

# B2B and B2C in 2001 Back 2 Bankruptcies and Back 2 Cycles

## Why Expansions End and Why This One Will Not Last Another Year

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There is a 60% chance that the Bush/Clinton expansion will end in 2001.

In the 1960s, in the midst of the Kennedy/Johnson expansion that lasted 35 quarters, economists had conferences with the title "Is the Business Cycle Dead?" Then it was the apparent success of the Kennedy tax cut that allowed the hubris to think that well-designed counter-cyclical fiscal policy could eliminate the business cycle. The 1970s dished out a rude comeuppance to this magical thinking.

Today, with 38 quarters of expansion already, it is the magic of the New Economy that has been driving the optimism.

"What differentiates this period from other periods in our history is the extraordinary role played by information and communication technologies," Greenspan said. "The effect of these technologies could rival and arguably even surpass the impact the telegraph had prior to, and just after, the Civil War."

Alan Greenspan, Chairman of the Federal Reserve Board, The Associated Press  
June 13, 2000

"Wherever productivity growth is today, my guess is that in six months or a year, it will be higher still," "About once in 100 years, something really big happens, and this is it." Risking the scorn of skeptics, Mr. Slifer added that he had begun to believe that recessions were no longer inevitable. "Is it inconceivable to think this thing can keep going, and in 2010 we could see the 20th year of this expansion?" he asked. "No."

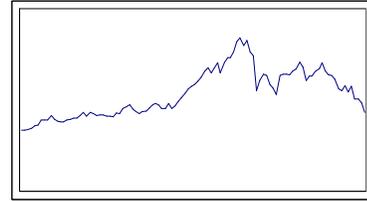
Stephen Slifer, the chief United States economist at Lehman Brothers. Reuters  
September 10, 2000

I don't think so. The personal productivity tools and communication devices of the New Economy do seem to have magical powers but these powers do not end the business cycle. Quite the

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contrary. The New Economy has experienced a classic boom and bust cycle that is extraordinary only in its amplitude and brevity.

The vivid image of the New Economy that is etched on most of our minds is the graph of the NASDAQ, which rose from 2000 in January 1999 to 5000 in April 2000 and is now back to 2500.



There is a reason for this wild ride. In the Old Economy, the assets were structures and equipment, which take time to build and which have substantial salvage value. The time to build slows the ride up and the salvage value softens the downturn. In the New Economy, the assets have been ideas about using the Internet. These ideas seem to have emerged effortlessly and instantaneously from the minds of Interpreneurs, which has made for a wild ride up. But these ideas have very little salvage value – only a mascot is left of Pets.com. This has made for a wild ride down.

While last year's New Economy question was "Is the productivity real?", today's humbled question is "How big will be the spillover?" Will the collapse of the stock markets and the bankruptcy cycle in the Dot.Coms create a tidal wave or only an imperceptible ripple? My view is that the wave is plenty big enough to end the Bush/Clinton expansion in 2001. The Bush/Clinton expansion was gasping and stuttering in 1995 and 1996, and would most likely have ended earlier but for discovery of the apparent investment opportunities afforded by the Internet. Now we are firmly in the bust part of the New Economy cycle, which is a big negative all by itself. But those five extra years of expansion have allowed more overbuilding and a more precarious situation. Today, looking into the future, it is difficult to see anything that will extend the life of this already old expansion.

The downturn doesn't have to be very serious. The greater stability of the economy since 1982 is the primary reason to believe that the downturn will be short and shallow. However, dealing with our external deficit could make the downturn longer and deeper. Today, net foreign investment exceeds \$400 billion, which is more than 4% of GDP. If global investors lose interest in acquiring US assets, this external deficit has to close, meaning we either have to export more or import less. If global investors allow us the time, we can close the deficit by slowly expanding exports more rapidly than imports, as we did in the 1980s, without serious adjustment problems. If global investors suddenly lose interest, then the adjustment has to be more rapid, which means that it is mostly imports that have to do the job. This would

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require an unhappy combination of an income effect and price effect: lower GDP and more inflation from a weakening dollar.

This is very bad news for Mr. Greenspan. The stability of the US economy since 1982 is at least partly attributable to more forward looking Federal Reserve policy. Prior to 1982, the Fed seems to have acted like the homeowner who constantly adjusts the thermostat based on the current temperature of the house, and the temperature is never right. Especially under Greenspan, the Fed has adjusted the thermostat in anticipation of future warming or cooling needs, and the temperature has been much more stable and more comfortable.<sup>1</sup> Now Mr. Greenspan, standing at the thermostat, sees a future that needs both more heating and more cooling. He may want to lower interest rates to fight off the looming recession, but he may also want to raise interest rates to fight off the looming depreciation of the dollar and the inflation it may bring. Then again he may want to slam the thermostat with a hammer, since it doesn't seem to be working like it used to: it is mostly gyrations in equities markets not bond markets that are driving this cycle.

In what follows I offer what I think is the most compelling evidence in support of this view. This is a set of graphs that illustrate the behavior of key macro variables during the six major expansions since World War II. These reveal the troubling signs about the current state of the economy. One graph shows that the Bush/Clinton expansion, which began in the second quarter of 1991, is long and smooth but weak. That contrasts with the Truman expansion in the early 1950s that was brief and volatile but very strong. Another graph shows that the declining unemployment rate in the long expansions has an early plateau and a late plateau. The Bush/Clinton expansion is now at its second plateau, and not likely to stay there for more than another year. A more prescient indicator of the state of the labor market is weekly hours in manufacturing. This indicator of pace of the economy rises dramatically during an expansion but falls off a bit at the end, which is exactly what has been occurring in the last several months. The spread between the long term and the short term interest rates also has a very distinctive path over an expansion, first widening and then tightening. That spread is now negative, signaling strongly that the end of this

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<sup>1</sup> The behavior of interest rates is clear evidence of this: in all but one recession, interest rates were rising going into the recession and began to drop immediately when the recession began, as if the Fed was surprised and forced to change its mind. In only the 1991 recession, interest rates were falling going into the recession as if the Fed had anticipated the heating needs. It is quite possible that this foresighted

expansion is imminent. But of course the finance story of the last five years has not been bank loans or corporate bonds. It has been the bull market in US equities that created unprecedented opportunities for the financing of New Economy start-ups. The equities markets are now saying no more.

After a discussion of these and several other graphs, I offer a simple econometric model designed to determine the probability that an expansion will end in the next four quarters. That model is the basis for the assessment that there is a 60% probability that the Bush/Clinton expansion will not last to 2002. Last in this document, I offer one recession scenario that is driven by hypothetical equity market adjustments. This scenario has a mild recession beginning in the second quarter of 2001, but it is really impossible to make a credible prediction at that level of detail. This scenario only describes the likely path of the recession, which may begin in any quarter of 2001. This recession, like 1990-91, is short and shallow, and the economy comes roaring back in 2002, propelled by the New Economy productivity trend that began in 1995.

## Warning Signs

Among the items that are signaling the end to this expansion are:

### ❖ **Tight labor markets.**

- The current low level of unemployment leaves few workers to hire.

### ❖ **Scarce capital.**

- Corporate profits are modest compared with investment expenditures, leaving corporations incapable of sustaining their investment expenditures from retained earnings.
- The flat yield curve is squeezing bank intermediation profits, and limiting their ability to make risky loans.
- The declining stock market is seriously discouraging equity issues.
- Venture capitalists, angels and employees are increasingly unwilling to plow money into Dot.Com ideas, not backed with bricks and mortar collateral or at least some significant cash flow.

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behavior is not going to be present in the 2001 recession which will be preceded by rate hikes and have rate reductions most likely after the recession is already underway.

❖ **Meager investment opportunities.**

- The US investment rate has been abnormally high over the last four years, leaving few “low-hanging” fruit to be picked. .

❖ **Sated consumers**

- Auto sales at the record rate of 17 million units for the last two years have filled the roads and garages with SUVs and other vehicles. A glut of used vehicles will compete intensely with new vehicles in 2001.
- Other consumer durables, including personal computers, have also had record sales rates.

❖ **Poorer consumers**

- The wealth effect from the equity markets, which was driving the consumer-spending binge, is now operating in the opposite direction.

❖ **Dependence on foreign capital**

- When the economic slowdown occurs, it will be made deeper and longer because of our reliance on foreign capital. The capital inflow into the US is over 4% of GDP, and if global investors tire of US acquisitions, external equilibration can only come through a combination of slow growth and higher prices for imports caused a weaker lower dollar.
- This will pull the Fed in opposite directions – toward lower interest rates and looser credit to offset the slowdown but also toward higher interest rates to support the dollar and to fight inflation.

Offsetting all these clouds is one sunny patch in the sky – the New Economy –, which is delivering terrific productivity growth and low inflation even with tight labor markets. But the most recent news from the Dot.Coms is all about bankruptcies, and the productivity gains cannot be seen where productivity can actually be measured – in manufacturing.

Although the conditions for the end of this expansion have been present for several quarters, there is as yet no clear incontrovertible evidence in the government statistics that the recession is already on the way. An early warning signal is the decline in hours per week in manufacturing. There is also clear trouble in autos, in personal computers and producer durables. No smoking gun yet, but some troubling numbers.

Watch: hours, employment, durable sales especially autos and housing. And watch the value of the dollar and the external deficit.

## The Bush/Clinton Expansion

The Bush/Clinton expansion which began in 1991 is now 38 quarters old. This is longer than any of the five other expansions since World War II. Data on the growth of real GDP for these six economic expansions are summarized in **Table 1** which contains the length in quarters, the average growth, the standard deviation of growth (a measure of volatility) and the cumulative growth. The growth rates of real GDP and the six sustained expansions are illustrated **Figure 1**. Cumulative growth over the expansions is illustrated in **Figure 2**, where the real GDP is normalized to be equal to one at the start of each expansion to facilitate comparisons.

**Table 1**  
**Growth of Real GDP in Six Expansions**

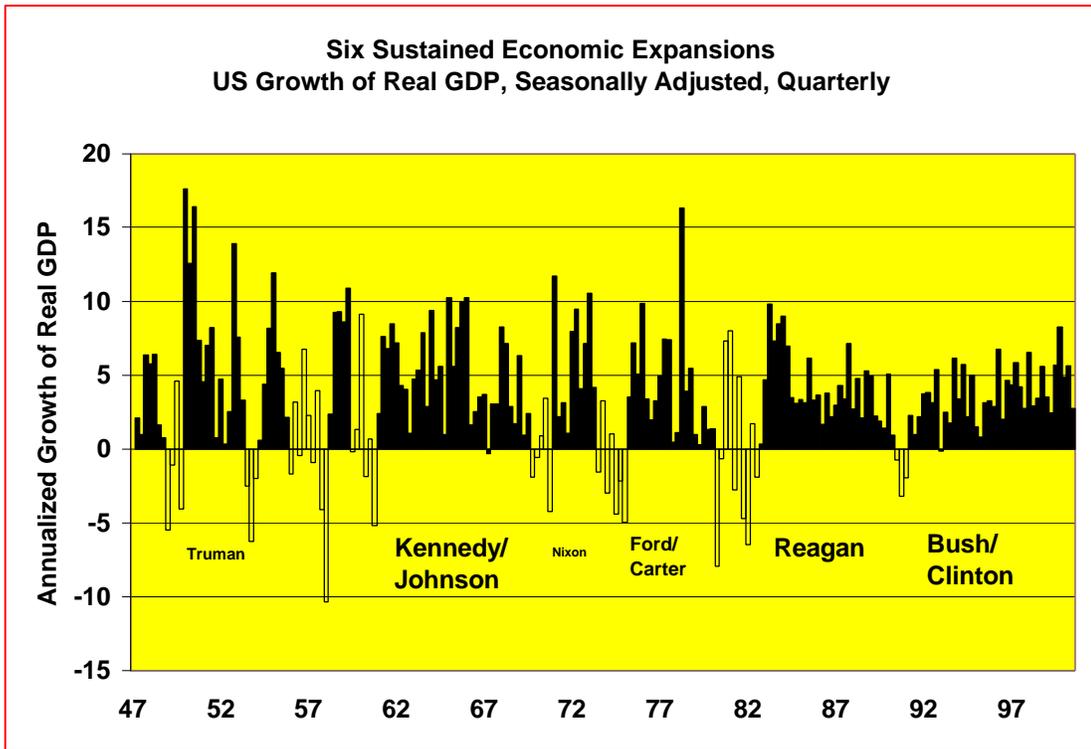
Period	President	Federal Reserve	Quarters	Mean	Std. Dev.	Total
1950:1 - 1953:2	Truman	McCabe/McMartin	14	7.6%	5.6%	28%
1961:1 - 1969:3	Kennedy/Johnson	McMartin	35	5.0%	3.0%	53%
1971:1 - 1973:2	Nixon	Burns	10	6.1%	3.7%	16%
1975:2 - 1980:1	Ford/Carter	Burns/Miller	20	4.4%	3.9%	24%
1982:4 - 1990:2	Reagan	Volcker	31	4.2%	2.4%	37%
1991:2 -	Bush/Clinton	Greenspan	38	3.7%	1.9%	41%

The 38 quarters of the Bush/Clinton expansion exceeds the 35 quarters of the Kennedy/Johnson expansion and 31 quarters of the Reagan expansion. Although the Bush/Clinton expansion is the longest, it is also the slowest, with a cumulative growth of 42%, less than the Kennedy/Johnson cumulative of 53%, and only slightly larger than the Reagan cumulative of 37%.

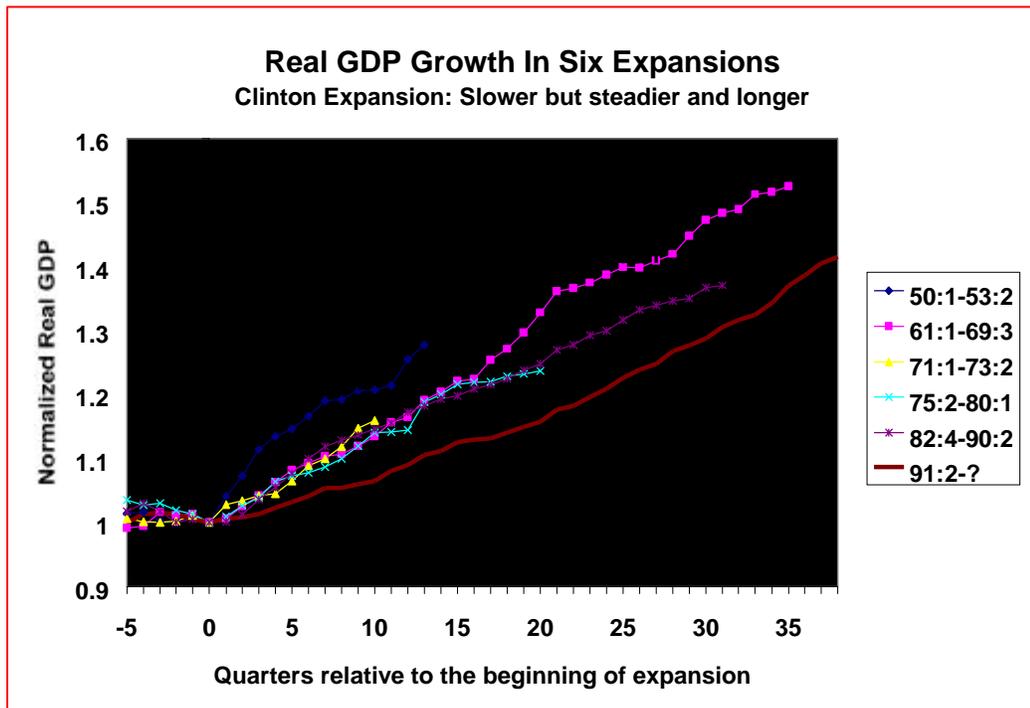
The Bush/Clinton expansion is also the smoothest, with a standard deviation of quarterly real GDP growth of 1.9% compared with the Reagan standard deviation of 2.4% and the Kennedy/Johnson standard deviation of 3%. Generally, the last fifty years have come with slower but more stable growth. Even since 1995, when the economy went into “high gear” the mean growth has been only 4.1%, lower than any of the other six expansions.

