

$\Gamma\gamma$

A Commentary by Harley Bassman:

The Convexity Maven

Not a Product of Credit Suisse Research
For Distribution to Institutional Clients Only

Value Concepts from the Credit Suisse Trading Desk
September 17, 2013

"How High is High ?"

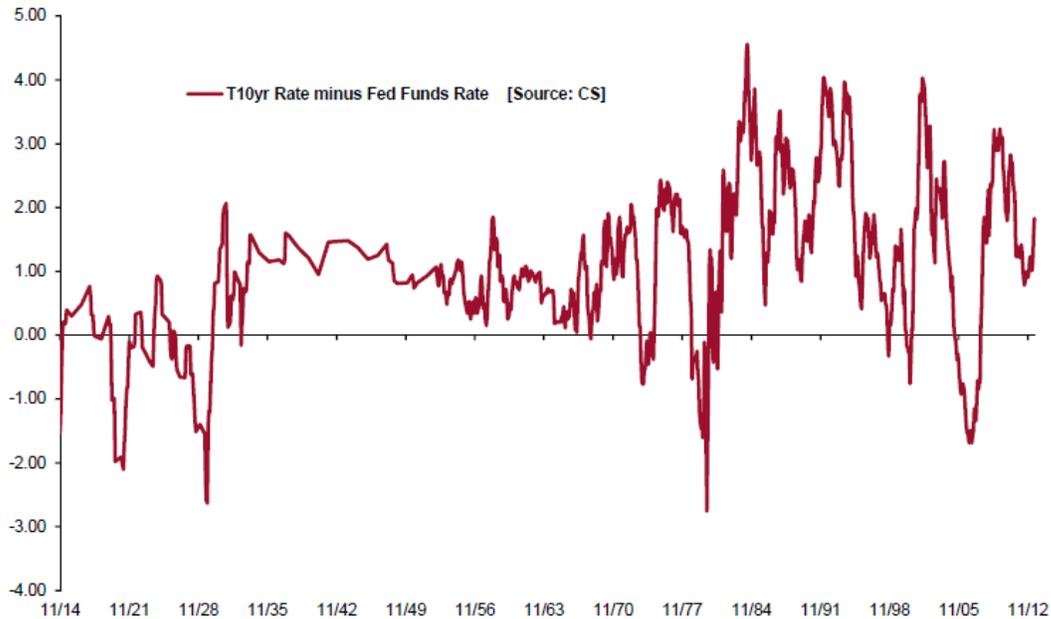


Jack and the Beanstalk

Notwithstanding that I have been a Drum Major for higher rates since I joined Credit Suisse nearly two years ago, let me surprise you by saying that I can trade from both sides of the investment spectrum. Just as a 1.5% yield paid for ten years in a fiat currency being dropped from a helicopter is a bad investment, so must we note that there is likely a limit to how high interest rates can climb without a currency collapse precipitated by an apocalyptic hyperinflation. Herein we broadly outline the theoretical upper-limits of USD interest rates, assuming the FED will be just as diligent in preventing a Weimar outcome as it was in detouring a Japanese deflation.

What we know.....

We have cited numerous times that the spread between the Fed Funds rate and the Treasury Ten-year rate seems to be limited to about 385bps. We support this notion by observing that the **-shark bite-** line below has been capped near this level for the past century, except for the panic surrounding the Continental Illinois bankruptcy in 1984.



While there is no obvious reason for this limitation, I suspect it is related to the carry dynamics of Yield Curve flatteners at this spread level. In any case, if this relationship is indeed rock-solid, then the yield on the T10yr must presently be limited to about 3.95% while the FED's policy of ZIRP is in place.

What we can infer.....

