Greenspan's conundrum: Solved

Received (in revised form): 21st September, 2009

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Abstract Treasury managers must monitor market events so that they can understand their risk exposures in their cash flows, cash portfolios and balance sheets. This paper will highlight how market dynamics can signal volatility and radical shifts in market values, specifically focusing on the recent credit crisis. In 2005, one of the leading economic indicators, the treasury yield curve spread, flashed the warning signs about the coming economic difficulties, anticipating the bursting of the housing market bubble. Former Fed Chairman, Alan Greenspan, was however puzzled by the bond market's behaviour in 2005 and failed to take any preventive action. In 2006, the current Fed Chairman, Ben Bernanke, (mis)interpreted the falling long-term forward rates as an aberration, narrowly focusing on at-the-time economic data and tight credit spreads. Investors also ignored the treasury bond market's warning signs, putting their faith in the Fed's forecast. Unfortunately, Greenspan and Bernanke were wrong and the worst economic crisis since the Great Depression followed.

Keywords: Greenspan's conundrum, yield curve spread, housing bubble

INTRODUCTION

'This time is different.' That is what investors usually hear from the pundits near the top of every bubble. However, history shows that it is always the same story — bubbles inflate and bubbles deflate. A similar episode occurred during the housing bubble in 2005 and 2006. During that period, the bond market flashed the warning signs about the approaching economic difficulties with the inverted treasury yield curve. Yet, Federal Reserve Chairmen Greenspan in 2005 and Bernanke in 2006 found a way to ignore those warning signs, arguing that possibly 'at that time it was different'. Unfortunately, they were wrong. Consequently, the Fed's preventive inaction during the 2005/06 period of the housing bubble contributed to the worst economic crisis since the Great Depression. This paper explains the treasury yield curve spread as a leading economic indicator and discusses the Fed's flawed interpretation of that indicator during the period near the top of the housing bubble.

THE YIELD CURVE SPREAD: A BACKGROUND

The yield curve spread is the difference between the yield on ten-year treasury bonds and the Federal funds rate. The Federal funds rate is the interest rate that banks charge each other for overnight loans. Due to its ultra-short maturity, it affects all short-term interest rates. The Federal Reserve Bank sets the Federal funds rate and uses it as a monetary policy tool to achieve economic objectives. Yields on ten-year treasury bonds affect mostly long-term interest rates, such as mortgages.

The nominal yield on a ten-year treasury bond can be expressed as a sum of real long-term interest rates and inflation expectations. Thereby, as inflation expectations change, nominal yields on ten-year treasury bonds adjust. At the same time, the Fed adjusts the Federal funds rate to combat changes in inflation expectations as appropriate. Figure 1 shows that yields on ten-year treasury bonds and the Federal funds rate show a high degree

of correlation over the long term. However, analysis of Figure 1 also shows that the Federal funds rate is more volatile over the short term. Treasury bond and Federal funds rate levels convey important information about inflation expectations and consequently the economy.

However, the difference between the yield on a ten-year treasury bond and the Federal funds rate, or the yield curve spread, can provide a deeper insight into an economic cycle. As shown in Figure 2, the inverted yield curve (which happens when the Federal funds rate is higher than the yield on ten-year treasury bonds) has marked the recessions of 2001, 1991, several in the late 1970s and early 1980s, 1974, and so on. As a result, the yield curve spread has been used as a key indicator of economic activity by the Conference Board Leading Economic Index.

A further inspection of Figure 1 also shows

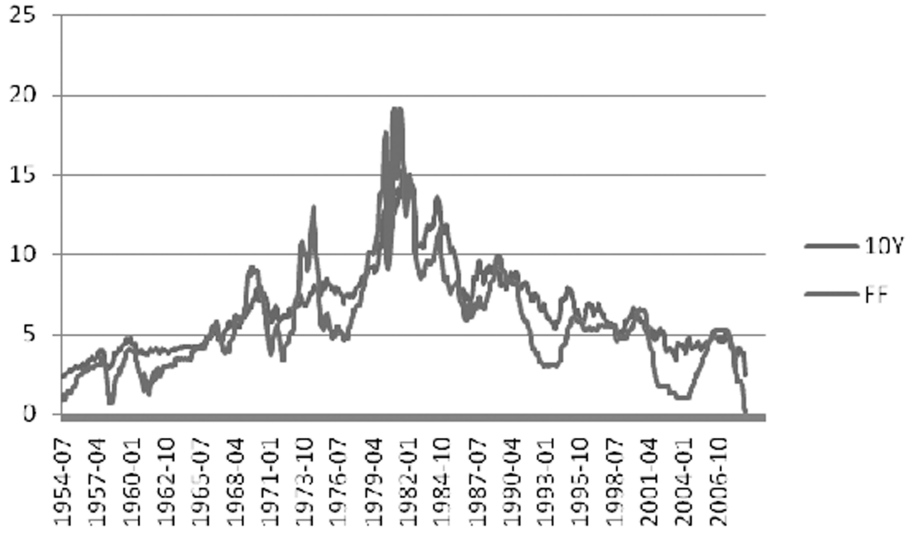

Figure 1: Historical yield on ten-year treasury bond and historical Federal funds rate

