

# The Myths and Facts of Risk Parity

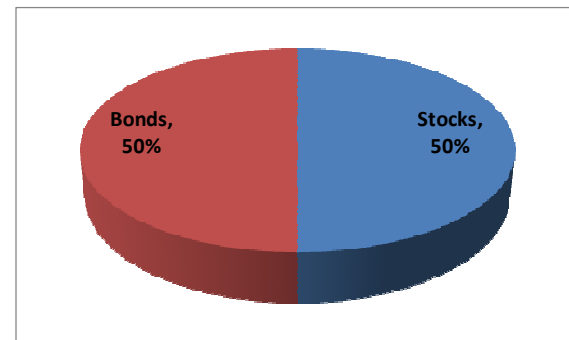
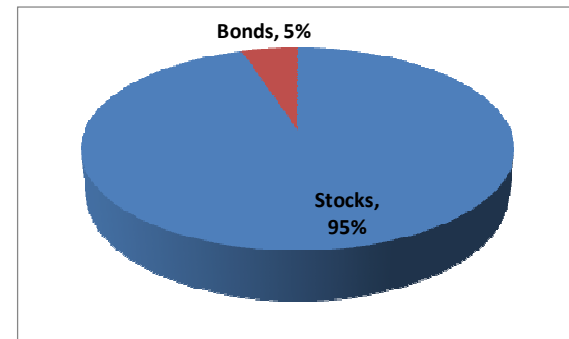
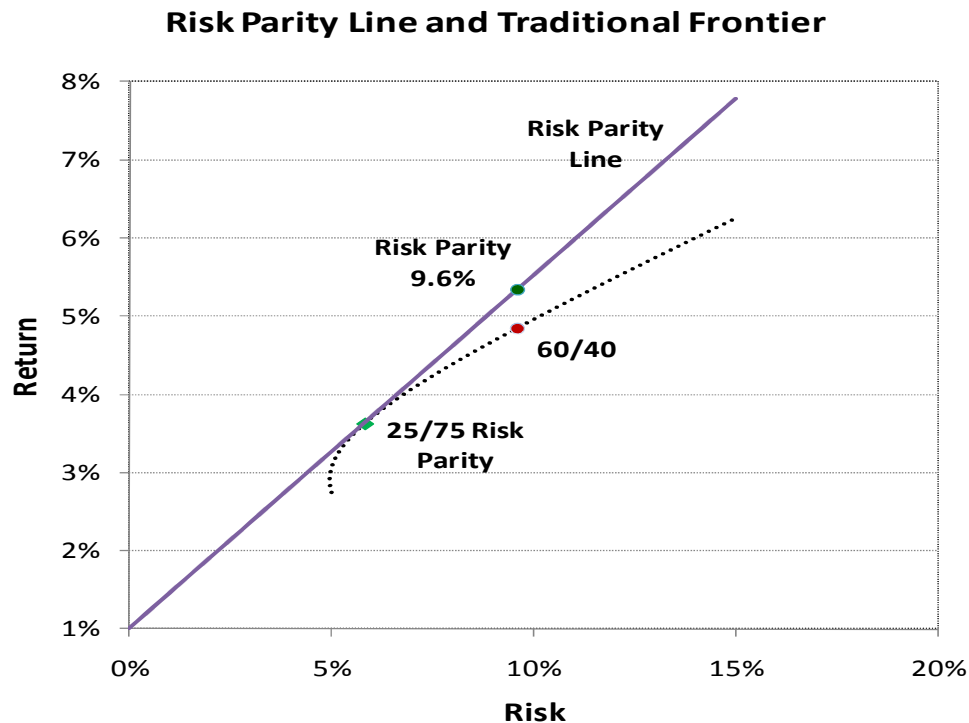
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# Risk Parity

## Risk Parity in a nutshell

- » Capture return premiums in a risk-balanced diversified portfolio



# Discussion and Debate

## Is Risk Parity dangerous?

- » Leverage
- » Liquidity risk
- » Risk premiums

# Leverage

## Leverage – A Taboo after 2008?

- » Modern economy is built on credit
  - » Banking system, corporate borrowing, consumer credit
  - » Businesses that own both insurance companies and investment companies – guess who?
  - » State governments that issues debts to invest in pensions – good idea?
  