**What makes these expansions end, and what will end the Bush/Clinton expansion?**

**Figure 1**

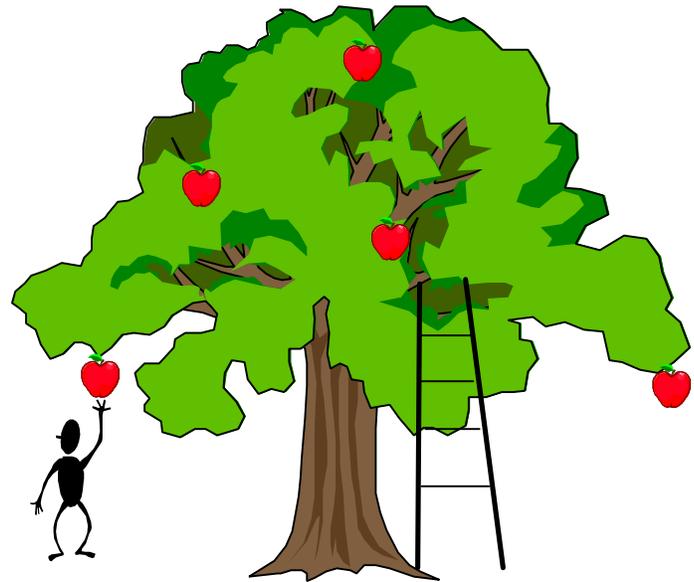


**Figure 2**



## The Simple Agronomy of the Business Cycle

During an economic downturn, the orchards of investment opportunities fill up with ripe and juicy apples. At the start of the recovery, businesses rush out to pick the low-hanging fruit. Inevitably, the opportunities get harder to find, and firms are forced to seek credit to finance the building of ladders that let them pick from the higher branches. The first businesses to turn to the credit markets find the terms very favorable, with creditors offering low interest rates and expecting little collateral. But



all this picking can increase the cost of labor and the cost of ladders. As more and more firms seek more and more credit to build ladders higher and higher, the banks and other credit sources start to worry about bankruptcies and start to insist on higher interest rates, more collateral and more clear evidence of high quality fruit on the branches. When credit gets too tight and the remaining opportunities too meager, the expansion ends, the businesses abandon the picked-over trees, leaving the orchards time to replenish themselves. And the cycle starts all over again.

The basic economic pathology that this model embodies is a lack of property rights. No one owns the orchards of opportunities. The tragedy of the commons is amplified because the fruit are more valuable when the picking is intense – investments have high rates of return when growth is great.<sup>2</sup>

### ***Labor markets tighten twice during expansions***

The tightening of the labor markets that is characteristic of an expansion is illustrated in **Figure 3**. To facilitate comparisons across expansions **Figure 4** displays these unemployment rates normalized to the level in the fifth quarter prior to the beginning of the expansion. In this figure, we see that unemployment

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<sup>2</sup> This story of the cycle has much in similarity to the more complicated offering of Zarnowitz(1999) who “ties together profits, investment, credit, stock prices, inflation and interest rates.”

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rises prior to the onset of an expansion, and it usually continues to rise even during the first quarter of an expansion. After a quarter or two of good sales, firms start to hire again and the rate of unemployment starts to drift downward. The slow growth during the beginning of the Bush/Clinton expansion was not enough to turn the unemployment rate around until sixth quarter. If unemployment were used to date the expansion, then we need to take away about 4 quarters from the Bush/Clinton expansion.

Another important feature of unemployment is that it falls rapidly to the pre-recession level and then plateaus out. The Kennedy/Johnson and the Reagan expansions had returned the unemployment levels to their pre-recession levels by about the eighth quarter, at which time unemployment flattened out. Both of these expansions got a second wind in their 17<sup>th</sup> quarter, and unemployment was driven down to 75% of its prerecession level. The Bush/Clinton expansion took longer to reach its first plateau and longer to get its second wind, which started in the 25<sup>th</sup> quarter. The unemployment rate is now right at 75% of its prerecession level. This looks like the final plateau, which will last only several quarters more if history is an accurate guide.

A better early warning signal of the path of an expansion is weekly hours per worker illustrated in **Figure 5**. Changes in hours precede changes in employment because firms have considerable flexibility to adjust hours in response to sales drops or sales increases, and only later make layoff or employment commitments. Thus hours per week drops quickly during the recession period preceding the expansion, but turns around right at the beginning of the expansion even as unemployment continues to rise. Weekly hours rise to a peak in the middle of an expansion and generally fall at the end of the expansion.

The Bush/Clinton expansion was sputtering and gasping in 1995 and 1996, a symptom of which was the precipitous drop in hours, which recovered completely during 1997. **What gave the Bush/Clinton expansion its second wind after its 20<sup>th</sup> quarter of life? The Bush/Clinton expansion is now gasping again and the hours per week is turning downward. What could possibly keep the expansion alive??**

Figure 3

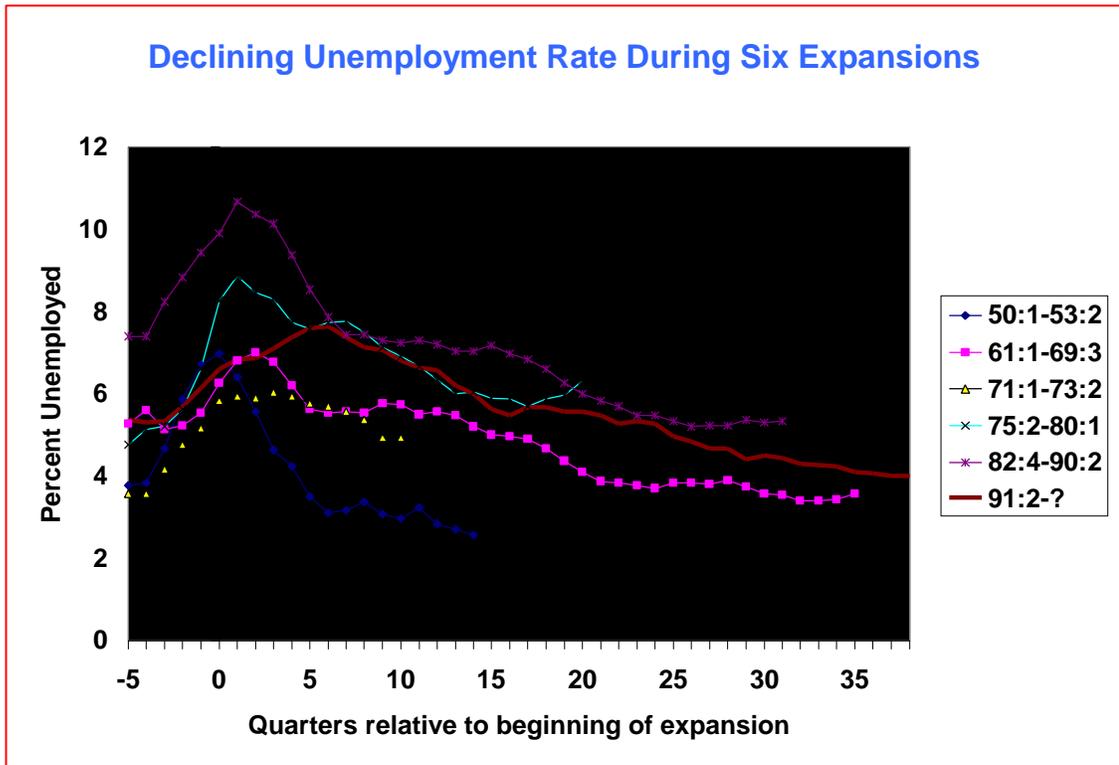


Figure 4

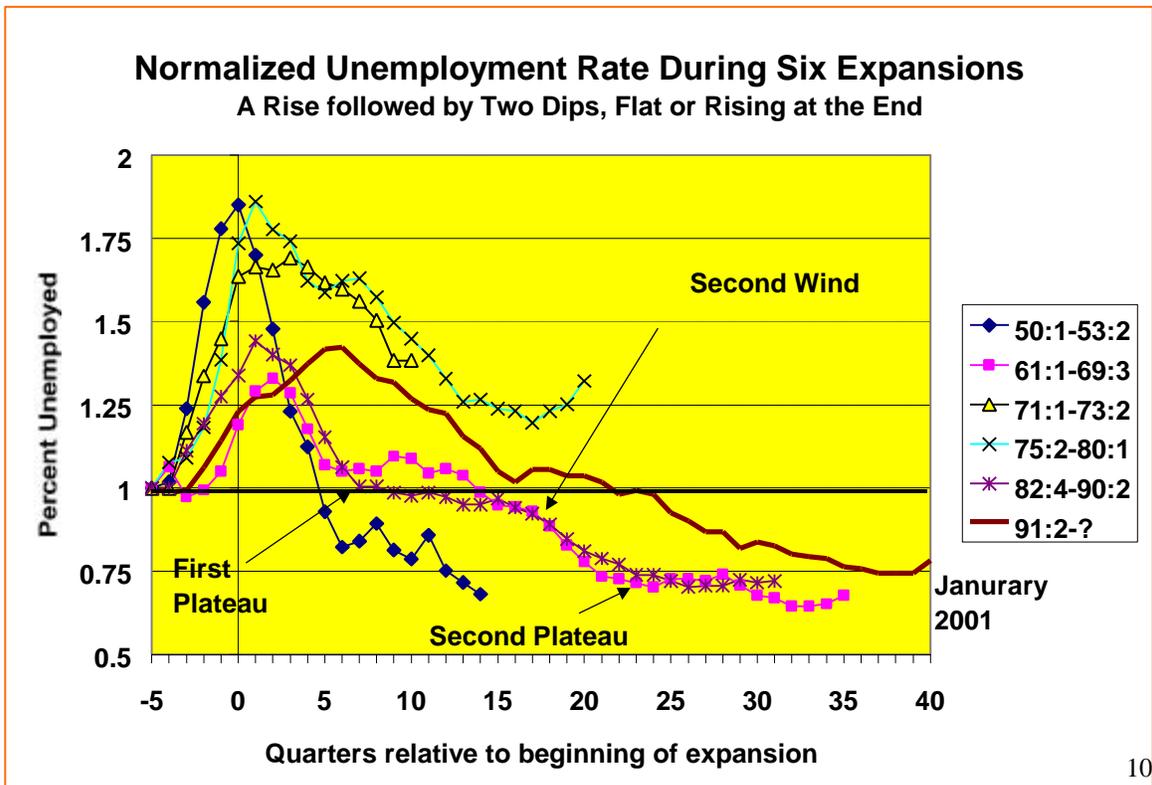
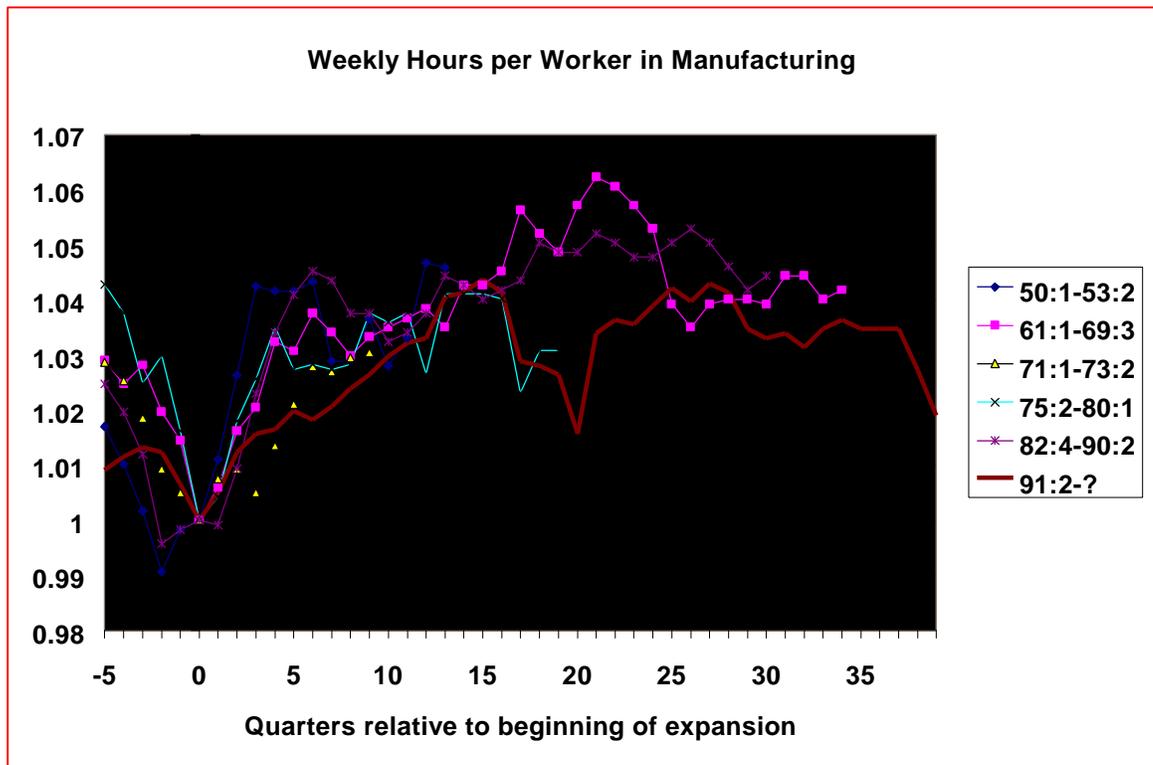