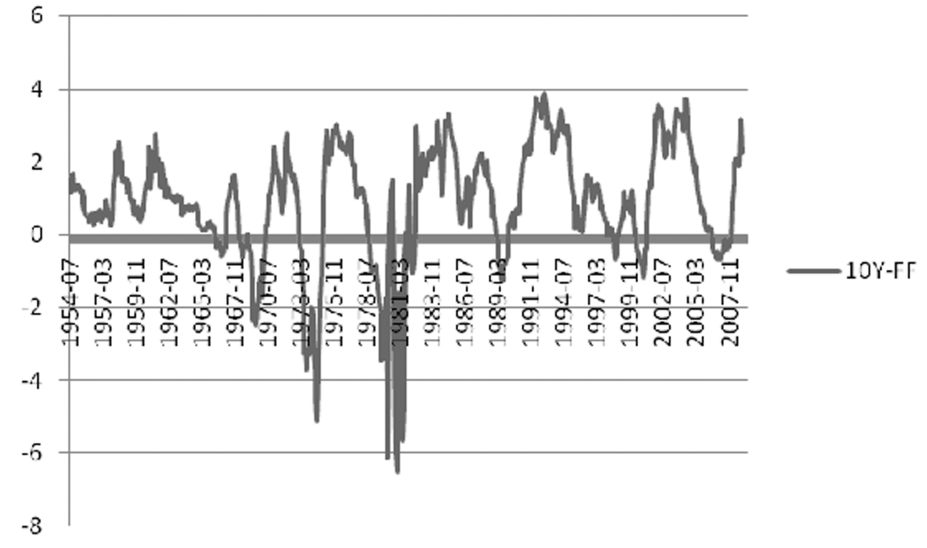

Figure 2: The treasury yield curve spread — difference between the yield on ten-year treasury bond and the Federal funds rate

that ten-year treasury bond yields normally rise during a campaign of Federal Reserve rate hikes. Surprisingly, during the Fed rate hike campaign in 2005 and 2006, ten-year treasury bond yields remained in a tight range (see Figure 3), causing the yield curve spread to narrow quickly and eventually become inverted (see Figure 4). Why did long-term rates not follow the Fed rate higher? How does one explain this yield curve puzzle? Did the inverted yield curve signal the housing bubble crash and the resulting recession?

SIMPLE MATHEMATICS OF THE YIELD CURVE

The yield on ten-year treasury bonds is the average of ten consecutive one-year forward rates, '*f*' (see Equation 1). Forward rates are unbiased estimates of future short-term spot rates. For example, a forward rate for the year

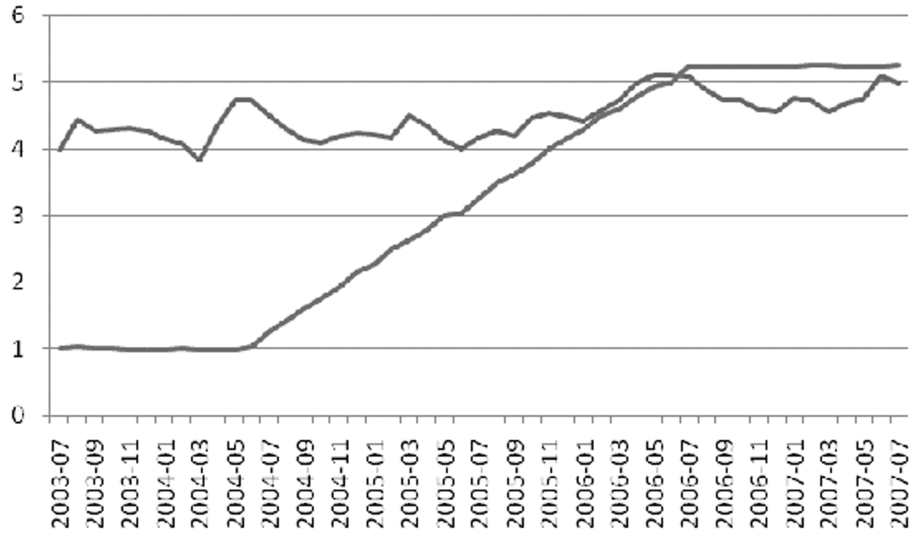

Figure 3: The conundrum period — Federal funds rate went up, ten-year treasury bond yield stayed in a narrow range