- » Investment strategies use leverages
  - » Private equity, real estate, hedge fund, common equity, 130/30
  - » Risk Parity

# Leverage

## Leverage – good and bad

- » Excessive leverage and illiquidity
  - » LTCM – 200:1 and spread trades
  - » Bear Stearns and Lehman Brothers: 30-40:1 and overnight repos versus structured credits
  - » AIG: CDS insurance without capital reserve – it's free money,  $\infty$ :1
- » Good and prudent use of leverage
  - » Corporate issuers with strong balance sheet – why would Google do it?
  - » Risk Parity to both reduce risk concentration and enhance return
    - » 2:1 Leverage is applied to the whole portfolio NOT just to bonds
    - » Cash 5 – 10 times of required collateral

## Investing in illiquid assets

- » Many alternative investments are highly illiquid
  - Private equity, real estates, hedge fund
  - Don't need quantitative measure for it
    - Multi-year lock-up
    - Withdraw halted during 2008 financial crisis
- » Traditional asset classes have varying degree of illiquidity
- » Should risk parity invest in illiquid assets?

# Liquidity

## Correlation and liquidity/volatility

	GSCI	S&P 500	Russell 2000	MSCI x US	EM Equity	US Treasury	US TIPS	US Corp	US MBS	US ABS	US CMBS	US HY	EMB	Chg Tedsp	Chg VIX
GSCI	1.00														
S&P 500	0.22	1.00													
Russell 2000	0.23	1.00	1.00												
MSCI x US	0.24	0.82	0.82	1.00											
EM Equity	0.31	0.72	0.73	0.77	1.00										
US Treasury	-0.04	-0.13	-0.14	-0.24	0.20	1.00									
US TIPS	0.26	0.02	0.03	-0.09	0.10	0.65	1.00								
US Corp	0.14	0.27	0.27	0.20	0.24	0.68	0.67	1.00							
US MBS	-0.05	0.04	0.03	-0.08	-0.06	0.84	0.60	0.71	1.00						
US ABS	0.22	0.12	0.13	0.06	0.13	0.42	0.60	0.69	0.54	1.00					
US CMBS	0.20	0.31	0.32	0.23	0.33	0.22	0.49	0.55	0.22	0.44	1.00				
US HY	0.23	0.60	0.61	0.57	0.61	-0.09	0.26	0.54	0.11	0.46	0.58	1.00			
EMB	0.17	0.55	0.56	0.57	0.69	0.14	0.36	0.48	0.28	0.32	0.45	0.57	1.00		
Chg Tedsp	-0.12	-0.07	-0.10	-0.13	-0.19	0.06	-0.28	-0.29	0.03	-0.36	-0.41	-0.39	-0.22	1.00	
Chg VIX	-0.19	-0.69	-0.70	-0.65	-0.62	0.12	-0.10	-0.34	-0.02	-0.10	-0.29	-0.54	-0.61	0.21	1.00

Diversification against equity risk

ABS/CMBS/HY/EMB's poor liquidity and equity exposure

- » Monthly returns from 1993 to 2010
- » Change in TED spread as a liquidity measure
- » Change in VIX as a volatility measure

# Liquidity



## Risk, return and tail risks

	<i>GSCI</i>	<i>S&amp;P 500</i>	<i>Russell 2000</i>	<i>MSCI x US</i>	<i>EM Equity</i>	<i>US Treasury</i>	<i>US TIPS</i>	<i>US Corp</i>	<i>US MBS</i>	<i>US ABS</i>	<i>US CMBS</i>	<i>US HY</i>	<i>EMB</i>
Excess Return	0.74%	4.78%	4.94%	0.90%	6.46%	2.80%	3.39%	3.47%	3.00%	2.31%	3.60%	4.62%	8.21%
Volatility	29.08%	18.36%	18.55%	19.05%	30.65%	4.62%	4.99%	6.43%	3.20%	5.06%	11.43%	12.52%	12.69%
SR	0.03	0.26	0.27	0.05	0.21	0.61	0.68	0.54	0.94	0.46	0.31	0.37	0.65
Skewness	-0.37	-0.73	-0.78	-0.79	-0.78	-0.21	-0.98	-0.70	-0.04	0.16	-0.82	-1.21	-2.40
Kurtosis	1.66	1.14	1.32	0.89	2.05	1.07	5.64	4.66	1.83	11.73	18.62	9.68	13.76

