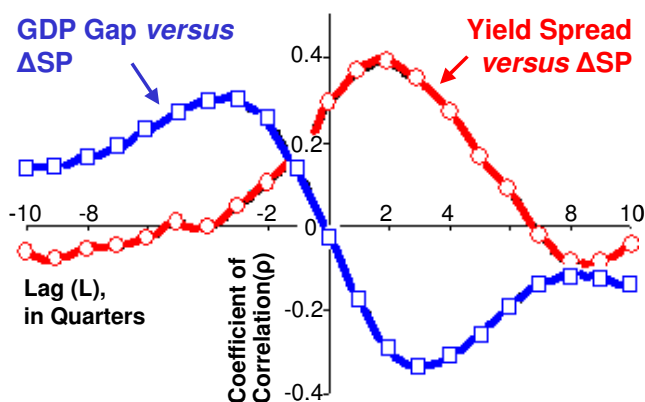


Exhibit 4.36:

For the 1954-2000 period, yield spread with 2-quarter lag and GDP-Gap with 3-quarter lag have been the leading and lagging indicators for annual changes in the S&P-500 real total return index, respectively.

Though statistically significant at 95% confidence level, these correlations do not cover adequate variability in the stock market to be the strong predictors of the market that we as investors would like to see. For instance, multiple regression analysis shows that yield spreads and GDP-Gaps together explain only one-fifth of observed variability in stock market returns. Nonetheless, this analysis shows that investors are well advised to continually monitor the changes in yield spread and GDP-Gap.

The remaining issue deals with the lessons that could be learned from the experience of the other countries with regard to the effect of stock market on the economy. Let us take the case of Japan. Exhibit 4.37 updates the Economist magazine's 1999 comparison of the 1991-99 performance of U.S. stock market with that in 1921-32 and with the 1981-92 performance of Japan's Nikkei index. Apart from updating the data, the only difference here is that we have used the S&P-500 index, and not the Dow index used by the Economist magazine. But the Dow mirrors the S&P-500 index so closely that

the inferences one can draw from Exhibit 4.37 should not diverge significantly from what the Economist magazine concluded. The problem with this picture is that, as was noted in Exhibit 3.42 earlier, the best correlation that U.S. market's 1990s history of total return index in real dollars shows is with its 1950s history, and not with its history in the 1920s and early 1930s.

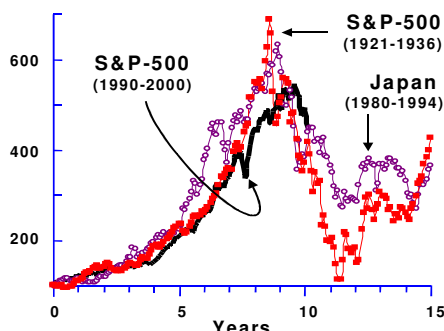


Exhibit 4.37:

History appears to support the fear that the ongoing turmoil in the stock market may well obliterate U.S. economy's sterling gains of the 1990s.

Updated from the Economist, September 25, 1999 ("Bonfire of the insanities")

The market's bear run since March 2000 makes the analysis of the Economist magazine seem quite prophetic. Japan's growth in the 1980s was associated with that in business productivity and resulted from a pronounced investment boom. With the current slowdown in business investment in the U.S., particularly in information technology, the U.S. appears to be following an eerily similar path. Also, as Japan's bust since the 1990s has covered the stock market as well as real estate, one should wonder if America's housing bubble is the next. The lesson clearly is that, as America's boom in the 1990s came mainly from the productivity growth brought about by investment in technology, the sooner the current dip in these investments reverses the better off the economy is likely to be. But then, investment in technology is often the last to recover after a trough in the business cycle. And, based the data in Exhibit 2.8, we may not have reached the trough in this business cycle as yet. As to the U.S. housing market, the correlation of house prices with income growth substantially weakens the evidence of any bubble.

An intense pessimism about the immediate future of the stock market is one extreme lesson that one can perhaps draw from these discussions. This is the message in such recent bestsellers as *"Irrational Exuberance"* by Robert Schiller and *"Valuing Wall Street"* by Andrew Smithers and Stephen Wright. The opposite extreme of unbridled exuberance is painted in the bestsellers like *"Dow 36000: The New Strategy for Profiting from the Coming Rise in the Stock Market"* by James Glassman and Kevin Hassell, *"Dow 40000: Strategies for Profiting from the Greatest Bull Market in History"* by David Elias, and *"Dow 100000: Fact or Fiction"* by Charles Kadlec and Ralph Acampora, on the other hand.