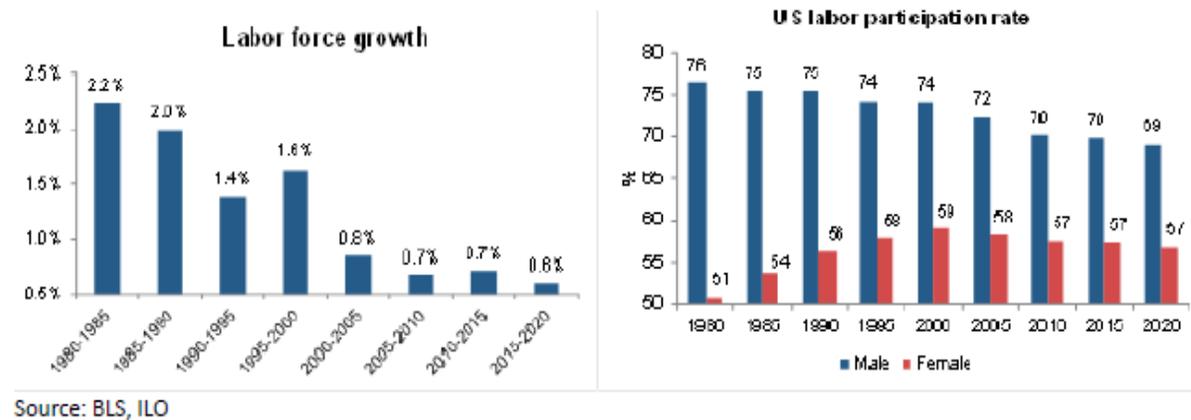
The 1987 Nobel Prize in Economics was awarded to Robert Solow for his 1956 work with T. W. Swan in expanding the Macro Economic "Neo-Classical Growth Model" that defined long-term nominal GDP as the sum of Labor Population Growth, Productivity, and Inflation. Since there is a strong efficient markets case to be made that nominal interest rates should have a correlation to nominal GDP, if we can set a boundary around the nominal growth rate of the economy, we should be also be able to create a wide band to contain nominal interest rates.

While I find it hard to predict what I may have for lunch tomorrow, demographers have no such issues with their subject matter. They can make projections about the population fifty years into the future since, aside from certain religious denominations, it tends to be difficult to be reborn.

The **-ruby line-** below tracks US live births since 1946. As detailed in our Commentary – *“The Pig in the Python”*, January 12, 2012, it does not take a huge leap to appreciate how the passage of the Baby Boomers through the economy contributed greatly to the strong GDP expansion of the 1980’s. After all, this was the period when they entered their peak earning years of ages 30 to 50.



As alluded to above, since everyone who will enter the Labor Force during the next few decades has already been born, we can be fairly certain as to its composition. Barring an immigration influx, the **-bice bars-** support projections that the Labor Force (population) Growth rate will be subdued for quite a while.