High Sharpe ratios of  
for bonds

ABS/CMBS/HY/EMB 's  
greater tail risks

- » High-risk assets did not perform well, why?
- » Low quality bonds fall between stocks and investment grade bonds and they have a high degree of illiquidity and tail risk, ill-suited for risk parity



# Equity Risk Premium

## Some perspectives

- » Is Sharpe ratio of 0.25 for equity low?
  - Not really – between 0.2 to 0.3 over long time period
  
- » Why it was not higher?
  - Extremely favorable environments: declining inflation, global economic expansion, emerging market growth, Greenspan puts, etc.
  - It is just volatile: value destruction from tech bubble and credit bubble
  - Or maybe it's cap-weighted indices
  
- » It is very hard to forecast

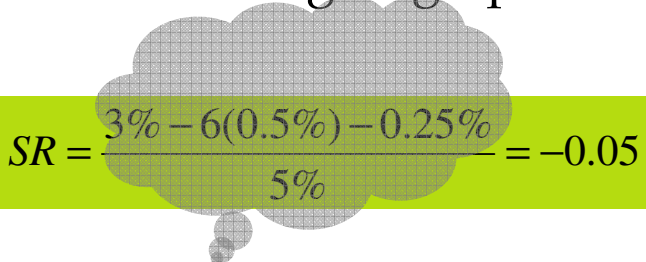
$$SR = \frac{2\% + 5\% - 0.25\%}{15\%} = 0.45$$

# Bond Risk Premium

## Some perspectives

- » Is Sharpe ratio of 0.60 high?
  - Yes - between 0.2 to 0.3 over long time period
- » Why it is so high?
  - Disinflation in the US and in the developed world
  - Without the tailwind of declining rates, it would be near 0.40
- » It is very easy to forecast and the rates are going up because ...

$$SR = \frac{3\% - 0.25\%}{5\%} = 0.55$$



$$SR = \frac{3\% - 6(0.5\%) - 0.25\%}{5\%} = -0.05$$

$$SR = \frac{3\% + 6(0.5\%) - 0.25\%}{5\%} = 1.15$$

# Stock versus Bond

## Relative return and relative valuation

- » Stocks have higher expected returns than bonds, even in the “best” scenario for bonds – they should!
- » Stocks look so cheap relative to bonds
  - Earning yield =  $1/15 = 6.67\%$  >> bond yield = 3%
- » But stocks are riskier, they should be cheaper. What about risk-adjusted valuation
  - Earning yield/risk =  $6.67/15 = 0.44$ ; bond yield/risk =  $3/5 = 0.60$
- » How to beat a 60/40 benchmark, why not 70/30 - is that TAA?

# Commodity Risk Premium

## Two contradicting views

- » Commodities offers no risk premium
  - Suppliers can always produce more to meet the demand
  - No income, no dividend
  - Historical returns came from roll yield
  
- » Commodities are in short supply
  - The era of low price is over: emerging market demand
  - Dwindling resources, peak oil
  - Fiat currencies in trouble