Figure 5

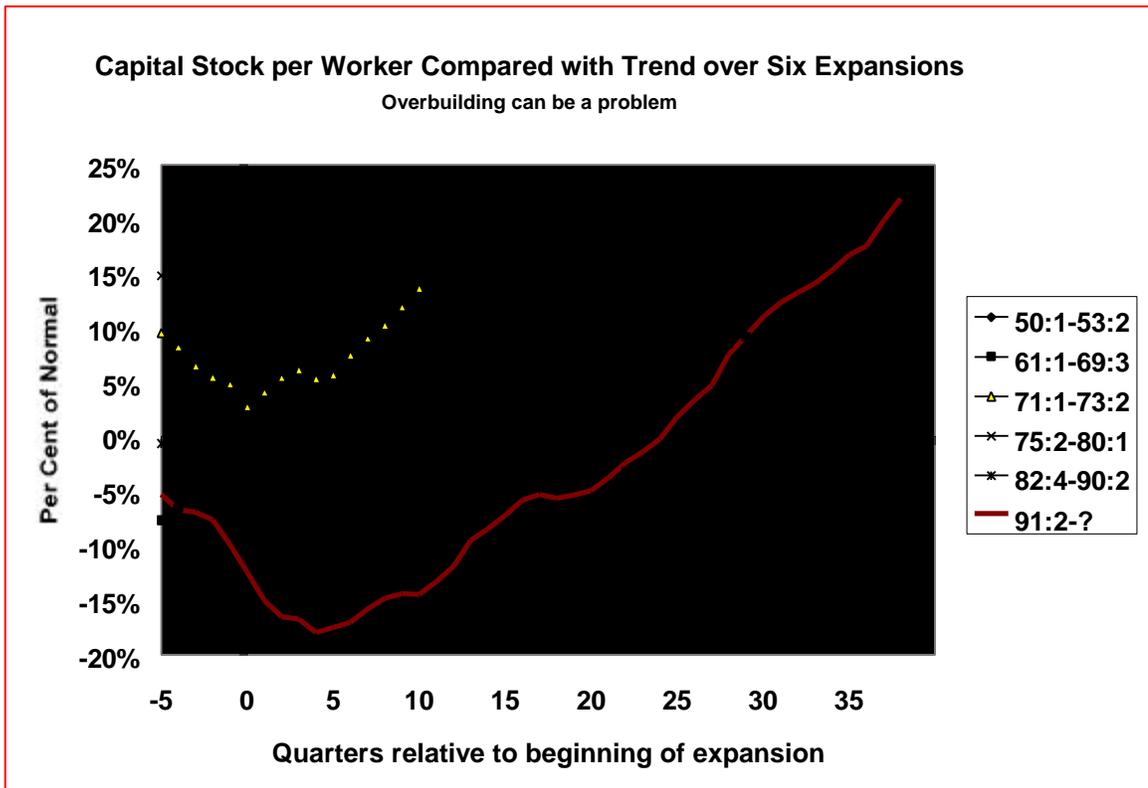


***Businesses rush out to pick the low-hanging fruit at the beginning of an expansion***

Investment is a primary driver of every expansion. Business investment opportunities are created by depreciation of old assets and by technological innovations. Relatively slow rates of investment during an economic slowdown leave many of these opportunities “on the tree”, ready for a quick harvesting when an expansion begins. **Figure 6** is one measure of the state of investment opportunities. This figure depicts the deviation from trend of the capital per worker where the capital stock is computed from mostly recent investments.<sup>3</sup>

<sup>3</sup> The capital stock is computed from the real investment series using a very high rate of depreciation of 25% per quarter:  $K(t) = .75 * K(t-1) + \text{Investment}(t)$ . The deviation from trend is found by the regression  $\log(K/\text{worker}) = a + b \text{ time}$ .

Figure 6



The message of **Figure 6** is that low rates of investment in the recession preceding an expansion generally create cyclical investment opportunities at the start of an expansion that are mostly taken off the tree in the first three years. Beyond those first three years, an expansion may create its own momentum, which can drive the capital stock above a sustainable level.

The Bush/Clinton expansion is a sequel to the Reagan expansion, which ended with very low rates of investment premised presumably on the widespread belief that the US was a mature economy with ever slowing rates of growth and very few investment opportunities. Five quarters into the Bush/Clinton expansion the capital stock bottomed out, 18% below its long-run trend. Slow but steady investment during the first 20 quarters brought the capital stock to within 5% of its long term trend. Then, late in 1995, businesses discovered the investment opportunities afforded by the Internet and the communication devices of the New Economy. Investment particularly in information technology took off in a big way. This is the most important explanation for the second wind of the Bush/Clinton expansion.

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But these high rates of investment since 1996 have driven the capital stock to 22% above trend in the third quarter of 2000. Now we are in a difficult reassessment period. If the investment opportunities afforded by the New Economy have real payoff, there is no problem with a new and higher level of capital per worker. But if, as seems to be happening, these investments are not producing the promised profits, then we are seriously overbuilt with few investment opportunities left.

The slowdown, however, has done nothing so far to stop the binge of auto factory construction. Toyota opened a factory in Princeton, Ind., last year and DaimlerChrysler is about to open one in Toledo, Ohio. Honda and Mercedes recently announced the construction of new factories in Alabama while Nissan said last month that it would erect an assembly plant in Mississippi. All of these factories will build sport utility vehicles, pickups or minivans, which will probably result in surplus production in market segments that had been the industry's most profitable.

New York Times, December 2, 2000

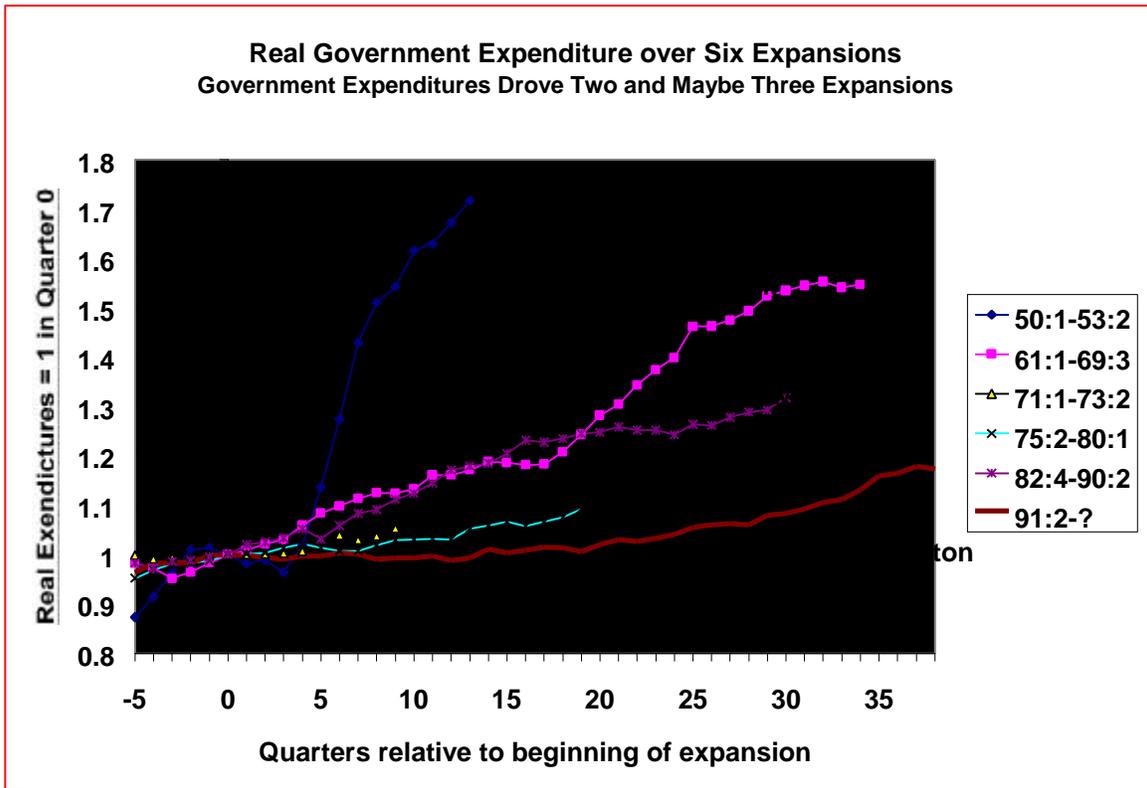
Automakers are Facing a Sales Slowdown By KEITH BRADSHER

***The Congress can keep an expansion going, or make it stop***

When the normal opportunities have been exhausted, major new government expenditure programs can reveal whole new orchards with new low hanging fruit and can drive an expansion on. Figure 7 shows that government expenditures during the Vietnam War pushed the Kennedy/Johnson expansion from potential termination after 16 quarters to a full life of 35 quarters. The end of the war was like a “No picking here” sign that terminated the expansion in its tracks. Expenditures on the Korean war were the major driver of the Truman expansion . The Reagan military buildup occurred prior to 1985, in the first 15 quarters of the expansion. Slow growth of government thereafter created drag not stimulus.

Government has not been part of the story during the Bush/Clinton expansion.

Figure 7



***The Federal Reserve Board Can Keep an Expansion going, or make it stop***

The Federal Reserve Board, which usually attempts to contribute to the start of an expansion with an infusion of credit into the system, can temporarily keep the expansion going with another injection of credit, but too much of this can encourage overpicking and can set off an inflationary spiral that can kill the whole tree.

One way of measuring credit tightness is the real interest rate depicted in **Figure 8**. Although there is no clear pattern over these expansions, the real interest rate has drifted up over the Bush/Clinton expansion to the high levels characteristic of the Reagan expansion.

Another way of measuring credit tightness is the spread between the 10 year Treasury Bond and the 3 month Treasury Bill depicted in **Figure 9**. When this spread is large, banks make substantial intermediation profits by accepting short term deposits and making long-term loans. When this spread is

small, banks have to be very careful to make loans to only the most credit-worthy borrowers. When the spread turns negative for an extended period of time, this can create serious banking problems and even Savings and Loan crisis in late 1979 and 1980.

Figure 8

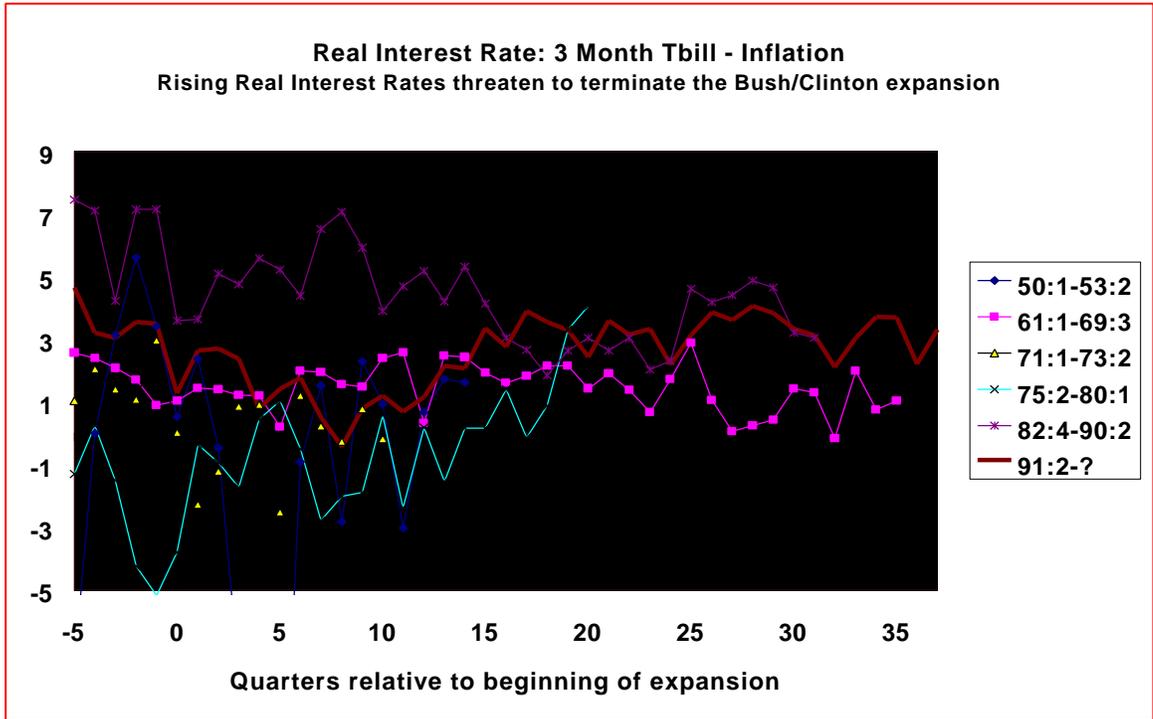
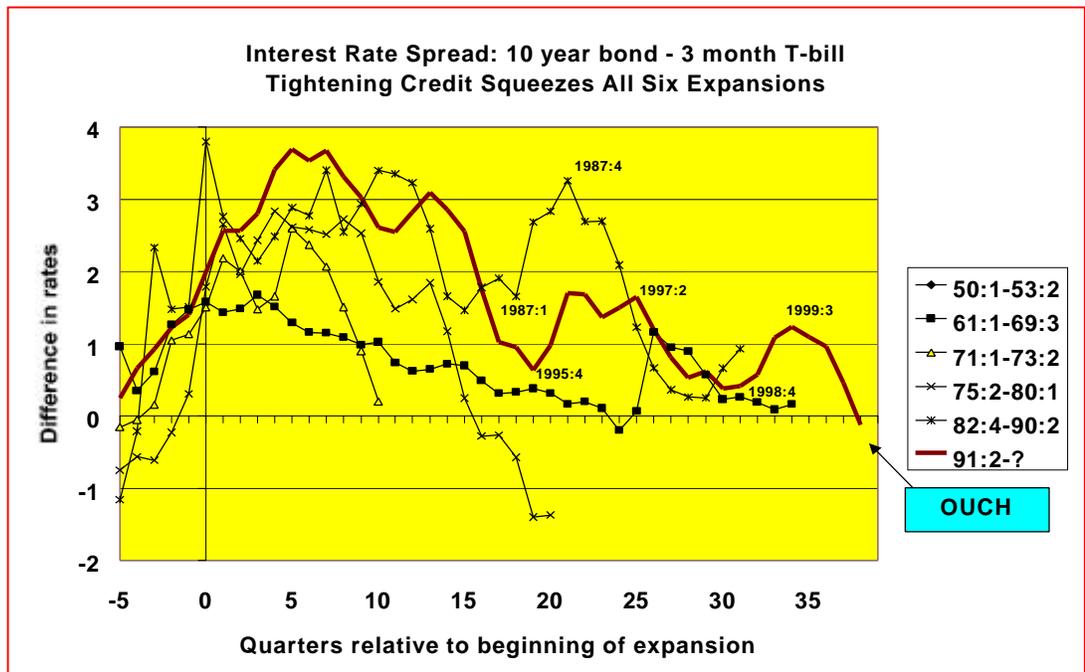