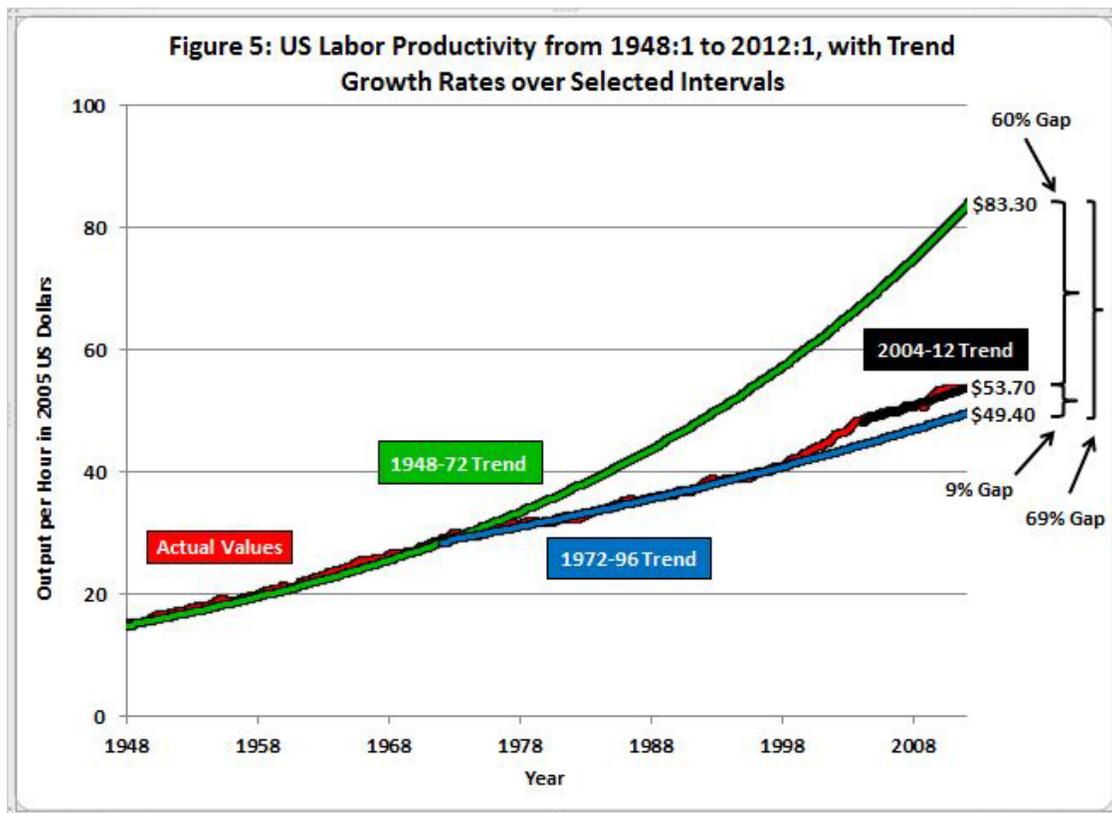


Since humans have short lives, and even shorter memories, we tend to project current trends a great distance, before and after us; and so may be the case with respect to Labor Productivity.

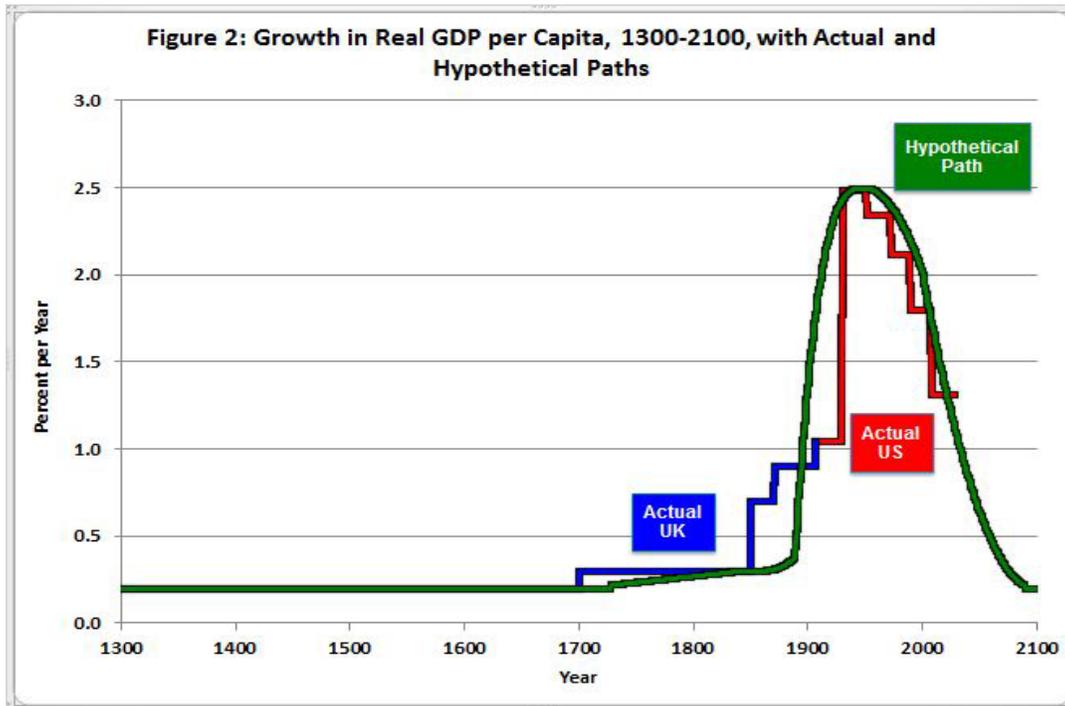
Many people attribute the large productivity gains of recent history to four waves: 1) Mechanization [factories and railroads], 2) Power [electricity and oil], Travel [cars and airplanes] and 4) Technology [communications and computers].

However, Robert Gordon has argued that we may have witnessed only a single long wave, where each subsequent sub-component is of lesser marginal value. (See NBER #7752) Moreover, this wave may have peaked in the middle of the twentieth century and it is now slowly receding.

This notion essentially opines that we have been the lucky lottery winners of the human race in that we have had the good fortune to be born during the past two hundred years. The chart below suggests that Productivity has indeed been slowing from the torrid post-war pace where military innovations were incorporated into the general economy.