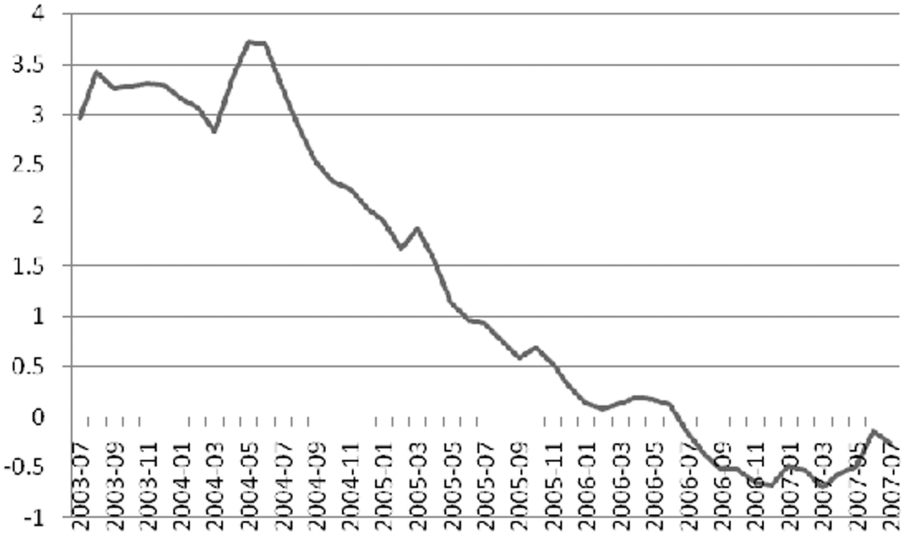

Figure 4: The conundrum period — inverted yield curve.

2015 is the unbiased estimate of the spot short-term rate in 2015.

$$10\ YTBond_{yield} = \frac{f_1 + f_2 + f_3 + f_4 + f_5 + f_6 + f_7 + f_8 + f_9 + f_{10}}{10} \quad (1)$$

The increase in the Federal funds rate causes all near-term forward rates to increase as well. As such, simple mathematics indicates that the average forward rate must increase even if longer-term forward rates remain unchanged. Longer-term forward rates would have to collapse as near-term forward rates increase for the average forward rate to remain unchanged or to decrease. Thus, one may conclude that an increase in near-term forward rates must be accomplished with a significant fall in longer-term forward rates for ten-year treasury bond yields to remain unchanged or fall as the Federal funds rate increases. Knowing this, the yield curve puzzle narrows to seeking an explanation as to why longer-term forward rates collapsed as shorter-term forward rates went up in 2005 and 2006 (see Figure 5 for illustration).

THE CONUNDRUM: GREENSPAN'S EXPLANATION

In the words of Alan Greenspan, Acting Federal Reserve Chairman, in his testimony to Congress on 16th February, 2005:

> 'For the moment, the broadly unanticipated behavior of world bond markets remains a *conundrum*.'

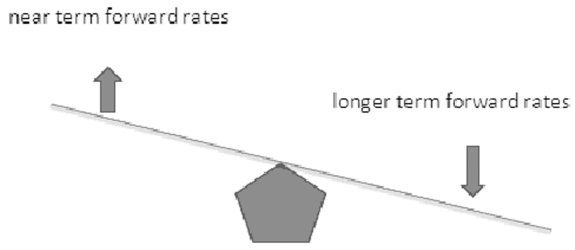

Figure 5: See-saw — near-term forward rates went up while longer-term forward rate went down

> '. . .it will be some time before we are able to better judge the forces underlying recent performance.'[1]

Basically, Greenspan confessed that he could not at that time explain the yield curve puzzle, now famously defined as 'Greenspan's conundrum'. Later, during his remarks to the central bank panel discussion on 6th June, 2005, he offered several explanatory hypotheses to explain the conundrum, but no solutions, venturing that falling longer-term forward rates might be a signal of economic weakness; a function of pension funds behaviour; or due to heavy accumulation of US treasury bonds by foreign central banks; deflationary forces from China and Russia; or a global savings glut.[2]