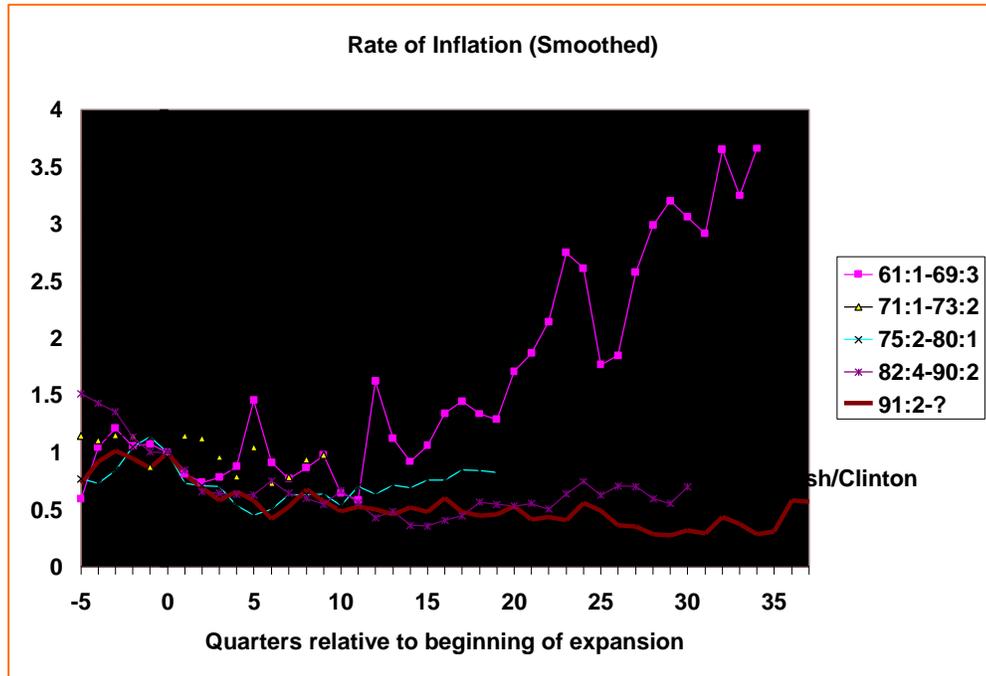
Figure 9



**Figure 9** does indeed reveal a substantial role of the Federal Reserve Board in our economic expansions. Credit tightness in the slowdown preceding an expansion is rapidly reversed with substantial injections of liquidity early in the expansion. This increases the spread between the long and short rates to 300 basis points or more after 5 quarters. Inevitably, this spread narrows and credit tightness helps to pinch off an expansion. Offsetting this general tendency toward tighter credit are occasional injections of liquidity. The Reagan expansion, which was plateauing out in 1987, was given its second wind by an injection of credit, which increased the spread to over 300 basis points in 1987 Q4. With this came a slight increase in the rate of inflation, illustrated in **Figure 10**. Here we see that inflation is tamed in the early phases of an expansion, and seems to come back a bit toward the end. But the huge burst of inflation in the later half of the Kennedy/Johnson expansion lingers in Fed memories, making them wary of expansionist monetary policies. The slight rise of inflation at the end of the Reagan expansion probably contributed to Fed caution and monetary tightening. By the time the Fed shifted direction at the end of 1989 and allowed the interest rate spread to increase, it was too little and too late, and the Reagan expansion ended in the second quarter of 1990, much to the chagrin of George Bush, who had to seek his second term as President with a troublesome recession in the background.

The Clinton expansion has been extended by two injections of liquidity, once in early 1996 and again in early 1999. But today, the spread between the long term and short term rates is negative, and banks must surely be feeling the pinch. Inflation has increased just a bit, though perhaps not enough to keep the Fed from a rescue injection of liquidity early in 2001.

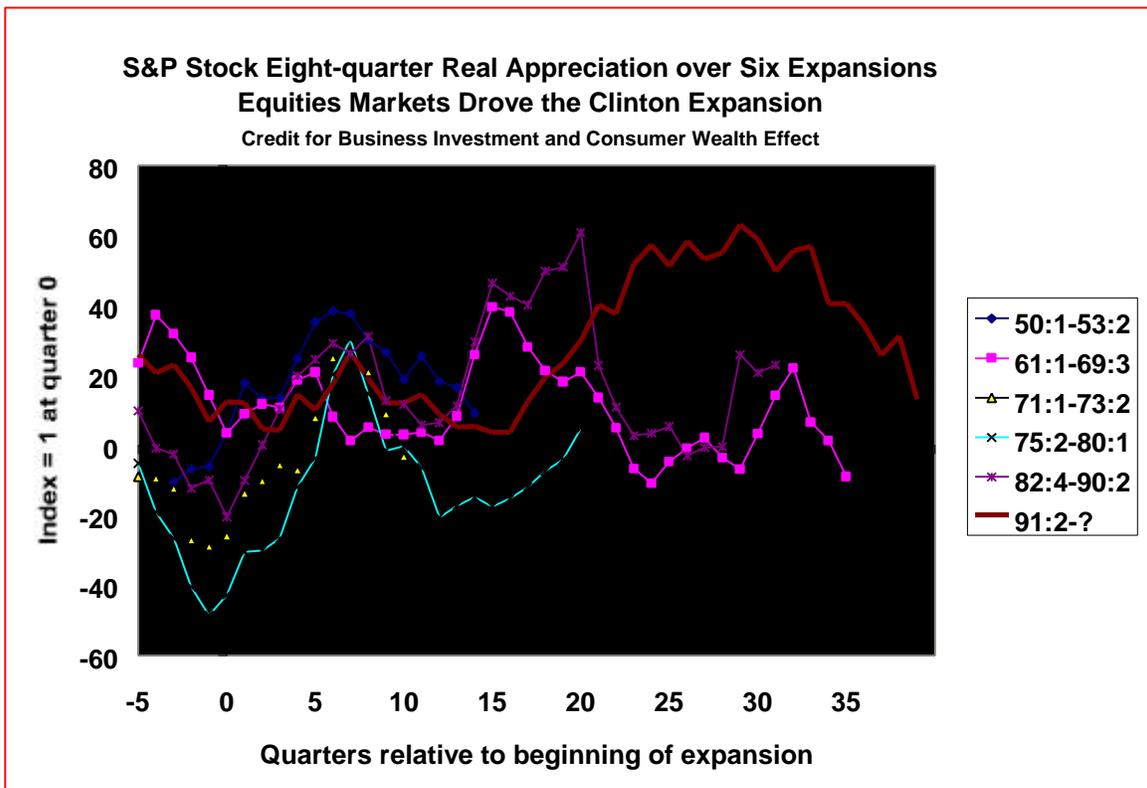
**Figure 10**



***Appreciation of equities can keep an expansion going***

A central feature of the last five years of the Bush/Clinton expansion has been the role of equities both as a source of capital to support business investments and a source of wealth to support consumer purchases of durables and nondurables. **Figure 11** is the 8-quarter appreciation of the Standard and Poors 500 stock index minus the rate of inflation. This interval of eight quarters is somewhat arbitrarily chosen to approximate the memory capacity of many investors.

Figure 11



It appears as though equity markets do well at the beginning of an expansion but not so well at the 10-15 quarter mark when, absent some new stimulus, the expansion might end. At this 15 quarter mark, both the Kennedy/Johnson and the Reagan expansions received help from the equities markets which delivered rates of appreciation considerably better than earlier. The Bush/Clinton equity appreciation occurred about 5 quarters later and was sustained at high levels for a much longer period of time.

The extraordinary behavior of equity markets from quarters 20 to 30 of the Bush/Clinton expansion suspended the normal rules for harvesting investment opportunities. It didn't much matter where the fruit was hanging, as employees, venture capitalists and equity investors scrambled headlong to pull the fruit off the tree and sell the harvest to the equity markets at incredible prices. Too bad the Internet fruit turned out pulpy and juiceless. The much-heralded first mover advantage applied not at all to Internet presence but only to access to the capital markets. Those who waited to 2001 for their IPOs will never be Dot-com millionaires.

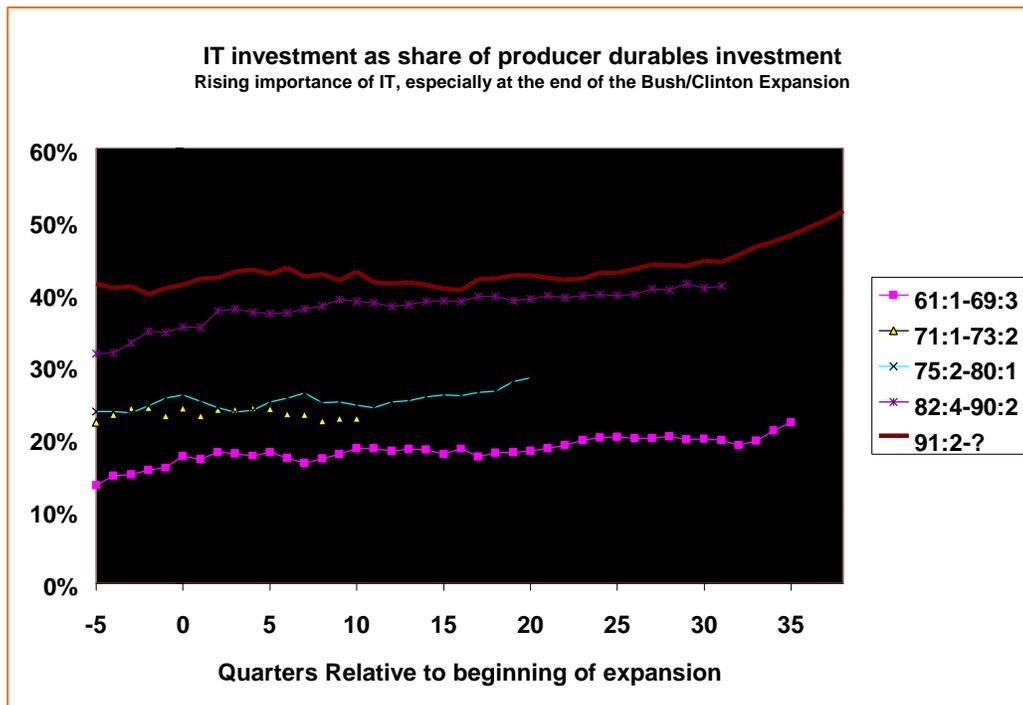
The direction of the equities markets at quarter 39 of the Bush/Clinton expansion is decidedly down, and we cannot expect help from the equities markets to sustain this expansion. Indeed it is unlikely that in our lifetime we will ever experience an equities market that is as strong as the last five years of the Bush/Clinton expansion.

### **American inventors can keep an expansion going**

Bursts of technology can also reveal whole new orchards of business investment opportunities with new low hanging fruit. The electric motor and internal combustion engine, with all of their many applications, drove the expansion of the 1920s, as did the Internet in the 1990s. Inevitably, newly discovered orchards are picked clean too, and the expansion has to terminate for the same reasons.

The Bush/Clinton expansion has been a major beneficiary of the Internet and wireless communication, which have created myriad new investment opportunities starting in 1995. While investment was rising to historically unprecedented levels in the last half of the 1990s, the share of computers and information technology in producer durables also rose from 40% in 1995 to over 50% in 2000. This was the Internet Expansion.

**Figure 12**



The Internet apples looked red and plump, but unfortunately no one thought to taste them. In the year 2000, the investor community started to make some serious taste tests, and found most of the apples artificial, pulpy and disagreeable, and highly unlikely to pay back the cost of all those ladders and pickers. While the Internet has already proven itself to be an extraordinary innovation for the delivery of data and information, there still is no business model for making money on the Internet. On the contrary, the very efficiency of the information delivery system paradoxically destroys the incentive to create information, by allowing virtually costless sharing. Who will create the music for Napster to distribute?

## **The good news and the bad news.**

The golden lining of this news is that Americans didn't really see all the Internet opportunities, and they allowed foreigners, especially Europeans, to pay for most of the ladders. Had we financed the Internet boom with bonds issued by viable American companies, we would be deeply in debt to Europe today, but we wisely issued them worthless equities, and these Europeans will never get their money back since the first attempt at wholesale cashing in will bring a double deterioration in their value: a crash in their valuation denominated in dollars, and a crash in the value of the dollar.

On the other hand, we made a mistake by imagining that a sucker is born every second and to suppose that the appreciation of our own equities that has been driven by European investment would go on forever. Based on that optimistic view, we have gone on a consumption binge. It would have been better in the long run to trade our worthless dot.com equities for equities and bonds issued by real European companies. But instead of buying Daimler-Benz, we bought Mercedes SUVs.

Thus the bad news is that we may have to adjust painfully to a new lifestyle that is no longer being paid for by issuing worthless paper to unsuspecting Europeans. This adjustment could require a relatively long and deep recession.