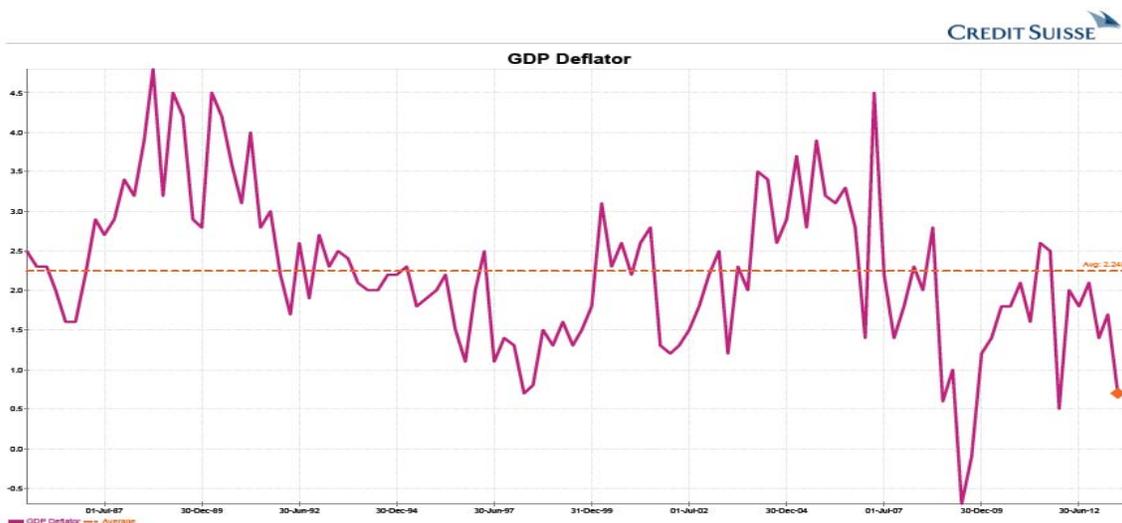


This next chart focuses solely upon the Productivity contribution to GDP growth. Notice that for the five hundred years preceding the invention of the cotton gin, mankind's quality of life was effectively unchanged. What is somewhat disheartening, especially for our grandchildren, is that the Single Wave hypothesis projects that Productivity gains into the next century will be somewhat muted as it returns to its ultra long-term path.



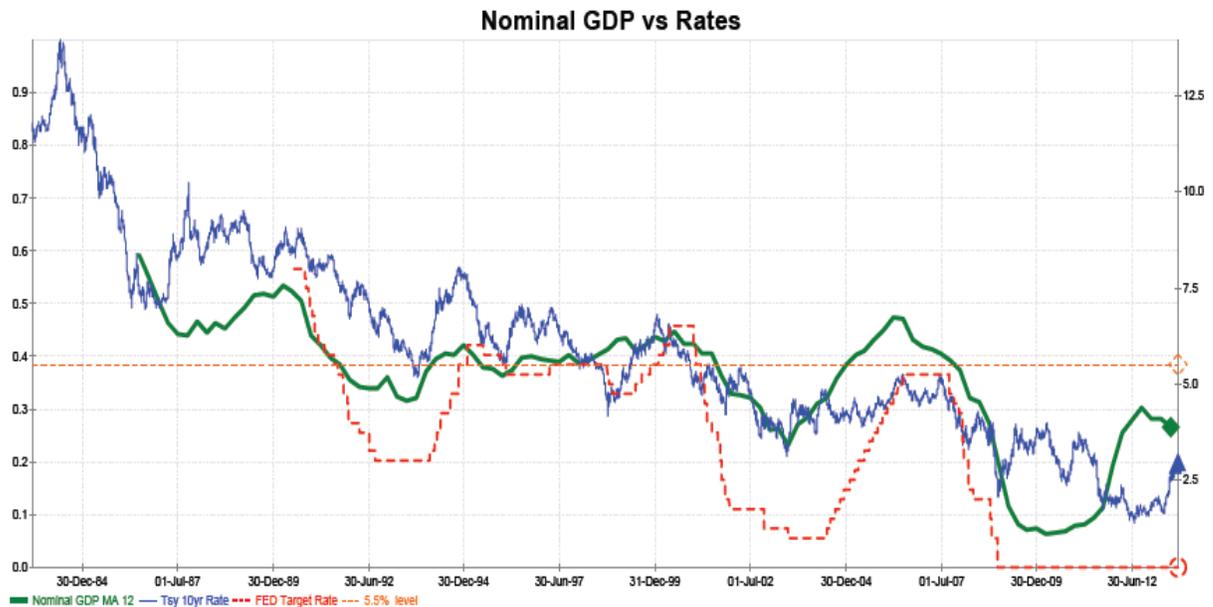
Source: Robert J. Gordon, NBER

The final contributing component to nominal GDP is Inflation. Notwithstanding my credentials as a vociferous "inflationista", it is a cold reality that the **-boysenberry line-** GDP Deflator has averaged a mere 2.3% over thirty years.