BERNANKE'S EXPLANATION: THIS TIME IS DIFFERENT

In his speech to Economic Club of New York on 20th March, 2006, Ben Bernanke, the new acting Federal Reserve Chairman, was slightly more academic, posing the question: 'Are market bond yields reacting to prospective macroeconomic conditions? Or, are there special factors that may have influenced market demand for long-term securities, independent of the economic outlook?'[3]

Forward rates have two components: the expected future spot rate and the term premium, which can be further split into the inflation risk premium and the real interest rate premium. The expected future spot rate component would react to anticipation of a possible recession and resulting Fed rate cuts in the future. The real interest rate premium subcomponent would react to increased demand for US treasuries, independent of economic outlook. See Figure 6 for an illustration of these points.

To the Economic Club of New York, Bernanke argued that a 'substantial portion of the decline in distant-horizon forward rates can be attributed to a drop in term premiums, mainly for the compensation for bearing real interest rate risk', adding that this was due to a 'reduction in economic volatility more

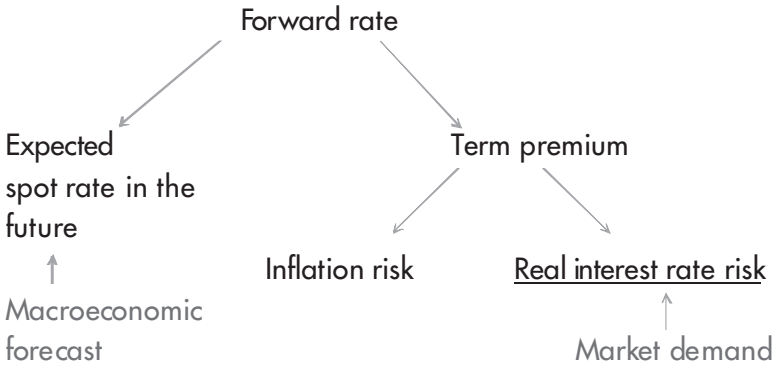

Figure 6: Bernanke's explanation of Greenspan's conundrum 20th March, 2006

generally'.[4] In conclusion, Bernanke told them, '. . .I would not interpret the currently very flat yield curve as indicating a significant economic slowdown to come'.[5]

Bernanke was more courageous than Greenspan and offered an explanation to the inverted yield curve puzzle. While he acknowledged the historical record of the inverted yield curve in predicting the recessions, he seemed to be suggesting that this time it was different. Even academic studies such as Backus and Wright[6] agreed with the Greenspan/Bernanke explanations of the 'conundrum'.

CONUNDRUM SOLVED

A little more than a year later, Bernanke was forced to lower the Federal funds rate from 5.25 per cent in response to first signs of troubles ahead — the collapse of two Bear Stearns hedge funds. By early 2009, the Federal funds rate was effectively at 0 per cent (Figure 7). Can these events solve Greenspan's conundrum in retrospect? Yes.

The bond market predicted that the 2003–07 recovery was based on the developing housing bubble, which would eventually burst. It also predicted that in the aftermath of the housing bubble, the Fed would have to lower the

Figure 7: Greenspan's conundrum solved — Federal funds rate went down to 0 per cent in the aftermath of the housing market crash

Federal funds rate back to 1 per cent or lower in reaction to a severe recession. Consequently, longer-term forward rates fell, even as Federal funds rate went up during the period from 2003 to 2007.

The bond market was right. The housing bubble came crashing down hard in 2008, and the Federal funds rate effectively dropped to 0 per cent, with all indications from the Fed that it will remain at 0 per cent for a long time.

The conundrum is solved.

IMPLICATIONS

The implications of the Fed's apparent 'miscalculation' are explored below.

Fed credibility

In 2005, Alan Greenspan was not able to explain what he called the 'bond market conundrum'. This makes the following quotes, taken from Greenspan's book, *The Age of Turbulence*,[7] particularly interesting. On the subject of the recession of 2002 and the economic climate following September 11th, Greenspan says:

> '...The Fed's response to all this uncertainty was to maintain our program of aggressively lowering short-term interest rates...'
>
> '...Deflation became the focus of increasing concern within the Fed...'
>
> '...We wanted to shut down the possibility of corrosive inflation; we were willing to chance that by cutting rates we might foster a bubble, an inflationary boom of some sort, which we would subsequently have to address...'
>
> '...government encouragement of subprime mortgage programs enabled members of minority groups to become first-time home buyers...'
>
> '...Were we setting ourselves up for a harrowing real estate crash?'