Our narrative shows that the truth perhaps lies somewhere in the middle. Take, for instance, the statistics on real annual returns summarized in Exhibits 3.44 and 4.28. Let us assume that the market's 1981-2000 performance is hard to repeat, and that the real returns during 1971-2010 will be the same as the returns during 1802-2001. In that case, with the geometric model discussed earlier, the 1802-2001 and 1981-2001 average annual returns as 6.33% and 8.58%, respectively, and the time-aggregation property discussed in the context of Equations (4.5a)-(4.5c), we can write

$$\begin{aligned} \ln(P_{2030}/P_{2002}) &= \ln(P_{2030}/P_{1981}) - \ln(P_{2001}/P_{1981}) & (4.6) \\ &= 50 \times 6.33\% - 21 \times 8.58\% = 29 \times 4.70\% \end{aligned}$$

With equal justification, we could use the 1971-2001 average annual returns of 6.32% here, of course. Equation (4.6) would then give the estimate of expected average returns during 2002-10 (or 2002-20 or 2002-30) about the same as that during 1971-2001. Recall our estimate of 4.9-11.2%, in section 3.1 earlier, for the expected average annual total returns (real) on the S&P-500 index during 2002-10.

This suggests that the average growth rate in the next 29-30 years may well turn out to be slower than the historic annual average of 6.3-6.5% in real dollars. But, adding an annual 3% for inflation, this also suggests that, in nominal dollars, there is no reason why the Dow, say 8,500 in mid-year 2002, may not reach about 15,000 in 2010 and approach 40,000 in 2,020, assuming the historic rates hold. This sailing may not turn out to be a smooth one, however.

In crunching the above numbers, we have only considered the mean returns and have ignored their volatility. A measure in financial statistics that captures this is the Sharpe-ratio. It shows the risk-adjusted performance of equities by normalizing the excess returns on equities in relation to short-term bonds (or the market-determined interest or inflation rate) for the fluctuations in the former, i.e.,

$$\text{Sharpe-ratio} = (\tilde{r}_{\text{equities}} - r_f) / s_{\text{equities}} \quad (4.7)$$

where r_f is the 'risk-free' rate computed for the short-term bonds, s_{equities} is the standard deviation for equities, and $\tilde{r}_{\text{equities}}$ the corresponding average return on equities. Exhibit 4.38 shows how the Sharpe-ratio for U.S. market, computed here in annually rolling 30-year segments, has varied through the past 150 years. Note that the overall risk-adjusted performance of the U.S. stock market, which peaked in the 1960s, has now remained positive for more than a century.

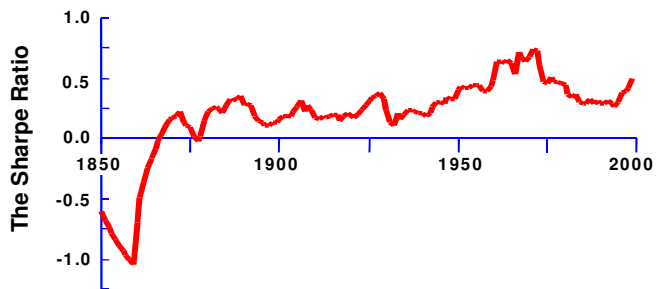


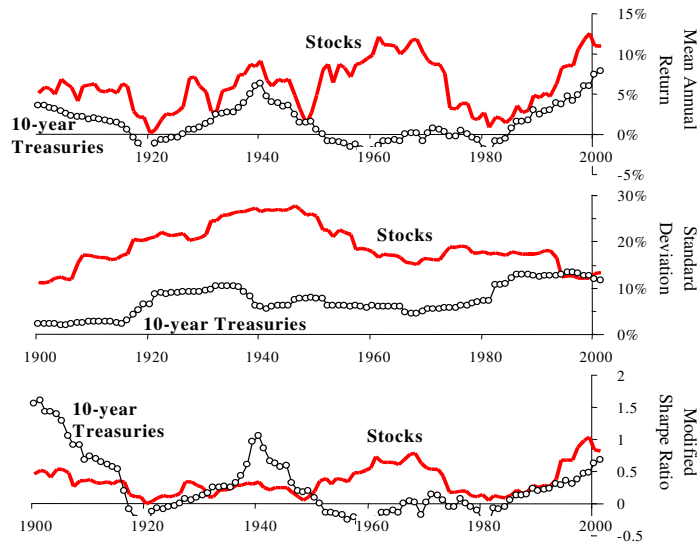
Exhibit 4.38:

Changes in U.S. market's Sharpe-Ratio, computed in annually rolling bands of 30-year segments.

What lessons from the market's performance history can be gleaned by this analysis? Exhibit 4.39 answers this question by comparing the mean, standard deviation and Sharpe ratio statistics for the real annual returns on stocks and bonds over the 1871-2001 period. For the stock market, these data have been annualized from 20-year holdings and have been computed using real annual data in annually rolling bands. The bond statistics are for 10-year Treasuries and have been computed from 20 annual data taken in annually rolling bands. Notice how these data point to an emerging convergence of stocks and bonds. Historically bond yields have been far less volatile than the stock returns, even in the early 1940s when their yields briefly approached those of the stocks. But bond volatility is already close to that of the stocks, although their returns are yet to match. Perhaps we may soon have bonds in the same basket as the stocks and not as their alternatives!

Exhibit 4.39:

The comparison of statistics of annual returns on stocks (S&P-500) and bonds (10-year Treasuries), computed for real annual data in annually rolling bands, shows that the stock returns have always surpassed yields on bonds but the two now have similar volatility. Their 'modified' Sharpe ratios³⁶ point to a possible resurgence in the demand for bonds, though.



4.3.3 The Return of Positive Returns:

As for investments, the market's troughs provide buying opportunities. After all, if the cooling of the market points to that of the economy at large, then the market is also likely to anticipate the economy's rise as well. Exhibit 4.40 thus examines the returns an investor would have received from buying at the market's troughs and holding (a) to the business cycle troughs and (b) for one year. Note how impressive the real total returns would have really been, overall! Barring one exception, they all are positive and greatly exceed the market's average returns. Clearly, the market's down turns are the buying opportunities that we should covet, no matter whether they presage the economy's slow-down or not. For instance, the investors who braved into the market in November 1987 and stayed into it for 1 year, despite the October 1987 crash, received an impressive 19.1% return in real or inflation-adjusted dollars. The challenge is to be able to identify the troughs.

Exhibit 4.40: Real total returns from buying at the stock market troughs

Stock Market Trough	Business Cycle Trough	Returns by holding from Stock Market Trough to Business Cycle Trough		Returns for 1-year holding from Stock Market Trough	Stock Market Trough	Business Cycle Trough	Returns by holding from Stock Market Trough to Business Cycle Trough		Returns for 1-year holding from Stock Market Trough
		Return	Period				Return	Period	
Jul-45	Oct-45	14.89%	3 months	27.74%	Sep-74	Mar-75	26.68%	6 months	30.26%
May-47	...	...	...	5.71%	Oct-78	...	...	...	15.97%
Jun-49	Oct-49	14.99%	4 months	34.44%	Mar-80	Jul-80	17.46%	4 months	22.43%
Aug-53	May-54	25.56%	9 months	31.61%	Jul-82	Nov-82	28.18%	4 months	51.08%
Feb-57	...	...	...	-4.42%	Jul-84	...	...	...	25.86%
Dec-57	Apr-58	8.03%	4 months	29.75%	Nov-87	...	...	...	19.09%
Oct-60	Feb-61	19.27%	4 months	25.71%	Oct-90	Mar-91	23.84%	5 months	28.06%
Jun-62	...	...	...	27.63%	Jun-94	...	...	...	16.15%
Sep-66	...	...	...	23.67%	Aug-98	...	...	...	31.77%
Jun-70	Nov-70	17.72%	5 months	33.45%	Sep-99	...	...	...	18.01%

Thus, as the writer Art Buchwald points out in a skit reproduced in Box 4.3 here, investors are what the market is now apparently waiting for! When might that happen? A plausible scenario is this. The *value investors* are usually the ones to herald the end of a bear market but, macabre as it may seem, the fair value for them often implies a 20-25% discount on what would be commonly identified as the fair value. Unfortunately, though, the mid-year 2002 market is priced at about its fair value, as will be seen in the next two chapters. It will need to wait a while longer, therefore, to become attractive to such investors.