What we can project.....

The **–aero line–** is the Treasury Ten-year rate since the early 1980s. While it will not win a beauty prize in the best fit contest, it does generally follow the trace of the **–absinthe line–** which is the moving average of Nominal GDP Growth. It is these similar trajectories that underlie the popular notion that the Ten-year rate should roughly equal the Nominal GDP rate.



Contrary to conventional option analysis, where volatility is quoted as a daily break-even, the true value of an option is its “unlimited tail event” risk/reward. The catastrophic insurance component of an option is its key value proposition. If the ultimate downside is known, ex ante, or if the path to that level can be reached in a continuous manner, then the urgency investors feel to purchase options is greatly reduced. Just think about how the financial crisis played out; assets that were thought to be AAA not only had their “worst case” downside re-price from 90ish to 10ish, but also the path to that level became unhinged. Monday’s trade at 85 was only next followed by Thursday’s print at 62, this was NOT the continuous pricing paradigm assumed by derivative modelers.

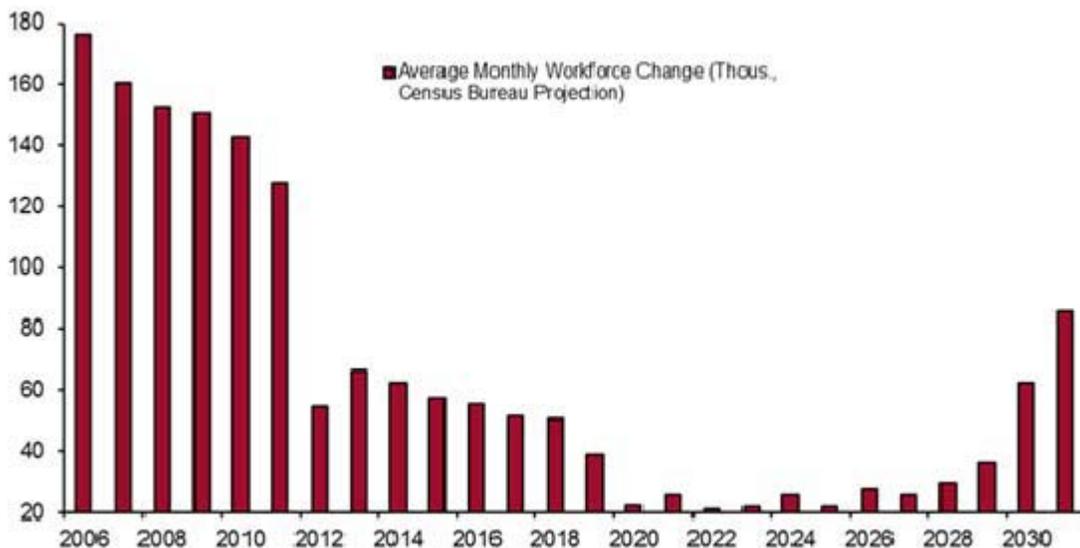
The combination of a declining population growth rate, a shrinking male and cresting female participation rate, and a rapidly aging baby boom generation makes it difficult to project a real GDP of much higher than 2.5% in the medium term. Overlay the possibility that the FED may be true to its word and try to hold the line on inflation near 2% and it becomes quite difficult for the nominal GDP rate to exceed 5% in the next decade. The bad news for the howling bond bears is that if Labor Population, Productivity, and Inflation (aka, nominal GDP)

cannot breach 5%, then it will be exceeding difficult for Ten-year rates to sustain a level much above 5.5%.

I have been a full voting member of the Bond Vigilantes since rates broke below 2.00% in 2011; and there is still plenty of money to be made on the bear side as financial markets normalize. For example, a ten-year Treasury with a 2.875% coupon will change hands at a dollar price below 85 in a 5.0% environment; but the notion of rates pricing much higher than that requires some aggressive assumptions.