Figure 13

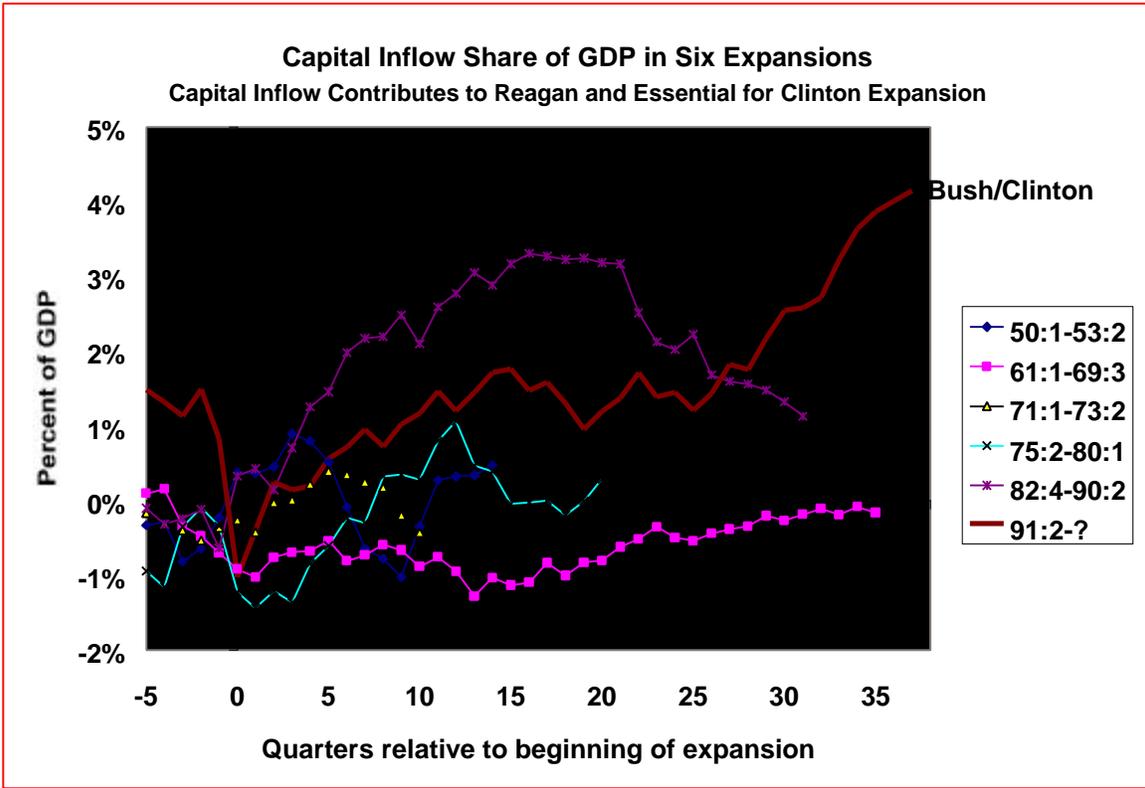
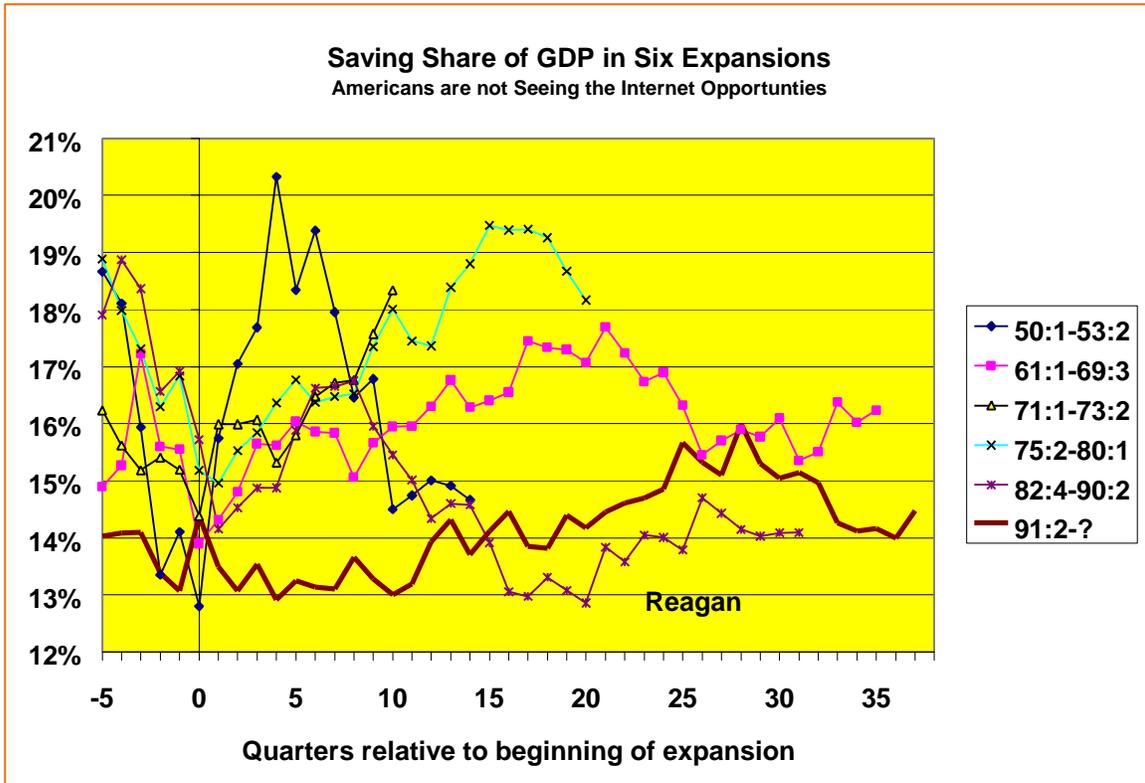


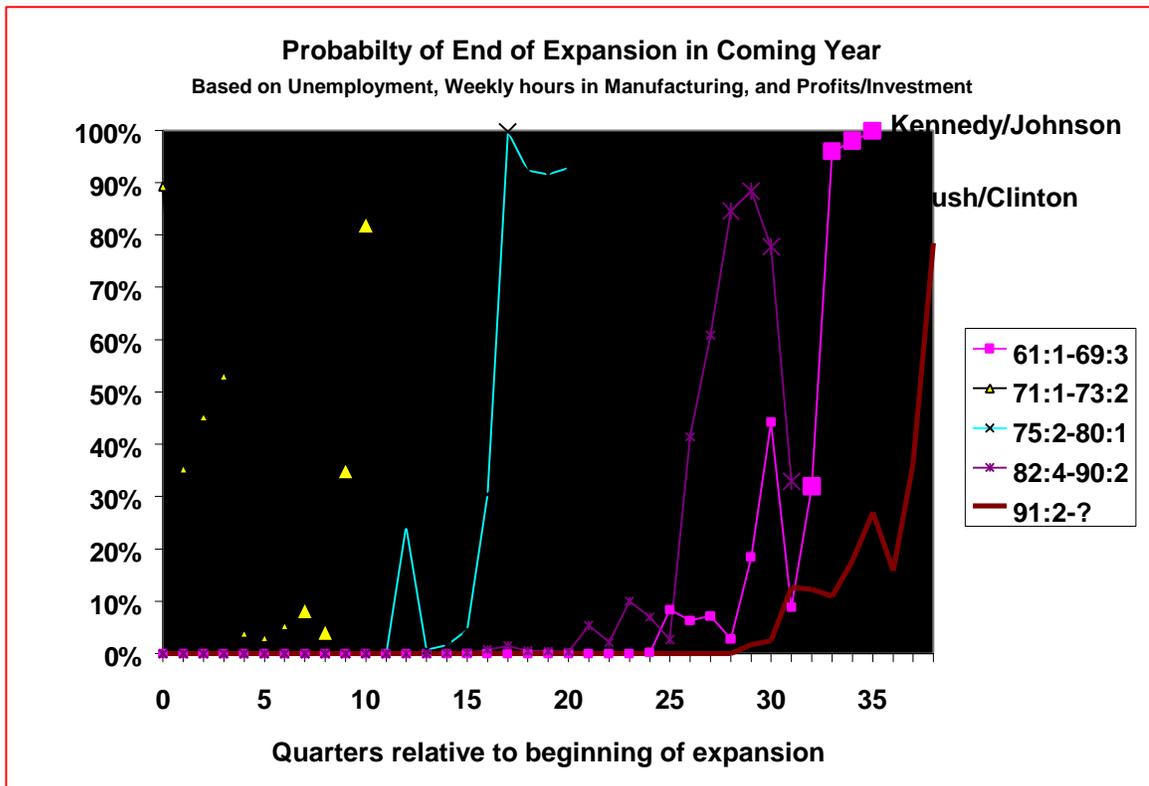
Figure 14



## It is easy to predict that an expansion will end, but it is much more difficult to predict when.

While the evidence about the limited lives of business expansions is considerably less than the evidence regarding the finiteness of human life (there are more human trials), still there has only been only one US business expansion that hasn't died ☺. Although some suggest that this expansion will live virtually forever, I seriously doubt it. **Figure 15** illustrates an estimated probability of the end of an expansion in the next year based on three key variables: the unemployment rate, corporate profits relative to investment, and weekly hours in manufacturing. An expansion ends when unemployment is low, when profits are low compared with investment rates, and hours are short. The formal econometric estimates are reported in Appendix 1.

**Figure 15**

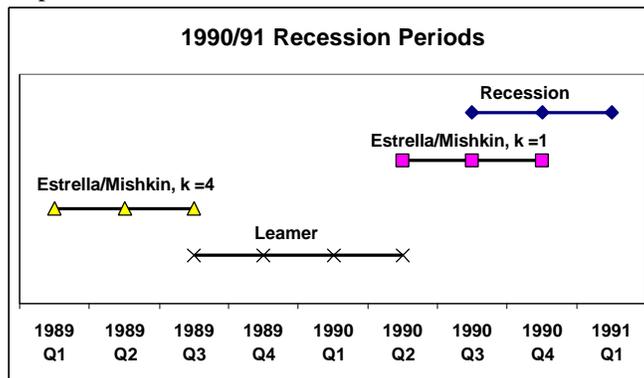


Leamer on Expansions

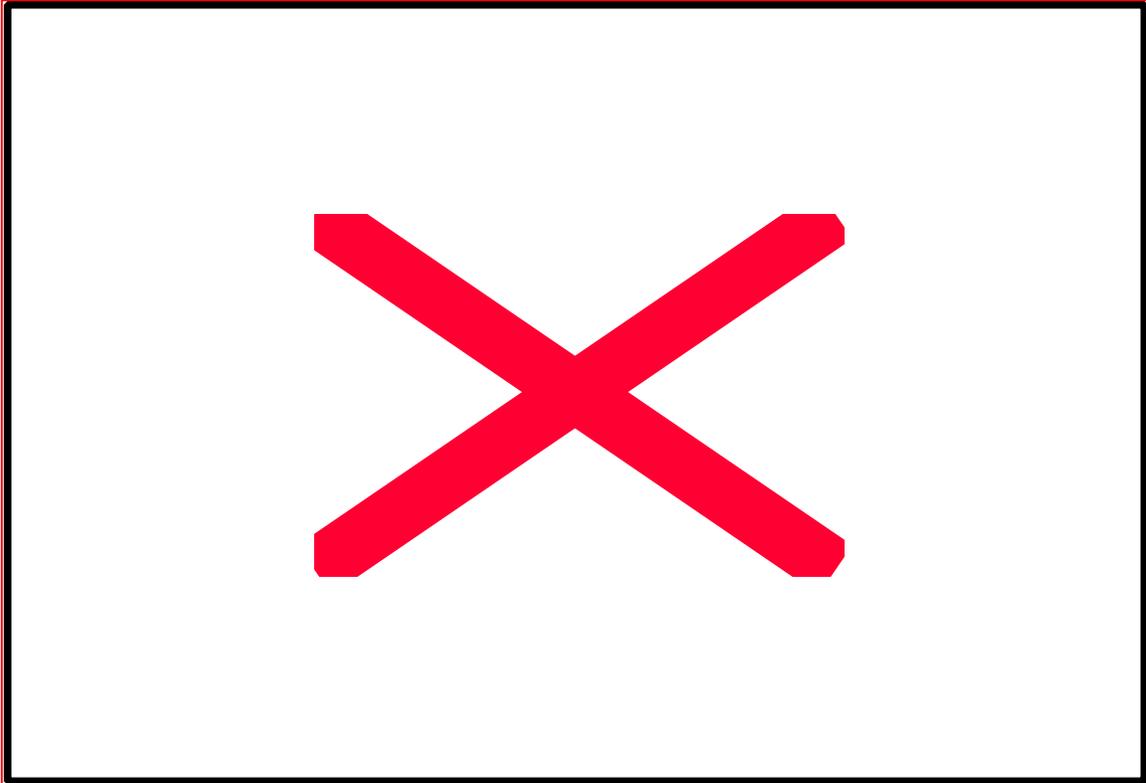
Without resorting to econometric jargon, suffice it to say that, with the assistance of a computer, I have searched for variables that help to distinguish the final four quarters from the other quarters of the last four expansions. In **Figure 15**, I use enlarged markers to identify the four quarters at the end of each expansion. Note how well we are picking up the end of four of the expansions. The only serious error in this index is the identification of the early part of the Nixon expansion as a problem period.

The probability of the end of an expansion in **Figure 15** should be contrasted with the index of leading indicators in **Figure 16**. The index of leading indicators is not doing a very good job identifying the end of the four expansions, except the Ford/Carter expansion in 1980. The reason for this is that the index of leading indicators is constructed to predict growth but not to pick up the turning points. It accordingly inadequately emphasizes the conditions that are present at the ends of the expansions.<sup>4</sup>

<sup>4</sup> Estrella and Mishkin(1989) also use a probit model to predict recessions but their model asks the question: “Are conditions present today which would make one think that the economy will be in recession in k quarters?” My question is: “Are conditions present today which would make one think that a recession will begin within the next four quarters?” Here is a graph that contrasts the periods that I identify with the Estrella/Mishkin periods:



**Figure 16**



The last three probabilities of the Bush/Clinton expansion in Figure 15 are out-of-sample predictions in the sense that we do not yet know if the expansion will technically end as early as the fourth quarter of 2000. These predicted probabilities are elevating rapidly, and exceeding 70% in the 3<sup>rd</sup> quarter of 2000. In other words, the model is suggesting a 70% chance of the end of the expansion in the last quarter of 2000 or the first three quarters of 2001.

The reader should be alert to an important technical problem with this kind of econometric analysis. The extensive data mining that lies behind the estimated model can create the illusion of accuracy, since the historical data may be well tracked, but when the model is used to forecast, the results can be disappointing. This data mining may cause us to overestimate the probability of the end of the Bush/Clinton expansion. But there is also a reason why the probability might be underestimated. The equities markets are not part of the model since they seem not to have played a demonstrable role in ending

the other expansions. Indeed the model suggests a rising risk of termination of the Bush/Clinton expansion in 1997 and 1998 which was no doubt completely overwhelmed by the affect of appreciating equities. The collapse of equities in the last six months seems surely to have increased the probability of the end of this expansion beyond the level suggested by the unemployment, profits and interest rate data. Thus there are two forces operating in opposite direction: data mining that creates an overestimated probability of recession, and uniqueness of the Bush/Clinton expansion, which may lead us to underestimate the probability. I informally mix this together with knowledge of what is happening in the fourth quarter of 2000, and make the judgement call that the probability is 60% of the end of the Bush/Clinton expansion, sometime in 2001.

What kind of downturn is most likely? I have estimated a small econometric model that explains unemployment, inflation, growth, weekly hours in manufacturing, interest rate on 3-month Treasury Bills, interest rate on 10-year Treasury bonds.<sup>5</sup> Equity appreciation has a direct positive effect on growth, and the capital inflow has a direct negative effect on inflation. Assuming a capital market adjustment and external rebalancing as depicted in **Figure 17**, we can expect a slowdown such as the one depicted in **Figure 18** which has slight negative growth of GDP in the first, second and third quarters of 2001. The numbers themselves are reported in **Table 2**. The recession is mild and growth bounces back strongly in 2002 because of the underlying productivity gains and investment opportunities that have been powering growth since 1995. In other words, the New Economy offers a higher sustainable real rate of growth, but not the end of cycles.

With this slower growth in 2001 will come a sharp rise in unemployment, which the Fed will want to fight aggressively with reductions in interest rates. But a weakening value of the dollar will bring higher prices for imports and a higher core level of inflation. Nonetheless, the Fed will be forced to act with sharply lower interest rates late in 2001.

