

Discussion of
“Expected inflation, real rates, and stock-bond
comovement”
by Greg Duffee

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The views expressed here are mine and are not representative of the views of Deutsche Bundesbank or the Eurosystem.

Outline

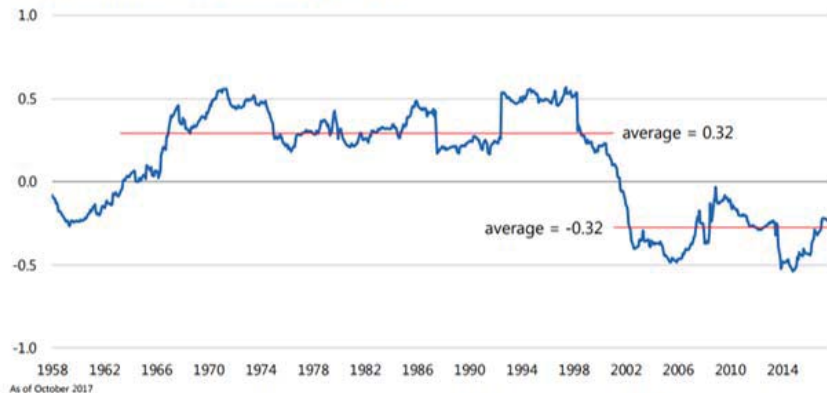
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 - Residuals, Regimes or Time-Varying Means?
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Summary of the paper and related literature

Observation 1: Stock-Nominal Bond Correlation

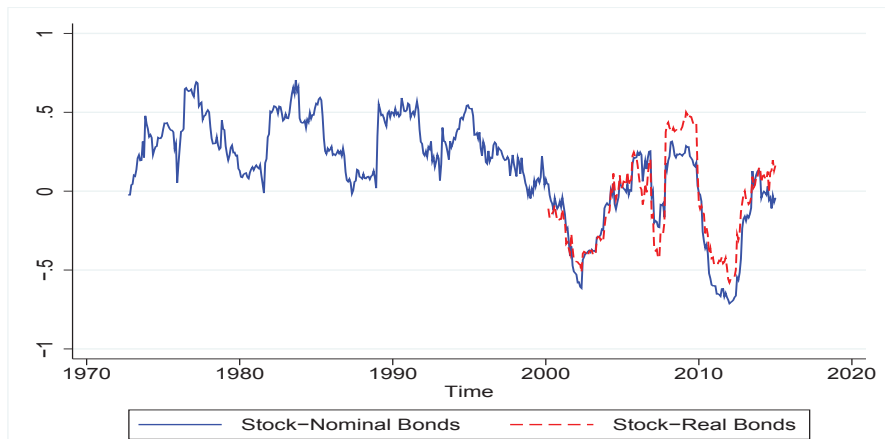
Well known fact: correlation of returns on U.S. stock and **long-term nominal** bonds switched sign in late 1990s (see e.g. Li 2002; Baele et al 2010, ...)

History of the stock-bond correlation: rolling 12 months



Observation 2: Stock-Real Bond Correlation

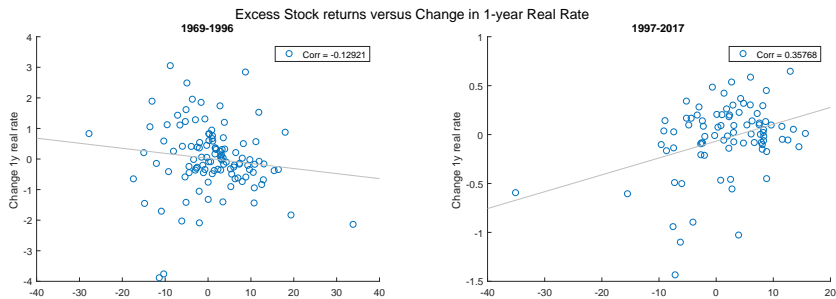
Not so well known fact: correlation of returns on U.S. stock and **long-term real** bonds very similar to that with nominal bonds (see Campbell et al 2009; Liu 2018)



Source: Liu 2018

Observation 3: Stock-Real Short Rate Correlation

New fact: correlation of U.S. stock returns and changes in **short-term real** rates also switches sign in late 1990s



Source: Duffee 2018

- What can we learn from this observation regarding explanations for the switching stock-bond correlation?

Previous explanations for changing stock-bond correlation

- Baele et al (2010): regime-switching factor model for stock and bond returns → macro factors explain little of the conditional comovement, risk premium and liquidity factors more important.
- Campbell et al (2018): switch in stock-bond correlation coincides with break in output-inflation link ⇒ when output and inflation positively correlated, disinflationary news are bad news but make nominal bonds more valuable → they are a hedge for aggregate risk.
- Baele and Van Holle (2017): Negative stock-bond correlations associated with periods of accommodative monetary policy, but only in times of low inflation. Stock-bond correlations are always positive when monetary policy is restrictive.