Box 4.3: Tom, Dick and Harry, the Economy Misses You

Art Buchwald

People talk about a recession the way they do about the weather. And like the weather, no one can do anything about it.

Frederick Hollcomb is an expert on recession and predicts the confidence of the man in the street.

“No one likes a recession. Even Al Greenspan hates them. But if you are going to have one, you might as well have it now than later.”

I said, “Is it true that recession is caused by the level of consumer confidence? The lower the confidence, the more the chance there is of the boat sinking?” Hollcomb replied, “There is something to that. The consumer can make or break the economy. For eight years confidence was high and recessions were unthinkable.

“Tom, Dick and Harry were spending money willy-nilly and not concerned about the tomorrow.

Then something happened—Tom first, then Dick, and then Harry, the people who set the confidence tables, started hoarding money instead of spending it. “Tom said he was cutting back because there was a talk of layoffs at his firm. Dick stopped going to boat shows because he didn’t want to add any luxuries to his lifestyle. Harry lost half his money when he got into an ugly divorce lawsuit with his wife.

“All sorts of solutions to avoid the recession problem were advanced. Bank interest rates were cut. Tax relief was offered, and department stores cut another 50% off most items in their stores.

“The big question was would Tom start spending again, and the second question was would Dick take any credit

on his MasterCard after he decided he didn’t want any more debt? Harry was hardly getting by after paying \$1500 a month in alimony: He told his lawyer, ‘How can we have consumer confidence when my ex-wife takes all my money?’

“By this time, Wall Street got into the act and said, ‘Our stocks are not going to make any money if nobody buys anything.’”

“What is the solution?”

“Another fed interest rate cut.”

“Will that bring Tom, Dick and Harry back into the economy?”

“If it doesn’t, Orville Redenbacher will go broke and Amazon is going to cry uncle.” So that’s where we stand right now. I tried to talk to Tom, Dick and Harry to get their side of it, but they wouldn’t answer my calls.

(Los Angeles Times
March 8, 2001)

“For online investors, our new keyboard has four extra buttons: BUY, SELL, PANIC, and BRAG!”

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4.4 Concluding Remarks:

Our examination of the history of the U.S. stock market in the last two chapters has shown that the market has, over time and over any given 30-year segment in its almost 200-year long history, always outperformed the other investment vehicles like Treasury bills and bonds, corporate bonds, commodities and the real estate. A nineteenth century investor would have justifiably considered these other investment vehicles as equally attractive alternatives for wealth preservation. But the situation through the twentieth century has been vastly different. During the 1802-1899 period, real annual returns on the market exceeded those on the long-term government bonds by barely 1.4%, but were almost 1% less than those on corporate bonds. During 1900-1999, on the other hand, the market's real or inflation-adjusted excess returns over these two instruments averaged 4-5% per year! This is also true of the commodities and the real estate markets.

The data from other markets worldwide paint an identical picture. In the U.K., for instance, real annual returns on long-term government bonds were 0.26-0.53% less than those on the stocks during 1700-1899, but 4.39% less during 1900-1999. The stock markets in Germany, Japan, Canada, France and Austria have performed even better than the U.S. stock market during the twentieth century.

To an investor, these factors alone should make the stock market the preferred, nay, the only, choice. Add to this the fact that investment itself is no longer a matter of choice. We are living longer but also have to retire sooner, and the age at which full retirement benefits can become available is receding farther into the future. Therefore, investing is now needed as much for creating wealth as for preserving it, and investing in the stocks satisfies both these needs simultaneously.

The stock market is a volatile place, of course. It is for this reason that we suggest stocks as wealth-preservers and wealth-builders over the long haul. How long a haul should that be? We find a 20-year holding horizon to be adequate. Indeed, apart from the fact that this is what the statistical structure of the annual returns data suggests, there has been no 20-year or longer period in the history of the U.S. stock market when the cumulative real returns have been negative. Now that the market has taken a rather prolonged pause, and has started the new millennium on a rather depressed note, the picture that we have drawn may seem irrationally exuberant, particularly to the investors who entered the market towards the waning years of the long bull market of the 1990s. But then, what else to call it if not the best buying opportunity that has taken a long time to come?