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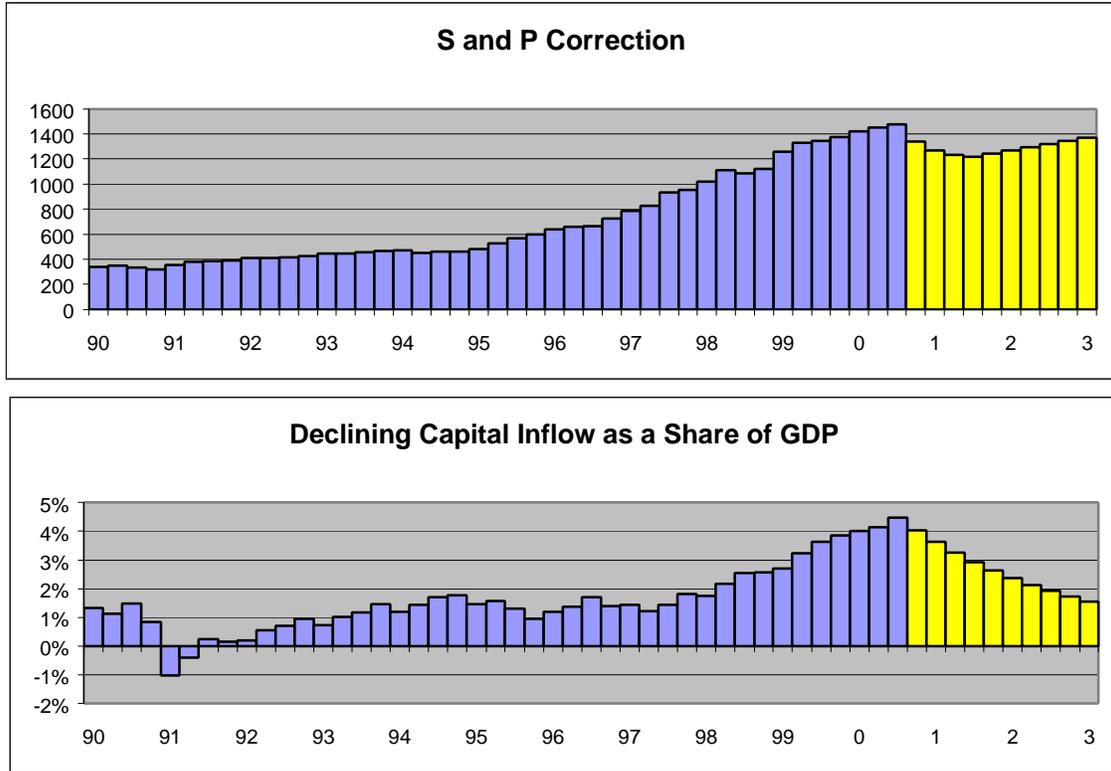
<sup>5</sup> See Appendix 2 for the equations used to generate these forecasts.

**Table 2**  
Drivers and Forecasts

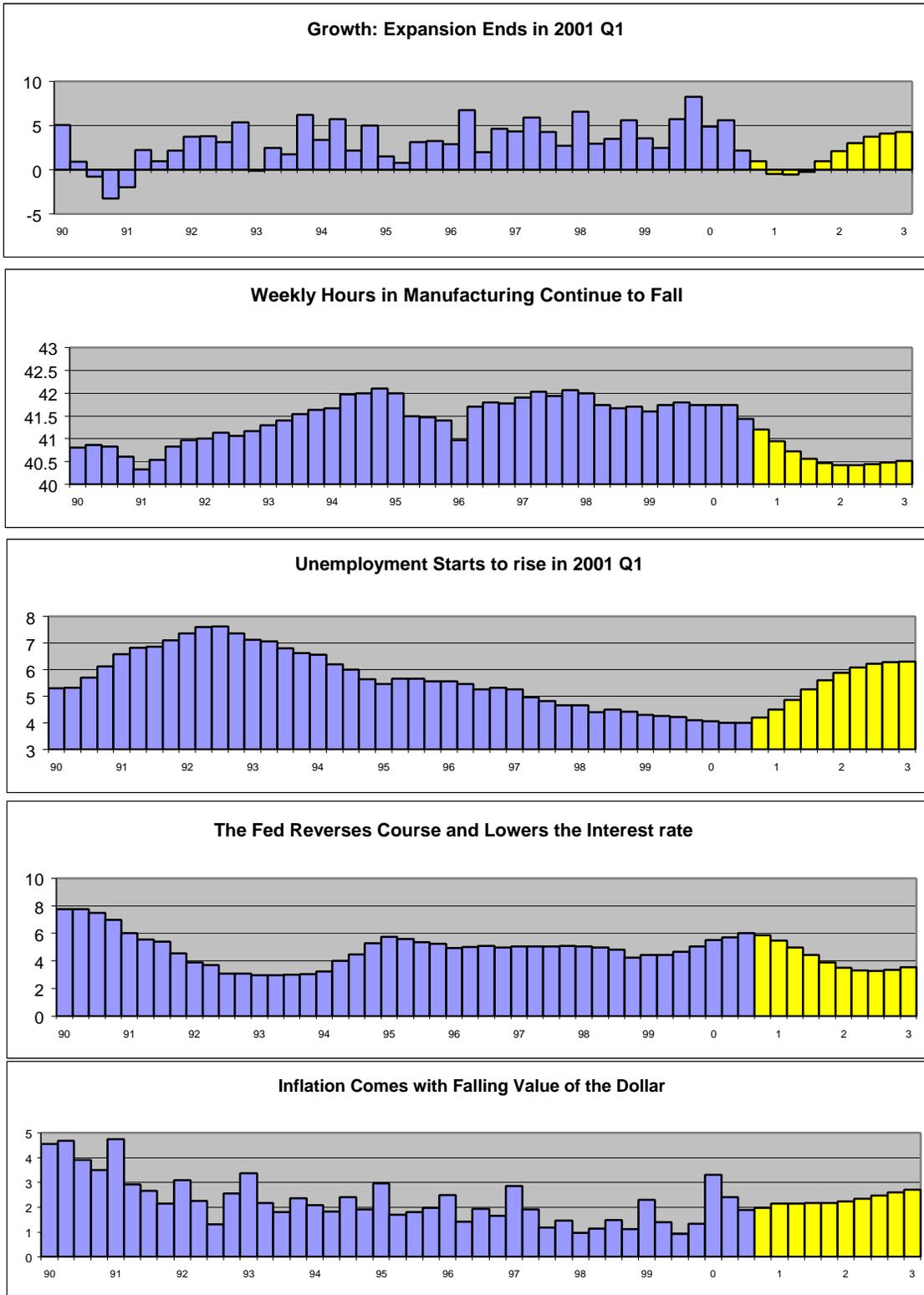
Year	Drivers		Forecasts					
	S&P	Inflow/GDP	Growth	Unempl.	Hours	Rate 3M	Rate 10Y	Inflation
2000	1,419	4.0%	4.9	4.1	41.7	5.5	6.5	3.3
	1,447	4.1%	5.6	4.0	41.7	5.7	6.2	2.4
	1,476	4.5%	2.2	4.0	41.4	6.0	5.9	1.9
	1,338	4.0%	0.9	4.2	41.2	5.9	5.8	2.0
2001	1,269	3.6%	-0.5	4.5	40.9	5.5	5.8	2.2
	1,234	3.3%	-0.5	4.9	40.7	5.0	5.6	2.1
	1,217	2.9%	-0.25	5.3	40.6	4.4	5.5	2.2
	1,242	2.6%	1.0	5.6	40.5	3.9	5.3	2.2
2002	1,266	2.4%	2.1	5.9	40.4	3.5	5.1	2.2
	1,292	2.1%	3.0	6.1	40.4	3.3	4.9	2.3
	1,318	1.9%	3.7	6.2	40.4	3.3	4.8	2.5
	1,344	1.7%	4.1	6.3	40.5	3.3	4.8	2.6

**Figure 17**

**Hypothetical Drivers: Stock Market Correction and External Rebalancing**



**Figure 18**  
**Forecasts Driven by Stock Market Correction and External Rebalancing**



**References**

- Estrella, Arturo and Frederic S. Mishkin (1998), “Predicting U.S. Recessions: Financial Variables as Leading Indicators,” *Review of Economics and Statistics*, Vol. LXXX, Number 1, February, 45-61.
- Gordon, Robert J.(2000), “Does the ‘New Economy’ Measure up to the Great Inventions of the Past?”, NBER Working Paper 7833, August.
- Hamilton, James D. and Dong Heon Kim,(2000)” A Re-examination of the Predictability of Economic Activity Using the Yield Spread,” NBER Working Paper 7954.
- Stock, James and Mark Watson, (1989) “New Indexes of Coincident and Leading Indicators,” in Olivier Blanchard and Stanley Fischer (eds.) NBER Macroeconomic Annual 4, 351-394.
- Zarnowitz, Victor (1999), “Theory and History Behind Business Cycles: Are the 1990s the Onset of a Golden Age,” NBER Working Paper 7010, March.

**Presidents and Fed Chairmen**

Presidents of the United States	Start Year
Harry S Truman	1945
Dwight David Eisenhower	1953
John Fitzgerald Kennedy	1961
Lyndon Baines Johnson	1963
Richard Milhous Nixon	1969
Gerald Rudolph Ford	1974
James Earl Carter	1977
Ronald Wilson Reagan	1981
George Herbert Walker Bush	1989
William Jefferson Clinton	1993
George W. Bush	2001

Chairmen of the Federal Reserve	Start Date
Thomas B. McCabe	Apr. 15, 1948
Wm. McC. Martin, Jr.	Apr. 2, 1951
Arthur F. Burns	Feb. 1, 1970
G. William Miller	Mar. 8, 1978
Paul A. Volcker	Aug. 6, 1979
Alan Greenspan	Aug. 11, 1987

APPENDIX 1: Equation for predicting the end of expansions

Dependent Variable: END4

Method: ML - Binary Probit

Date: 01/02/01 Time: 11:00

Sample(adjusted): 1961:1 1999:4 IF EXPANS\_QUARTER>0

Included observations: 131 after adjusting endpoints

Convergence achieved after 9 iterations

Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	175.9571	44.50204	3.953911	0.0001
U	-3.247905	0.844709	-3.844998	0.0001
PROFITS/INVEST	-32.94568	8.317271	-3.961116	0.0001
HOURS_WEEKLY	-3.502725	0.909495	-3.851286	0.0001
Mean dependent var	0.122137	S.D. dependent var	0.328701	
S.E. of regression	0.197855	Akaike info criterion	0.313630	
Sum squared resid	4.971612	Schwarz criterion	0.401423	
Log likelihood	-16.54280	Hannan-Quinn criter.	0.349304	
Restr. log likelihood	-48.62224	Avg. log likelihood	-0.126281	
LR statistic (3 df)	64.15888	McFadden R-squared	0.659769	
Probability(LR stat)	7.59E-14			
Obs with Dep=0	115	Total obs	131	
Obs with Dep=1	16			

Note: END4 is an 0-1 indicator selecting the last four quarters of each expansion.  
No adjustment has been made for the intertemporal dependence of this indicator

**Simple association during expansions: before the end and at the end**

	U	PROFITS/INVEST	HOURS_WEEKLY	SPREAD
Average but end	6.05	0.56	40.82	1.70
END 4 effect	-1.22	-0.04	-0.25	-1.45
t-value	-3.25	-1.52	-1.48	-5.50

APPENDIX 2

This appendix has six equations that describe a recursive model in which firms first make employment commitments (unemployment), then set prices (inflation). Then sales occur (GDP growth) and firms respond by varying hours. The Fed reacts and influences the short-term interest rates. Last the bond markets respond and determine the 10-year bond rate.

**Variable Names**

Eq Order	Variable	Mnemonic
1	Unemployment Rate	U
2	Inflation Rate	INFLATION
3	Annualized Growth of Real GDP	G
4	Weekly Hours per Worker in Manufacturing	HOURS_WEEKLY
5	Rate of Interest, 3 Month Treasury Bills	RATE_3M
6	Rate of Interest, 10 Year Treasury Bonds	RATE_10Y
Calc	Rate_10Y - Rate_3m	SPREAD
Calc	Rate_3m - Inflation	RATE_REAL
Driver	Annual Appreciation S&P 500	S_AND_P/S_AND_P(-4)
Driver	-Current Account / GDP	INFLOWP

**Summary Statistics**

Mnemonic	Std.				2000:3		1999:3		d(Z)
	Mean	Max	Min	Dev.	Value	Z	Value	Z	
U	5.82	10.67	2.57	1.51	4.00	-1.20	4.23	-1.05	-0.15
INFLATION	3.72	12.52	0.05	2.58	1.90	-0.70	0.92	-1.08	0.38
G	3.41	16.32	-10.34	3.96	2.20	-0.30	5.69	0.58	-0.88
HOURS_WEEKLY	40.55	42.10	38.70	0.75	41.43	1.18	41.80	1.66	-0.49
RATE_3M	5.45	15.05	0.79	2.77	6.02	0.20	4.65	-0.29	0.49
RATE_10Y	6.75	14.85	2.35	2.76	5.89	-0.31	5.88	-0.32	0.00
SPREAD	1.30	3.80	-1.43	1.12	-0.12	-1.28	1.23	-0.06	-1.21
RATE_REAL	1.73	7.45	-5.16	2.23	4.02	1.03	3.73	0.90	0.13
S_AND_P/S_AND_P(-4)	1.10	1.45	0.68	0.15	1.10	0.00	1.24	0.94	-0.94
INFLOWP	0.00	0.04	-0.01	0.01	0.04	3.01	0.04	2.39	0.63

Data Set                    190 Observations  
 1953:2 - 2000:3  
 Interval limited by data availability on 10y US Bonds

Notes                        Z is (value-mean)/Std.Dev.

Leamer on Expansions

Equation 1				
Employment Commitments: Change in Rate of Unemployment (Layoffs)				
Dependent Variable: D(U)				
Method: Least Squares				
Date: 12/26/00 Time: 09:19				
Sample(adjusted): 1953:2 2000:3				
Included observations: 190 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.80	1.70	3.41	0.0008
U(-1)	-0.09	0.02	-4.60	0
D(U(-1))	0.26	0.09	2.96	0.0035
G(-1)	-0.02	0.01	-2.37	0.019
G(-2)	-0.01	0.01	-1.09	0.2781
D(HOURS_WEEKLY(-1))	-0.25	0.11	-2.35	0.02
HOURS_WEEKLY(-1)	-0.13	0.04	-3.20	0.0016
TIME>1970	0.17	0.06	2.87	0.0046
R-squared	0.54	Mean dependent var	0.01	
Adjusted R-squared	0.52	S.D. dependent var	0.38	
S.E. of regression	0.27	Akaike info criterion	0.24	
Sum squared resid	12.95	Schwarz criterion	0.37	
Log likelihood	-14.44	F-statistic	30.11	
Durbin-Watson stat	1.87	Prob(F-statistic)	0	
Layoffs occur when unemployment is low and rising, when growth is weak, and when weekly hours in manufacturing have been falling. There is a statistically significant increase in the unemployment rate by 0.17 after 1970.				