# Commodity Risk Premium

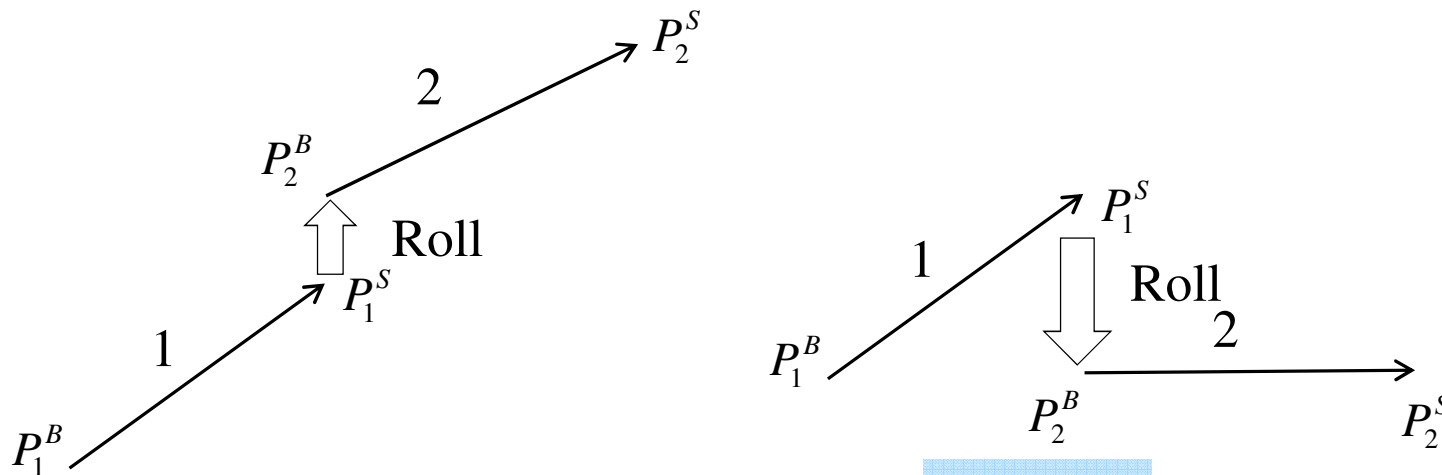
## Understand roll yield

- » Investing in commodity futures
  - Rolling into next contract
  - Contango (negative roll yield) versus backwardation (positive roll yield)
- » Financial futures are often in contango (S&P 500, Treasury, gold) due to spot-future parity
  - Yet they have had long-term positive returns - buy high/sell higher?
- » Why commodity futures depends on roll yields?
  - Sell high/buy low?

# Commodity Risk Premium

## Understand roll yield

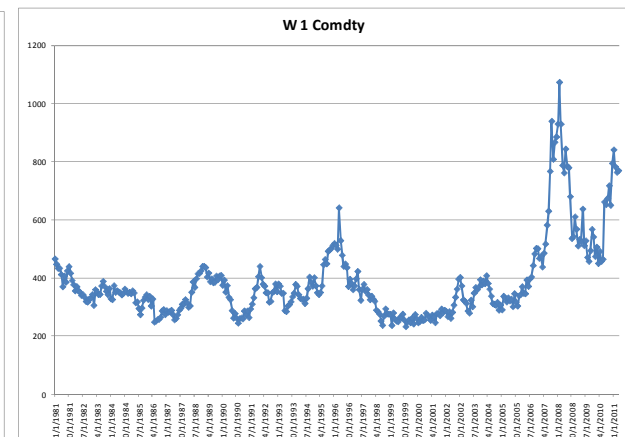
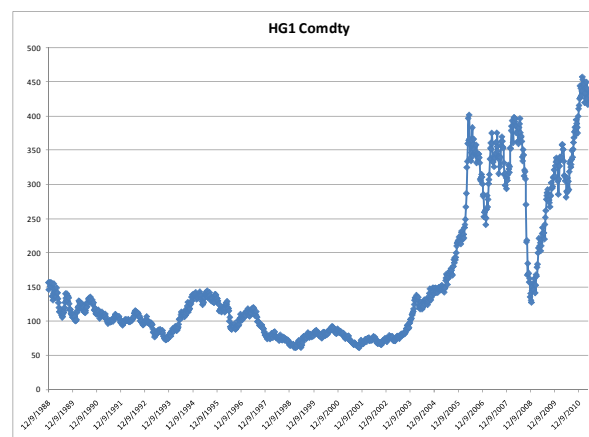
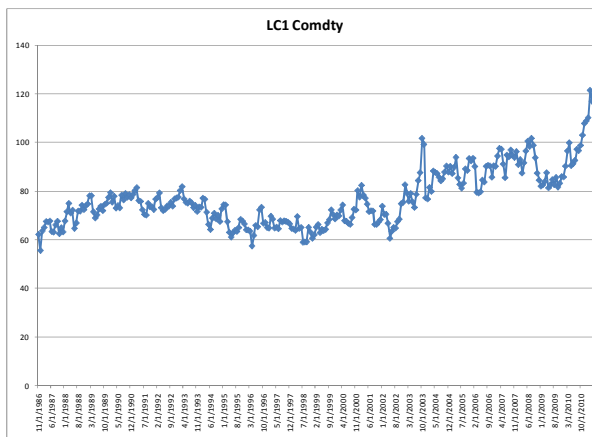
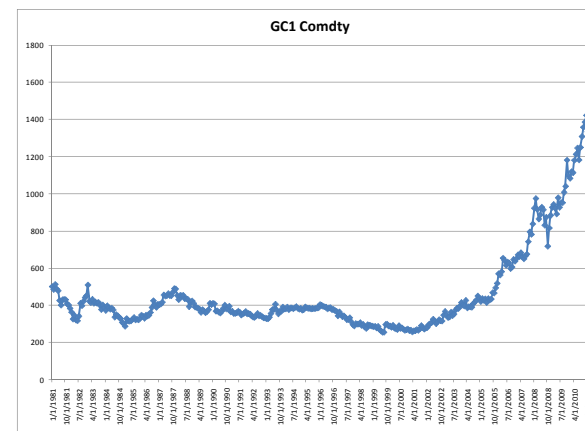
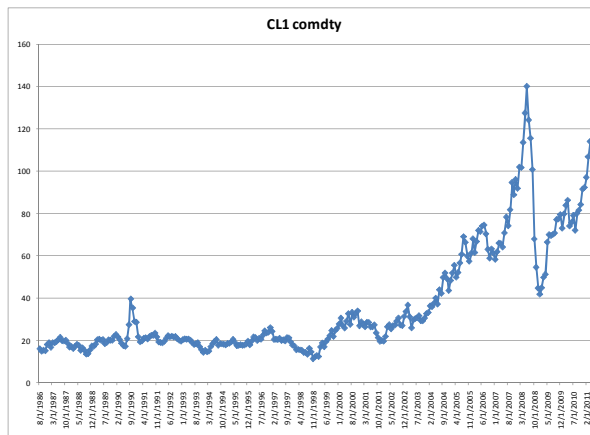
- » Roll yield is important only if the price of a commodity stays unchanged for the long run