Without a political metamorphosis that advocates for a nineteenth century style immigration policy, our population demographic is baked in the cake. And while the huge Echo Boom cohort is now rolling into their peak productivity (and earning) years of ages 30 to 50, this is heavily offset by the retirement of the well-skilled Baby Boomers. (See our James Sweeney's recent publications) This leaves an extraordinary inflation as the remaining lever to push rates past a 6%-handle. While this is possible, it is also unlikely in the near-term as even \$3Tn in "Helicopter funds" has yet to accelerate Monetary Velocity.

The nearly 4.0% real GDP of the 1980's and 1990's was driven by the confluence of the Baby Boom cohort aging through their most highly productive years as the fourth Innovation Wave of technology opened into full bloom. (Imagine if you will that I used a Fax Machine to send this type of publication when I started at Drexel thirty years ago.) I suspect the Inflation the FED is trying to build is destined to take root only after the Echo Boomers fully implement Artificial Intelligence via Quantum Computing sometime in 2025 when the US workforce demographic once again turns positive.



Source: Credit Suisse, ij rsch

The Trades.....

.....for ZIRP into 2015:

Sell 100mm 2 year into 8yr - 20yr payer mid-curve K = 4.75%
Buy 100mm 10 year into - 20yr payer K = 4.75%
Pay 400bps

This is still my "best Rates trade", period:

- 1) Limited Loss to the 400bp premium paid;
- 2) Positive "roll down" Carry of 160bp during the first year;
- 3) Potential unlimited gain if the front leg expires worthless.

The sale of a two-year option with an Implied Volatility near 92nv versus the purchase of a ten-year option (on the identical rate) near 71nv creates the purchase of synthetic Forward Implied Volatility in the mid-60s. Similar to a "butterfly" trade, this package should be most valuable if the 8yr-20yr rate is near the 4.75% strike upon the expiry of the first option. Moreover, employing reasonable assumptions, the package will be worth at least its cost of 400bps as long as that rate is within 150bps of the strike, shown by the **-lavender lines-** traced at 3.25% and 6.25%. This "eyeballs to about 2.0% and 5.0% on the **-clementine line-** Tsy ten-year rate. As previously detailed, this looks like a solid range in a world of ZIRP and unfavorable demographics.



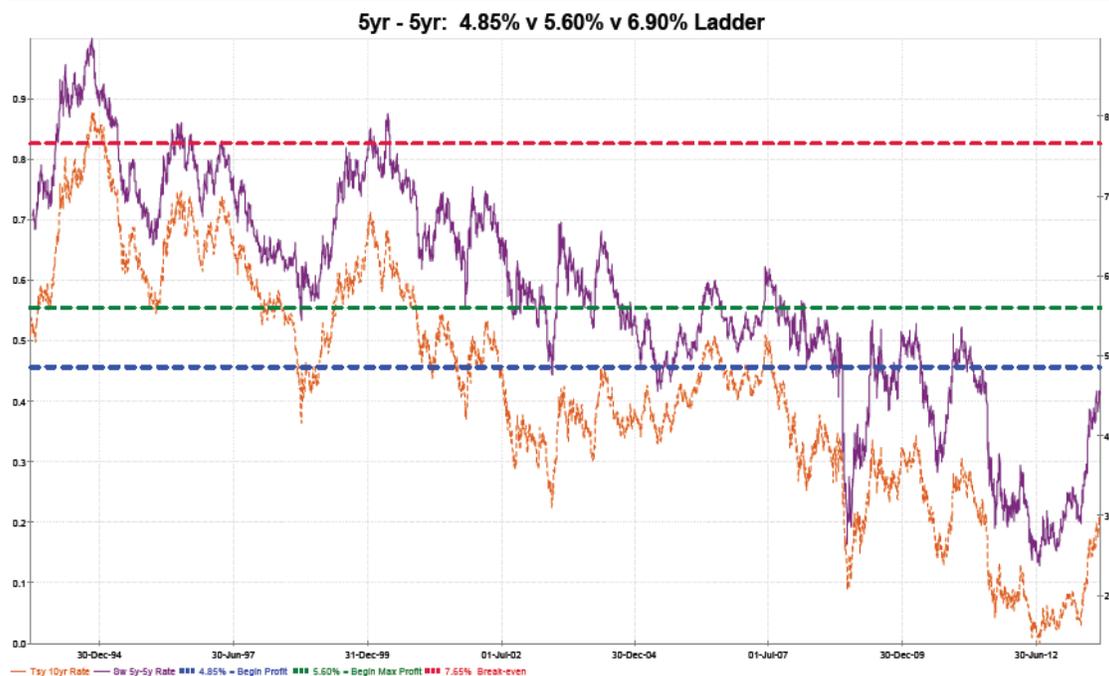
.....for controlled inflation into a normalizing market:

Buy 100mm 5yr into 5yr payer; K = 4.85%
Sell 100mm 5yr into 5yr payer; K = 5.60%
Sell 100mm 5yr into 5yr payer; K = 6.90%
Zero Cost at entry

This trade is interesting with respect to both its Rate and Skew profile, however, here I will only focus upon the Rate aspect. This is your standard “payer ladder” construction where you are long one option versus short two; so to be clear, you do have the potential for unlimited loss. On the next page, the *-bondi line-* at the first strike of 4.85% is where this package is in the money at expiry. This is followed by the *-avocado line-* at 5.60% where your gains are capped. The gains on this payer spread start to dissipate at 6.90% and are fully depleted by the *-red line-* at 7.65%; further rate increase can lead to unlimited losses.

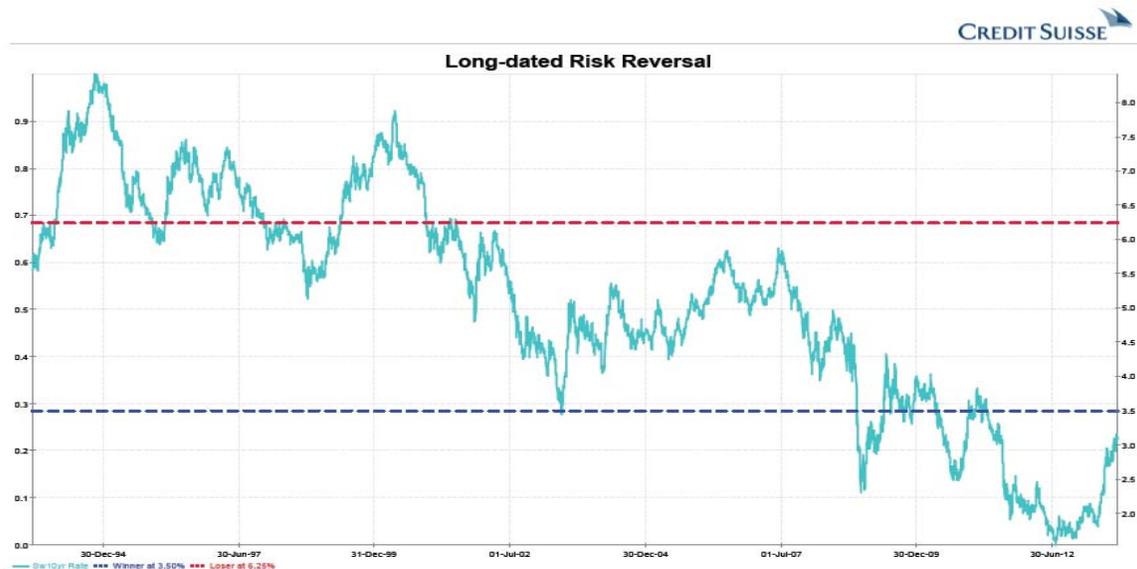
Amongst its various attributes, this ladder is slightly short duration at inception and has a rather low management profile since its initial convexity (gamma) is near zero. In a nutshell, you must be comfortable that the *-clementine line-* ten-year rate will not find a home above a 7%-handle five years hence so you can earn the maximum payout between 5.60% and 6.90% on the 5yr-5yr swap rate. This is another way to insist that inflation will not much exceed 4%.

CREDIT SUISSE



.....for long liability managers who fear a Japanese deflation:

Buy 100mm 5yr into 10yr receiver; K = 3.50%
Sell 100mm 5yr into 10yr payer; K = 6.25%
Zero Cost at entry



Wall Street lore is full of tales about the last time this trade looked interesting a decade ago. A terrific Pension/Insurance Co. trade that is favorable when:

- 1) The Yield Curve is steep;
- 2) Implied Volatility is high;
- 3) Payer skews are elevated.