Leamer on Expansions

Equation 2				
Price Setting: Inflation (Annualized rate of change of GDPdeflator)				
Dependent Variable: INFLATION				
Method: Least Squares				
Date: 12/26/00 Time: 19:21				
Sample(adjusted): 1982:2 2000:3				
Included observations: 74 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.42	0.33	1.30	0.198
INFLATION(-1)	0.45	0.12	3.89	0.000
INFLATION(-2)	0.29	0.11	2.74	0.008
G(-1)	0.07	0.04	1.96	0.054
D(INFLOWP(-1))	-47.85	24.51	-1.95	0.055
R-squared	0.55	Mean dependent var		2.75
Adjusted R-squared	0.53	S.D. dependent var		1.11
S.E. of regression	0.76	Akaike info criterion		2.36
Sum squared resid	40.22	Schwarz criterion		2.52
Log likelihood	-82.45	F-statistic		21.33
Durbin-Watson stat	2.10	Prob(F-statistic)		0.00
Inflation since 1982 has been tame, averaging 2.75%, but persistent. Aggressive price setting occurs when sales have been strong. Price increases are small when there is a strong dollar and competition with external sources of supply.				

Leamer on Expansions

Equation 3				
Sales Growth: Annualized Rate of Growth of Real GDP				
Dependent Variable: G				
Method: Least Squares				
Date: 12/26/00 Time: 08:15				
Sample(adjusted): 1953:3 2000:3				
Included observations: 189 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.38	2.41	-3.47	0.001
U(-1)	0.49	0.23	2.16	0.032
D(U(-1))	-2.95	0.73	-4.04	0.000
SPREAD(-1)	1.58	0.48	3.30	0.001
SPREAD(-1)^2	-0.46	0.17	-2.69	0.008
RATE_REAL(-1)	-0.30	0.12	-2.58	0.011
S_AND_P(-1)/S_AND_P(-4)	8.16	2.25	3.62	0.000
R-squared	0.29	Mean dependent var	3.41	
Adjusted R-squared	0.27	S.D. dependent var	3.97	
S.E. of regression	3.40	Akaike info criterion	5.32	
Sum squared resid	2099	Schwarz criterion	5.44	
Log likelihood	-496	F-statistic	12.59	
Durbin-Watson stat	1.88	Prob(F-statistic)	0	
Growth is high when unemployment has been high and falling, when the spread between the long and short-term interest rates has been high, when the real rate of interest has been low and when the stock market has been appreciating.				

Leamer on Expansions

Equation 4				
Intensity of Work: Average Weekly Hours in Manufacturing				
Dependent Variable: HOURS_WEEKLY				
Method: Least Squares				
Date: 12/26/00 Time: 08:16				
Sample(adjusted): 1953:3 2000:3				
Included observations: 189 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.04	0.78	3.89	0.000
HOURS_WEEKLY(-1)	0.79	0.07	10.99	0.000
HOURS_WEEKLY(-2)	0.13	0.07	1.87	0.063
D(U)	-0.22	0.06	-3.67	0.000
G	0.02	0.01	2.78	0.006
D(G)	0.02	0.01	2.87	0.005
D(D(G))	-0.01	0.00	-3.77	0.000
SPREAD(-1)	0.04	0.01	2.95	0.004
R-squared	0.95	Mean dependent var	40.55	
Adjusted R-squared	0.95	S.D. dependent var	0.75	
S.E. of regression	0.18	Akaike info criterion	-0.60	
Sum squared resid	5.60	Schwarz criterion	-0.46	
Log likelihood	64.39	F-statistic	464.97	
Durbin-Watson stat	2.01	Prob(F-statistic)	0	
Weekly hours in manufacturing is very persistent. Hours fall when unemployment is rising, and when growth is slow or slowing. Hours fall(rise) at the peak(trough) when growth is leveling off. Weekly hours are high when the interest spread is large and encouraging growth.				

Leamer on Expansions

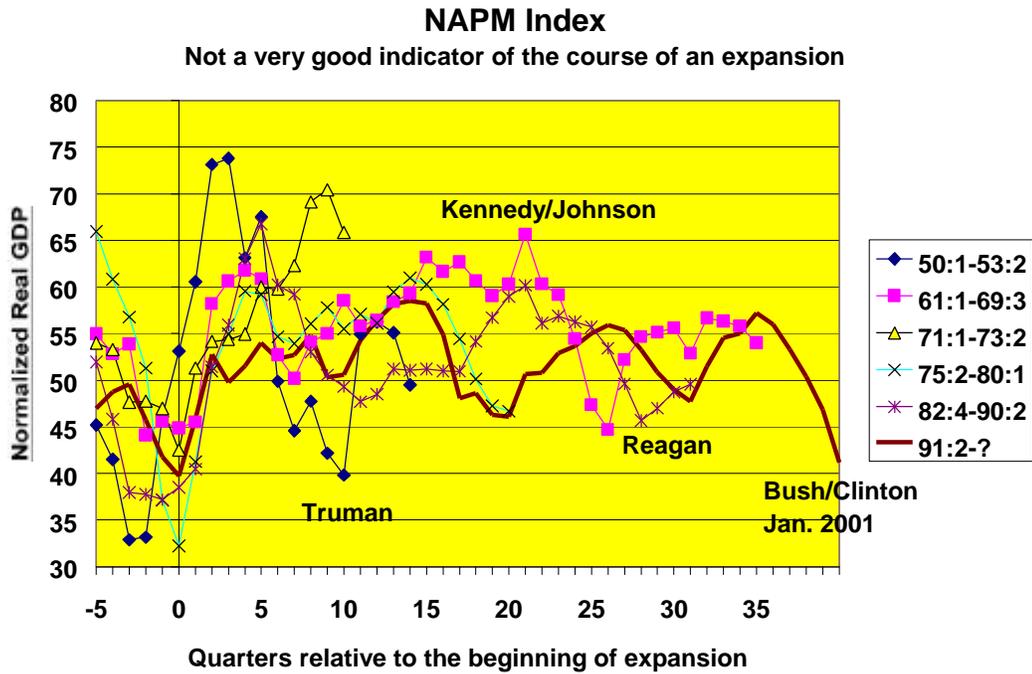
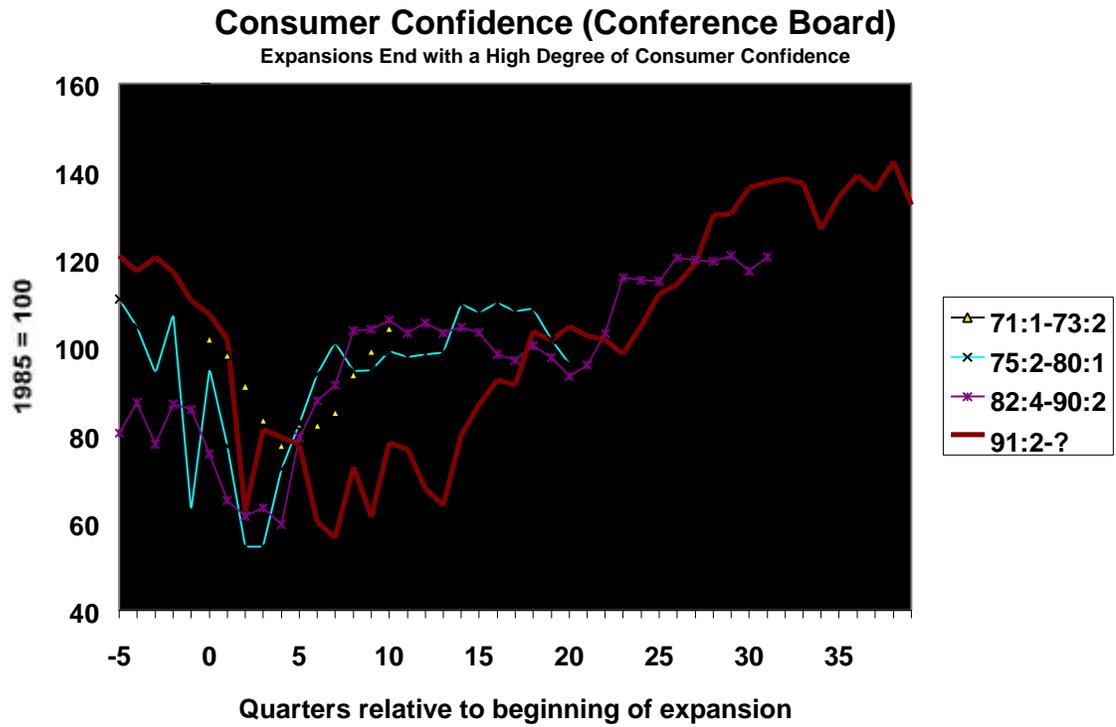
Equation 5				
Fed Reaction: Rate of Return for Three-month Treasury Bills				
Dependent Variable: RATE_3M				
Method: Least Squares				
Date: 12/24/00 Time: 15:38				
Sample(adjusted): 1987:1 2000:3				
Included observations: 55 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.80	0.40	2.02	0.049
RATE_3M(-1)	0.88	0.04	19.80	0.000
D(RATE_3M(-1))	0.35	0.10	3.37	0.002
INFLATION	0.15	0.05	3.25	0.002
INFLATION(-1)	0.06	0.05	1.22	0.228
U	-0.14	0.05	-2.76	0.008
D(U)	-0.74	0.24	-3.08	0.003
G	0.02	0.02	1.26	0.214
R-squared	0.98	Mean dependent var	5.34	
Adjusted R-squared	0.97	S.D. dependent var	1.44	
S.E. of regression	0.24	Akaike info criterion	0.10	
Sum squared resid	2.65	Schwarz criterion	0.39	
Log likelihood	5.32	F-statistic	274.7	
Durbin-Watson stat	2.17	Prob(F-statistic)	0	
<p>The Fed's target short-term interest rate is high if inflation is high, if unemployment is low and falling, and if growth is strong. Adjustment toward this target occurs at the rate of at least 12% per quarter, more if the recent movement of rates is in the direction of the target.</p>				

Leamer on Expansions

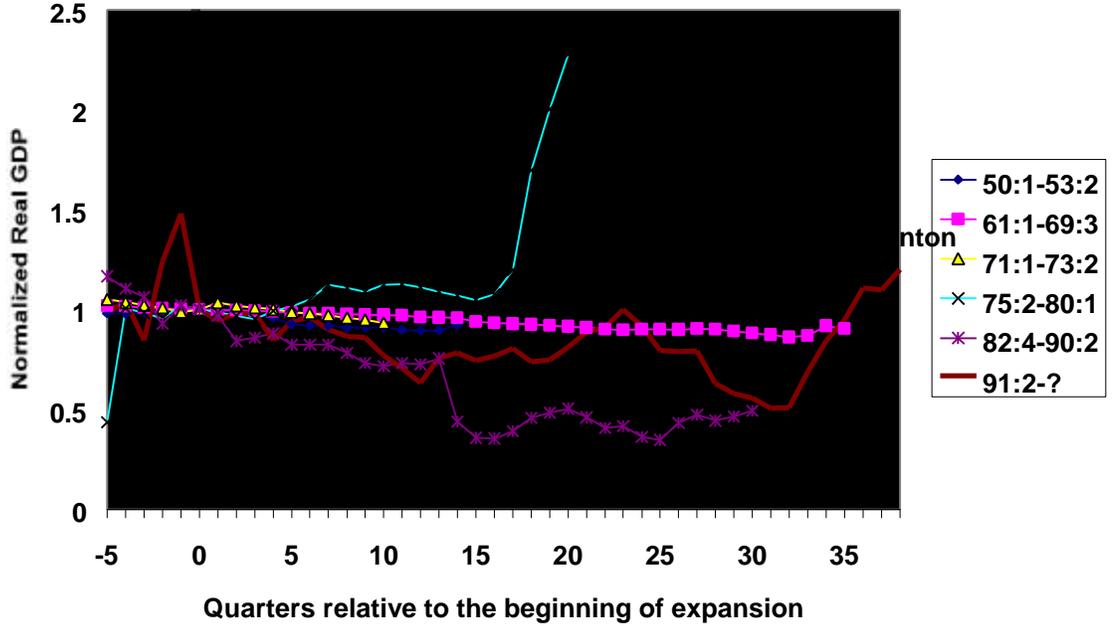
Equation 6				
Bond Market Reaction: 10 Year Treasury Bond				
Dependent Variable: RATE_10Y				
Method: Least Squares				
Date: 12/26/00 Time: 17:51				
Sample(adjusted): 1953:4 2000:3				
Included observations: 188 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.13	0.07	1.90	0.059
RATE_10Y(-1)	0.87	0.03	34.97	0.000
D(RATE_10Y(-1))	0.21	0.07	2.99	0.003
RATE_3M	0.12	0.03	4.29	0.000
D(RATE_3M)	0.13	0.07	1.93	0.055
D(D(RATE_3M))	0.13	0.05	2.89	0.004
D(G)	0.01	0.01	1.22	0.226
D(U)	-0.19	0.08	-2.50	0.013
INFLATION	0.02	0.01	1.68	0.096
R-squared	0.99	Mean dependent var	6.79	
Adjusted R-squared	0.99	S.D. dependent var	2.74	
S.E. of regression	0.32	Akaike info criterion	0.63	
Sum squared resid	18.83	Schwarz criterion	0.79	
Log likelihood	-50.45	F-statistic	1648.15	
Durbin-Watson stat	2.00	Prob(F-statistic)	0	

The 10 year US Treasury Bond rate is very persistent, but has some measurable momentum. The 10 year Treasury follows the 3 month Treasury with a significant and complicated lag, and with a barely perceptible inflation component. Both movement and acceration of the 3 month bill rate are encapsulated in the 10 year bond. Rising growth and falling unemployment both contribute to high bond yields, possibly capturing an expected inflation effect.