Based on these quotes, Greenspan was puzzled by the mess he partially created. Or, perhaps he purposely misled the public in his public statements in 2005. Another alternative is that he simply could not forecast the magnitude of economic pain the global economy would face in the aftermath of the housing bubble — something that would raise a question mark over his competencies.

Bernanke was also familiar with the deflationary threat to the US economy post September 11th. In 2002, he gave his famous speech 'Deflation: making sure it doesn't happen here' as the Fed governor.[8] Yet, Bernanke was not publicly puzzled by the bond market conundrum. Quite the contrary, he focused narrowly on up-to-date positive economic data and tight credit spreads as an indication of factors independent of the economic situation that explained the falling long-term forward rates and offered a positive economic outlook going forward. Did Bernanke purposely mislead the public in 2006 or perhaps he demonstrated poor forecasting skills by blindly focusing on data?

Whether the Fed chairs demonstrated dishonesty or a lack of competency remains the question of less importance; either way the Fed lost its credibility with investors.

Market efficiency

The stock market did not efficiently price in the potential effects of a housing bubble crash on the real economy. Global stock markets, especially the Chinese stock market, rallied in 2007. Commodities soared across the board. However, global stock markets suddenly crashed at the end of 2007, while commodities, especially the crude oil bubble, deflated in mid-2008. Apparently, markets were encouraged by Bernanke's positive outlook in 2006 and decided to ignore the inverted yield curve as well. As a result, individual investors lost a significant portion of their retirement accounts, institutional investors experienced withdrawals, adding to the forced selling pressure, and most investment banks were wiped out or bailed out.

It seems like the Fed policy was to prevent a recession in the short term by scarifying a longer-term depression, as irrational as it seems.

Further, in 2005 as home prices increased, many homebuyers were priced out of housing and forced to take the pay-option adjustable-rate mortgages (ARMs). Unfortunately, these mortgages are due to reset during the period from 2009 to 2012. Had Greenspan seriously considered that the bond market was worried about the housing market crash, he could have discouraged the pay-option ARM financing in 2005 and the subprime crises of 2008–09 would have been the end of it. Now investors have an even greater worry until 2012 — the pay option reset monster. Market efficiency is not a possibility if the information, or the people who deliver the information, cannot be trusted. As a result many investors will choose to stay on the sidelines, which will only prolong the crisis.

Practical implications for treasury managers

The President of Houston Treasury Management Association, Charles VanRavenswaay, made the following comment about the present paper in an e-mail to the author:

> 'Interesting article ... You do indeed provide food for thought with respect to capital market issues. Personally, I knew where the world was headed when I saw an economist on CNN loudly declare that the business cycle was dead — good times forever more. When economists start believing that nonsense we are definitely in trouble. There are indeed limits to consumption.'

Treasury managers, like other capital market participants, rely on the Federal Reserve's official forecasts and statements as a key input in proprietary forecasting models. The Fed's lack of credibility can only create uncertainty in proprietary forecasts of all capital market players, including treasury managers.

Treasury managers should therefore not ignore visible recessionary warning signs, such as the flattening of the yield curve or deteriorating leading economic indicators, even when the economists and the top regulators discredit or ignore those warning signs. Budgetary mistakes in the onset of a recession can be very costly to a corporation and to an individual treasury manager's career. The lesson from the recent credit crisis is that not all firms get bailed out by the government, and not all managers remained employed in those firms that do get bailed out. Treasury managers should therefore invest heavily in due diligence and administer proprietary forecasts with appropriate risk management in place.

SUMMARY

This paper highlighted how market dynamics can signal volatility and radical shifts in market values, specifically focusing on the recent credit crisis. Former Fed Chairman Greenspan was puzzled by the behaviour of the treasury yield curve in 2005, even though there is enough evidence that his Fed contributed to the housing bubble with ultra-low interest rates and lax regulation. The current Fed Chairman Bernanke (mis)interpreted the inverted treasury yield curve in 2006 as an aberration, basing his conclusions narrowly on at-the-time good economic data and tight credit spreads. Investors ignored the treasury bond market warning signs as well, putting their faith in the Fed's forecast. As a result, the stock market failed to efficiently price the potential of the worst recession since the Great Depression in the aftermath of the housing bubble. Consequently, the stock market's sudden adjustment (or crash) caught many investors by surprise. The lesson is: be wary when you hear that 'this time is different' in a context of a potential bubble, even if it comes from the Fed. As a result, treasury managers should invest heavily in due diligence and administer proprietary forecasts with appropriate risk management in place.

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