Endnotes for Chapter 4

- ¹ Fabozzi, F.J. and Fabozzi, T.D., “*Handbook of Fixed Income Securities*” (Irwin, 1995).
- ² Federal Home Loan Bank System, Freddie Mac, Fannie Mae, Sallie Mae, Farm Credit System, Tennessee Valley Authority
- ³ A coupon is basically the interest payment on the bond and is called so because, in order to receive the payment, the holder of the bond usually needs to clip it off and mail it to the bond’s issuer. Take a Treasury bill carrying 15.75% coupon rate and maturing in Nov 2001, for instance. For semiannual payments, buying this \$1000 bond in Jan 2001 means receiving two \$78.75 coupons, one in May 2001 and the other in Nov 2001, when the \$1,000 face value of the bond too will be redeemed. The price that this bond will sell for is the present value (PV) of this cash flow, or the value of this cash stream discounted to the present and, for a 4.86% effective annual yield, was quoted at \$108.21 (per \$100) on Jan 12, 2001. The bond was thus selling at a premium because its coupon exceeded the current interest rate.
- ⁴ The PV of an annuity can be easily computed as the difference between two perpetuities. Take two perpetuities, X and Y, with the present values of PV_X and PV_Y and both having the same coupon, say C. The n-period annuity with this cash stream of C per period is then $PV_X - PV_Y$. Since a perpetuity (e.g., a consol in the UK and Canada or a preferred stock in the US) offers a never-ending stream of level cash flow, we have

$$PV_X = \frac{C}{r_{\text{period}}} \quad \text{and} \quad PV_Y = \frac{C}{r_{\text{period}} (1+r_{\text{period}})^n}$$

This is because, by writing

$$PV_X = \frac{C}{(1+r_{\text{period}})} + \frac{C}{(1+r_{\text{period}})^2} + \frac{C}{(1+r_{\text{period}})^3} + \dots$$

so that

$$(1+r_{\text{period}}) PV_X = C + \frac{C}{(1+r_{\text{period}})} + \frac{C}{(1+r_{\text{period}})^2} + \dots$$

$$\text{we obtain} \quad (1+r_{\text{period}}) PV_X - PV_X = r_{\text{period}} PV_X = C$$

We then have $PV_X = (1+r_{\text{period}})^n PV_Y$ because the payments on our perpetuity Y begin period n after those on X.

- ⁵ The yield to maturity (YTM) of a bond is basically its internal rate of return (IRR). By definition, IRR is the rate of return that makes the net present value (NPV) of an investment equal zero, NPV being the present value of the cash stream net of investment. For instance, suppose an initial investment of C_0 generates a cash stream C_1, C_2 and C_3 in the manner shown here. For this investment, we have

Time	0	1	2	3
Cash Flow	$-C_0$	C_1	C_2	C_3
Discount Rate	r	r	r	

$$NPV = -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3}$$

and IRR would be the value of r for which $NPV = 0$.

- ⁶ In the US, the legislated goal of monetary policy that defines the Fed’s task is to keep the economy growing at a moderate pace while keeping inflation low.