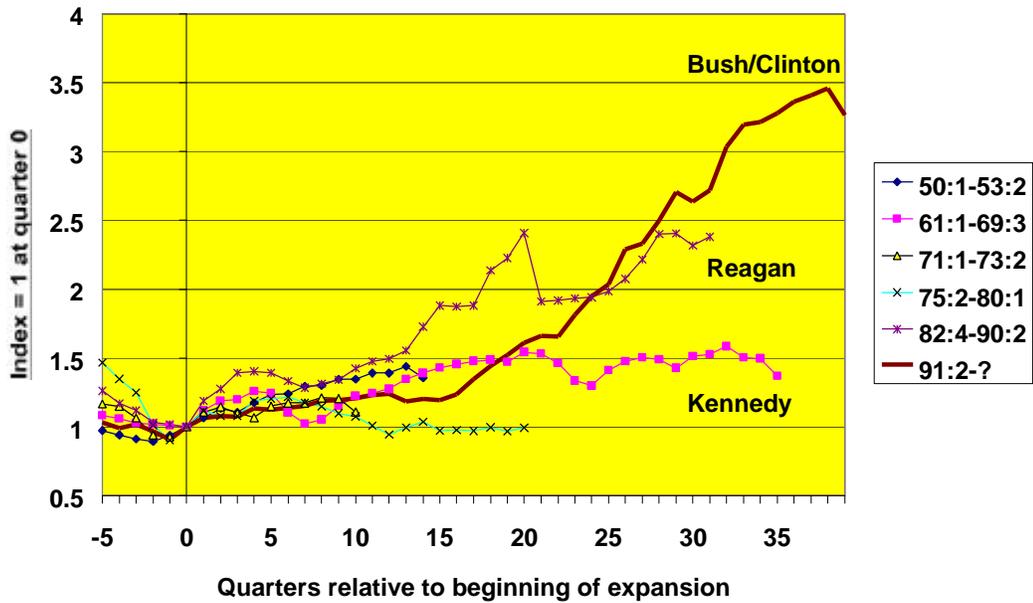
## Additional Graphs



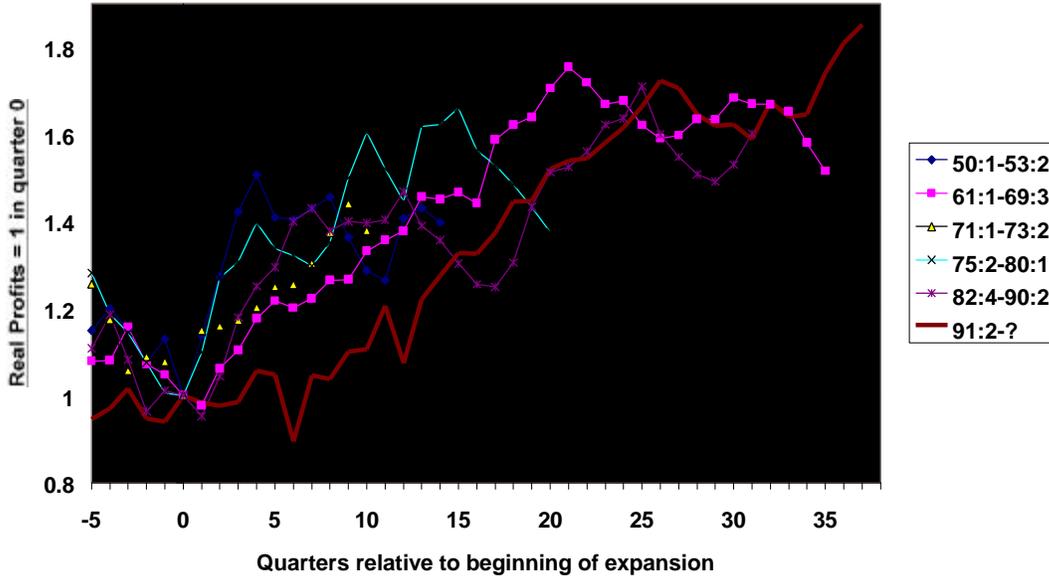
**Price of West Texas Crude, 1996\$ per Barrel  
One Oil Price Shock**



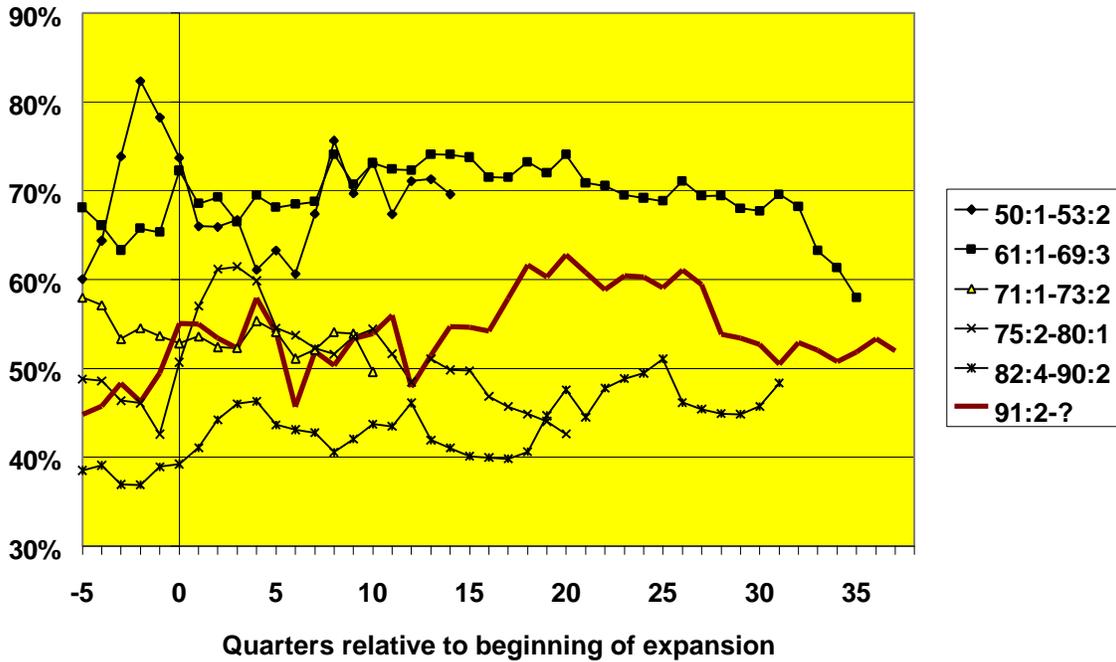
**S&P 500 Stock Index /GDP Price over Six Expansions  
Equities Markets Drove the Bush/Clinton Expansion**



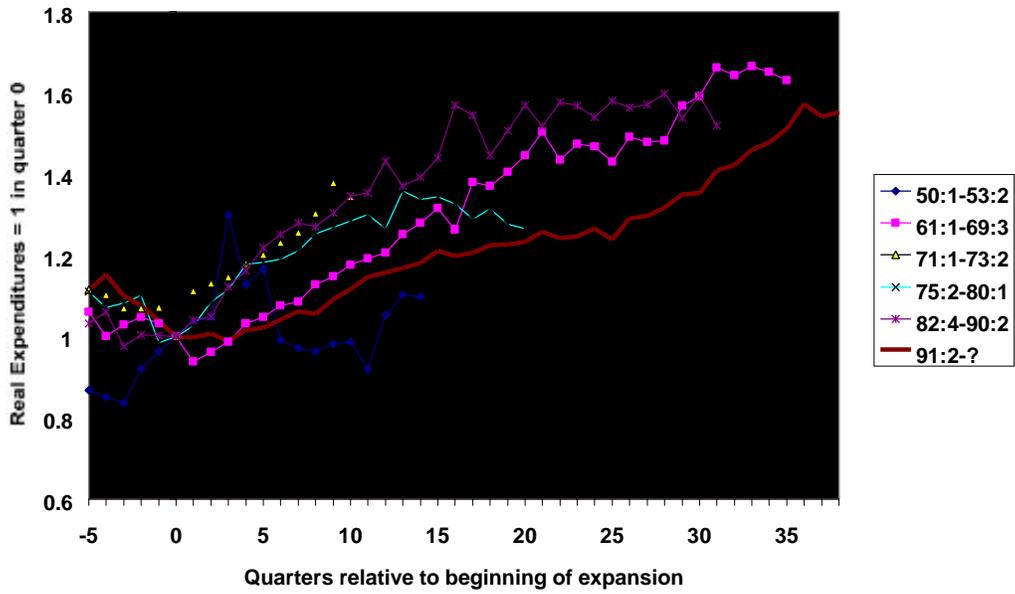
**Real Corporate Profits over Six Expansions**  
Stagnant Profits May Contribute to Ending Expansions



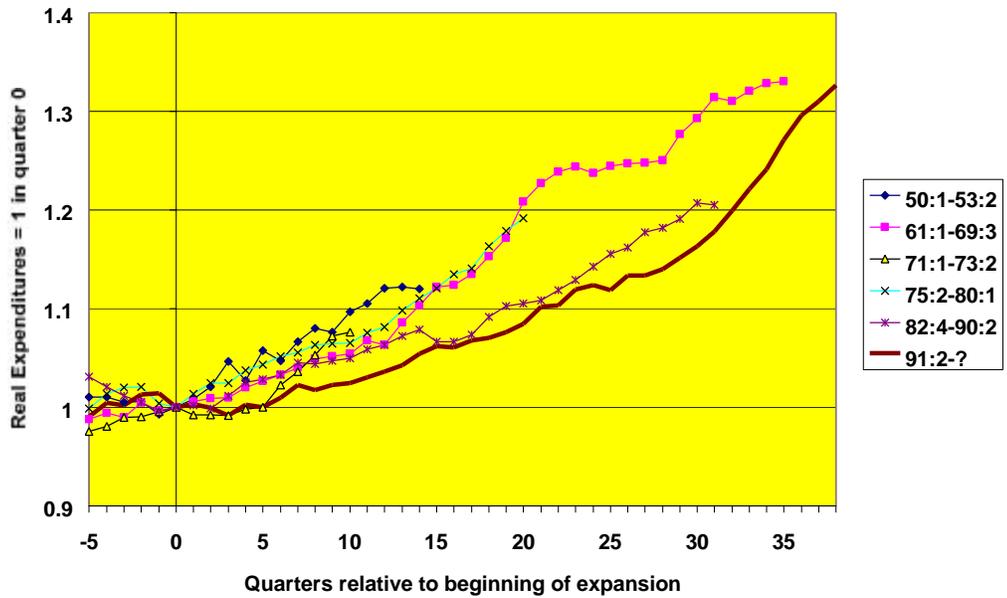
**Profits /Gross Private Investment in Six Expansions**  
Declining Profits Implicated in End of Most Expansions

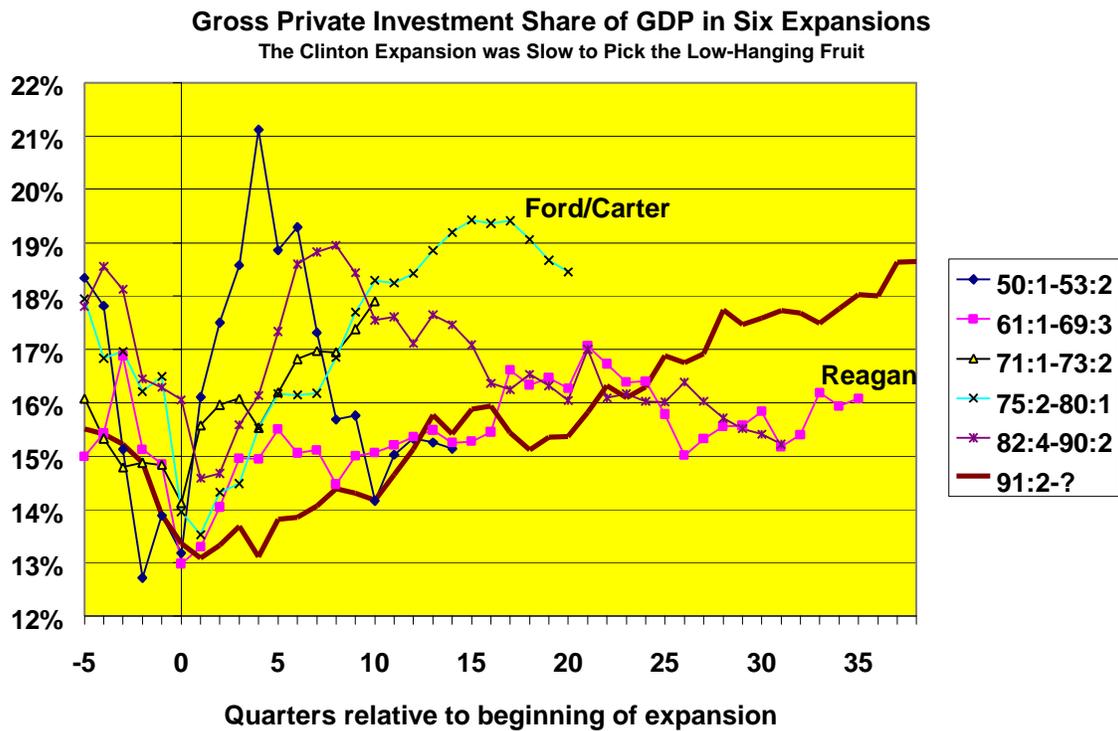
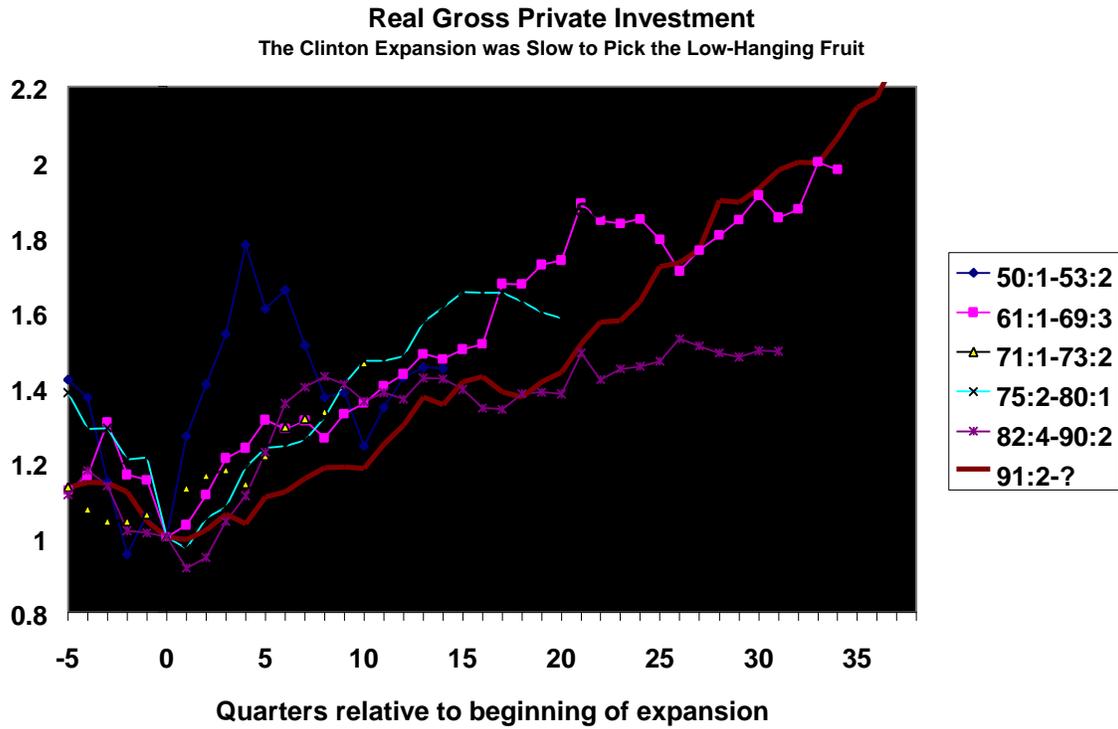


**Real Expenditures on Consumer Durables over Six Expansions**  
Durables flatten at the end of expansions



**Real Consumption of Nondurables Over Six Expansions**  
Nondurables still strong at end of expansions





**Spread between New Corporate Bond and the 10y gov. bond**  
Flight from Risk Can terminate an Expansion