$$1 + r = \frac{P_1^S}{P_1^B} \cdot \frac{P_2^S}{P_2^B} = \left[ \frac{P_1^S}{P_2^B} \right] \cdot \frac{P_2^S}{P_1^B} = \underbrace{\left( \frac{P_1^S}{P_2^B} \right)}_{\text{Roll yield}} (1 + r_{\text{price}})$$

# Commodity Risk Premium

## Historical prices



# Risk Parity and Risk Premiums

## Capture risk premiums in a diversified portfolio

- » Positive and roughly equal risk-adjusted premiums
- » Forecasting long-term returns is challenging
- » Diversification is key to risk-adjusted returns
  - Nominal bonds and commodities – a natural hedge
  - Pro-growth risky assets versus counter-cyclical safe assets
  - A Chinese fable – Spear and Shield
- » No need for diversification with perfect foresight and certitude



# The Risk Parity Alternative

## Risk Parity as alternative investments

- » Risk Parity focuses on risk-adjusted returns
- » It has presented some challenges to traditional approach to investing
  - Asset managers
  - Advisors
  - Investors

# The Risk Parity Alternative

## Risk-adjusted returns

- » Investment industry has not focused on risk-adjusted returns
- » Asset allocation portfolios are often loaded with risky assets with equity risk and illiquidity risk
- » Asset class indices are poor proxies for return premiums
- » Illusion of diversification leads to risk concentration
- » **A paradigm shift?**

# The Risk Parity Alternative

## From traditional to alternative

- » Traditional asset allocation is a well-accepted practice
  - Strategic forecasts and strategic asset allocation
    - 60/40 or alike
  - Selection underlying managers
    - Passive or active vs. cap-weighted indices
  - Tactical shift based on return forecasts
    - Bias towards risky assets
- » A rocky ride with low risk-adjusted returns

# The Risk Parity Alternative

## Asset managers

- » Risk parity or not?
- » What to with traditional asset allocation products?
- » If risk parity, what's the difference?

# The Risk Parity Alternative

## Advisors

- » Embrace risk parity or not?
- » Peer risk, timing risk
- » Where does it belong, GTAA or alternative?
- » A slice or the whole pie?
- » How to fit it into the traditional advisory service?
- » How to evaluate the strategy and product offerings?
- » How to educate plan sponsors?

# The Risk Parity Alternative

## Investors

- » Leverage or not?
- » A slice or the whole pie?
- » Why not do it ourselves?
- » Can risk parity achieve investment objectives?
  - Return target, liability requirement
- » What is the benchmark: cash/inflation plus, 60/40?
- » Peer risks??
- » What if interest rate goes up?