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- ⁷ John Taylor, “Discretion versus Policy Rules in Practice” *Carnegie-Rochester Conference Series on Public Policy*, vol. 39, pp. 195-214 (1993). See also John B. Taylor, “A Historical Analysis of Monetary Policy Rules” in *Monetary Policy Rules* (Ed: John B. Taylor) (University of Chicago Press), pp. 319-347 (1999).
- ⁸ For the fourth quarter of 2000, real GDP was \$9,394.2 billion, in chained 1996 dollars, when the potential GDP, according to the Congressional Budget Office, was \$9,171.3 billion.
- ⁹ Arthur Laffer has recently argued (“So You Thought the Fed Set Interest Rates?”, *The Wall Street Journal* — March 22, 2001) that, rather than setting the rates, the fed merely adjusts the discount rates to the prevailing 3-month T-Bill rates.
- ¹⁰ Although widely used by the central banks (e.g., “Monetary policy, made to measure”, *The Economist*, p. 60, Aug 10, 1996), some economists find the source of fed’s success in combating U.S. inflation since 1980 in aggressively seeking to prevent inflation, not in John Taylor’s premise of responding to inflation. For instance, R.L. Hetzel (“The Taylor Rule: Is it a Useful Guide to Understanding Monetary Policy?”, *Federal Reserve Bank of Richmond Economic Quarterly*, vol. 86, pp. 1-33, 2000) has reported a significantly improved correlation coefficient, from 0.66 for November 1965—July 1979 to 0.81 for August 1979—July 1987 and 0.91 for August 1987—May 1999, from regression analysis of empirical data and Taylor rule predictions, suggesting that the fed action in setting the interest rates is becoming increasingly timely.
- ¹¹ Brennan, M.J. and Schwartz, E.S., ‘Saving Bonds, Retractable Bonds, and Callable Bonds’, *Journal of Financial Economics*, vol. 5, pp. 67-88 (1977).
- ¹² Edwin Elton, Martin Gruber, Deepak Agrawal and Christopher Mann (“Explaining the Rate Spread on Corporate Bonds”, *Journal of Finance*, vol. 56, pp. 247-277, 1998) have argued that, rather than merely the expected default, the premium that
- ¹³ Jeremy Siegel: “Are Stocks Still Right For the Long RUN?” *Mckenna Lecture Series, St. Vincent College* (<http://www.facweb.stvincent.edu/Academics/cepe/Articles/Siegel.html>, accessed on July 7, 2002).
- ¹⁴ In his seminal paper “Portfolio Selection” (*Journal of Finance*, vol. 7, pp. 77-91, 1952), Harry Markowitz was the first to explain how the standard deviation of returns is a direct measure of volatility. He further argued that risk reduction requires selecting such assets in a portfolio that do not move together, or correlate inversely, in other words.
- ¹⁵ Antulio N. Bomfim, “Optimal Portfolio Allocation in a World Without Treasury Securities”, *Finance & Economics Discussion Series*, No. 2001-11, Federal Reserve Board.
- ¹⁶ See, for instance, the article by R. Mehra and E.C. Prescott (“The Equity Risk Premium: A Puzzle”, *Journal of Monetary Economics*, vol. 15, pp. 145-161, 1985), who first raised this problem. Recent studies (e.g., I. Welch, “Views of Financial Economists on the Equity Premium and Other Issues”, *Journal of Business*, vol. 73, pp. 501-537, 2000; and R. Arnott and R. Ryan: “The Death of the Risk Premium: Consequences of the 1990s”, *Journal of Portfolio Management*, Spring 2001) estimate the equity premium at 0-13%.
- ¹⁷ Ana M. Aizcorbe, Arthur B. Kennickell and Kevin B. Moore. “Recent Changes in U.S. Family Finances: Results from the 1998 and 2001 Survey of Consumer Finances”, *Federal Reserve Board Bulletin*, vol. 89, pp. 1-32 (2003).
For details of 1998 and earlier surveys, see Arthur B. Kennickell, Martha Starr-McCluer and Brian J. Surette. “Recent Changes in U.S. Family Finances: Results from the 1998 Survey of Consumer Finances”, *Federal Reserve Board Bulletin*, vol. 86, pp. 1-29 (2000).
- ¹⁸ URL: <http://www.ici.org>
- ¹⁹ Sarkis J. Houry. ‘INVESTMENT MANAGEMENT: THEORY AND APPLICATION’ (Macmillan, New York, 1983).
- ²⁰ These data are from the NAREIT (National Association of Real Estate Investment Trusts) web site (www.nareit.com) and from the press release of May 29, 2001, that reported the results of Ibbotson Associates’ analysis.