All three of these conditions are currently available; thus you can buy a call option that is struck in-the-money on a Spot basis funded by the risk that the Sw10yr rates pierces a level not visited in well over a decade.

Final thoughts.....

Do not shed a tear and mutter curses of betrayal, your favorite bond bear has not shed his furry coat just yet. A US Treasury ten-year at 2.90% is still a lousy investment for almost anyone with a time horizon past lunch. [Various domestic Integrated Oils sport a P/E of 11ish and dividend of 3ish.]

However, the confluence of ZIRP and Taper has steepened the Yield Curve such that the 5yr-5yr rate is kissing 4.50%, barely 50bps from its 2004 to 2010 average. Demographics will limit labor growth and I doubt the iPhone-36 will add much to my productivity. So it's either inflation or a deleveraging panic that can drive the T10yr much above 5.5%. Of these two, I worry about the latter as it is possible that retail investors may finally realize they have the wrong asset mix.

Between 2008 and 2012, mutual fund investors sold \$560bn of Equities and purchased \$1.07Tn of Bonds. If one assumes that their cost basis was evenly distributed annually, they sold the S&P at 1265 and bought the T10yr at 3.04%. Since the "lemming gene" has yet to be deleted from investor DNA, managing a reciprocal flow of funds could be a challenge if the FED startles the market and prompts a stampede. [This is why I absolutely love Forward Rate Volatility]

As much as it makes good press to employ comparisons to Weimar and Zimbabwe, the reasonable odds of rates reaching 6% are none too great, at least until the middle of Hillary's first term in office.

Harley S. Bassman
Credit Suisse US Rates Trading
September 17, 2013



Clear Notice: This Commentary reflects the view of its author and is independent of CS Strategy.

This material has been prepared by individual sales and/or trading personnel of Credit Suisse AG or its subsidiaries or affiliates (collectively "Credit Suisse") and not by Credit Suisse's research department. It is not investment research or a research recommendation for the purposes of FSA rules as it does not constitute substantive research. All Credit Suisse research recommendations can be accessed through the following hyperlink: <https://s.research-and-analytics.csfb.com/login.asp> subject to the use of approved login arrangements. This material is provided for information purposes, is intended for your use only and does not constitute an invitation or offer to subscribe for or purchase any of the products or services mentioned. Any pricing information provided is indicative only and does not represent a level at which an actual trade could be executed. The information provided is not intended to provide a sufficient basis on which to make an investment decision. Credit Suisse may trade as principal or have proprietary positions in securities or other financial instruments that are the subject of this material. It is intended only to provide observations and views of the said individual sales and/or trading personnel, which may be different from, or inconsistent with, the observations and views of Credit Suisse analysts or other Credit Suisse sales and/or trading personnel, or the proprietary positions of Credit Suisse. Observations and views of the salesperson or trader may change at any time without notice. Information and opinions presented in this material have been obtained or derived from sources believed by Credit Suisse to be reliable, but Credit Suisse makes no representation as to their accuracy or completeness. Credit Suisse accepts no liability for loss arising from the use of this material. Nothing in this material constitutes investment, legal, accounting or tax advice, or a representation that any investment or strategy is suitable or appropriate to your individual circumstances. Any discussions of past performance should not be taken as an indication of future results, and no representation, expressed or implied, is made regarding future results. Trade report information is preliminary and subject to our formal written confirmation.

CS may provide various services to municipal entities or obligated persons ("municipalities"), including suggesting individual transactions or trades and entering into such transactions. Any services CS provides to municipalities are not viewed as "advice" within the meaning of Section 975 of the Dodd-Frank Wall Street Reform and Consumer Protection Act. CS is providing any such services and related information solely on an arm's length basis and not as an advisor or fiduciary to the municipality. In connection with the provision of the any such services, there is no agreement, direct or indirect, between any municipality (including the officials, management, employees or agents thereof) and CS for CS to provide advice to the municipality. Municipalities should consult with their financial, accounting and legal advisors regarding any such services provided by CS. In addition, CS is not acting for direct or indirect compensation to solicit the municipality on behalf of an unaffiliated broker, dealer, municipal securities dealer, municipal advisor, or investment adviser for the purpose of obtaining or retaining an engagement by the municipality for or in connection with Municipal Financial Products, the issuance of municipal securities, or of an investment adviser to provide investment advisory services to or on behalf of the municipality.