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- ²¹ Charles P. Mackay, *Memoirs of Extraordinary Popular Delusions and Madness of Crowds* (Bentley, 1941); Charles P. Kindleberger, *Manias, Panics, and Crashes: A History of Financial Crises* (John Wiley, 2000); P.M. Garber, *Famous First Bubbles: The Fundamentals of Early Manias* (MIT Press, 2000).
- ²² François Longin and Bruno Solnik, “Extreme Correlation of International Equity Markets”, *Journal of Finance*, vol. 56, pp. 649-676 (1998)
- ²³ Philippe Jorion and William Goetzmann, “Global Stock Markets in the Twentieth Century”, *Journal of Finance*, vol. 54, pp. 953-980 (1999).
- ²⁴ M.H. Miller and F. Modigliani, “Dividend Policy, Growth and the Valuation of Shares”, *Journal of Business*, vol. 34, pp. 411-433 (1961).
- ²⁵ M.H. Miller and M. Scholes, “Dividends and Taxes: Some Empirical Evidence”, *Journal of Political Economy*, vol. 90, pp. 1118-1141 (1982). See also D.F. Bradford and R.H. Gordon, “Taxation and the Stock Market Valuation of Capital Gains and Dividends”, *Journal of Public Economics*, vol. 14, pp. 109-136 (1980); and M.H. Miller, “Behavioral Rationality in Finance: The Case of Dividends”, *Journal of Business*, vol. 59, pp. S451-S468 (1986).
- ²⁶ E.F. Fama and K.R. French: “Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay”, *Journal of Financial Economics*, vol. 60, pp. 3-43 (2001).
- ²⁷ R. La Porta, F. Lopez-de-Silanes, A. Shleifer and R. Vishny: “Agency Problems and Dividend Policies around the World”, *Journal of Finance*, vol. 55, pp. 1-34 (2000).
- ²⁸ Wilford Eiteman and Frank Smith, *Common Stock Values and Yields* (University of Michigan Press, 1953). Also see Lawrence Fisher and James Lorie, “Rates of Return on Investment in Common Stocks”, *Journal of Business*, vol. 37, pp. 1-21 (1964).
- ²⁹ This is a major advantage of time aggregation and follows from our preference, discussed in section 1.3, for the geometric mean. For instance, if $r_{t=2}$ is the total return for two-period holding, then it follows from equation (2.2) that $r_{t=2} = \ln(P_{t=2}/P_{t=0}) = \ln(P_{t=2}/P_{t=1}) + \ln(P_{t=1}/P_{t=0}) = r_{t=1} + r_{t=0}$.
- ³⁰ Basically, the variance $\text{var}_{t=2}$ for our two-period return follows the same linearity as our two-period return $r_{t=2}$ if we assume that the returns are normally distributed, i.e., $\text{var}_{t=2} = \text{var}_{t=1} + \text{var}_{t=0}$. As standard deviation is the square root of variance, annualizing the standard deviation from monthly data requires multiplying the latter by $\sqrt{12}$.
- ³¹ At its simplest, GDP is computed from its expenditure identity as $\text{GDP} = C + I + G + (X - M)$ where C = Personal Consumption, I = Investment, G = Government Purchases, X = Exports, and M = Imports.
- ³² Angus Maddison, “Monitoring the World Economy, 1820-1992” (OECD, Paris, 1995).
- ³³ Paul Samuelson: “Science and Stocks”, *Newsweek*, Sept 19, 1966, p. 92.
- ³⁴ John Stock and Mark Watson: “Macroeconomic Forecasting Using Diffusion Indexes”, *Journal of Business and Economic Statistics* (forthcoming). The paper is available at the URL: <http://www.wws.princeton.edu/~mwatson/publi.html>
- ³⁵ Following are amongst the numerous research papers that discuss the various facets of this interesting topic:
 Eugene Fama, “Stock Returns, Real Activity, Inflation, and Money”: *American Economic Review*, v. 71, pp. 545-565 (1981).
 G. Kaul, “Stock Returns and Inflation: The Role of the Monetary Sector”: *Journal of Financial Economics*, v. 18, pp. 253-276 (1987).
 Campbell Harvey, “Forecasts of Economic Growth from the Bond and Stock Markets”: *Financial Analysts Journal*, v. 47, pp. 38-45 (1989).
 Jeremy Siegel, “Does it Pay Stock Investors to Forecast the Business Cycle?”: *Journal of Portfolio Management*, v. 18, pp. 27-34 (1991).
- ³⁶ This ratio is called ‘modified’ in this Exhibit because, for the real or inflation-adjusted data used here, $r_f = 0$ in Equation (2.15).