Greg's approach

- We see that the correlation between stock returns and **real short rates** also switches sign. That rules out the liquidity and risk premium story of Baele et al.
- But both real rates and stock returns should react to macroeconomic news, so a macro explanation is possible.
- For 1969 – 1996 and 1997 – 2017 separately, estimate

$$\begin{pmatrix} \Delta r_t \\ ex_t \end{pmatrix} = \begin{pmatrix} \mu_{\Delta r} \\ \mu_{ex} \end{pmatrix} + \underbrace{F\epsilon_t}_{\text{Macro component}} + \underbrace{\eta_t}_{\text{Residual component}},$$

where ϵ_t macro “shocks” measured as revisions to GDP and GDP deflator forecasts from the SPF.

Greg's approach - ctd.

- Then do a covariance decomposition for both samples:

$$\text{Cov} \begin{pmatrix} \Delta r_t \\ ex_t \end{pmatrix} = \underbrace{FCov(\epsilon_t)F'}_{\text{Macro component}} + \underbrace{Cov(\eta_t)}_{\text{Residual component}}$$

- And study relative importance of macro component for $Cov(\Delta r_t, ex_t)$ within and across the 1969 – 1996 and 1997 – 2017 samples.
- Reasoning: to the extent that macro dynamics explain the switching sign in the stock real rate comovement, we should see the off-diagonal element of $FCov(\epsilon_t)F'$ switch sign across samples.

Main finding

- The component of the stock-real rate comovement spanned by macro news is positive in both samples. It is the residual component which switches sign.

Panel B. Contemporaneous covariances with stock returns

Sample [Num Obs]	Variable	Spanned by Expectation Innovs	Orthogonal to to Expectation Innovs	Test of Equality
1969Q1 – 1996Q4 [112]	3-month rate	1.27* (0.77)	-1.30 (0.85)	2.58** (1.17)
	1-year rate	0.89 (0.67)	-2.07** (0.85)	2.96*** (1.10)
1997Q1 – 2017Q4 [84]	3-month rate	1.00** (0.50)	0.11 (0.23)	0.88* (0.50)
	1-year rate	0.81*** (0.30)	0.19 (0.17)	0.62* (0.33)
Test of Equality Across Samples	3-month rate	0.28 (0.92)	-1.42 (0.88)	
	1-year rate	0.08 (0.73)	-2.26*** (0.87)	

- What do we learn from this? Not clear...

Comment 1: Residuals, Regimes or Time-Varying Means?

- Bianchi et al. (2018) argue that regimes of high (low) asset valuations relative to fundamentals are associated with persistently low (high) values for the real fed funds rate. Find break around 2000:



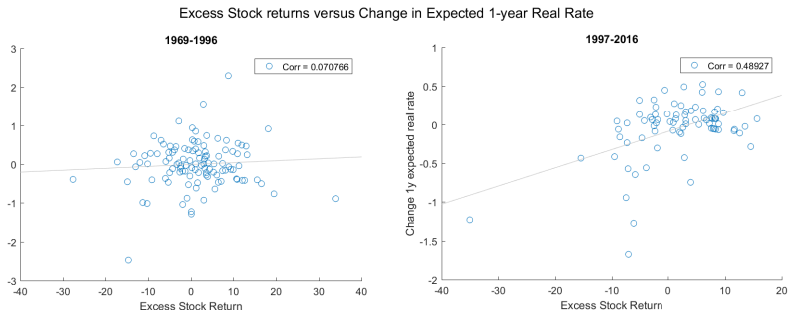
- These regimes are also evident in Greg's results: $\mu_{\Delta r}$ is .13 in pre-97 and $-.2$ in post-97 sample; μ_{ex} is 1.8 in pre-97 and 2.7 in post-97 sample.

Residuals, Regimes or Time-Varying Means? - ctd.

- More generally, conditional means of real rate changes and stock returns time-varying. In particular, expected real rates are persistent and likely depend on monetary policy communication.
- In Greg's model, the residual component will pick up time variation in expected real rates. If expected real rate changes comove with stock returns, and this comovement changed in late 1990s (as suggested by BLL's results), this might explain the sign switch of the stock real rate correlation.
- Suggestion: incorporate survey-based expected real rates in analysis.

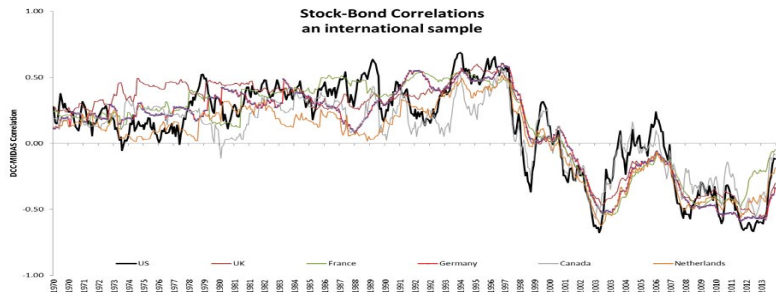
Stock Returns Comove with Exp. Real Rates Post-1997

- I take the one-year expected real rate from Crump, Eusepi, Moench (2018). This is using all available surveys of professional forecasters for the US, including the SPF.
- Relating the quarterly change in the expected real rate to excess stock returns gives a small positive correlation pre-97 and a strong positive correlation post-97:



Comment 2: International Evidence

- The stock-nominal bond correlation switches sign in various countries around the same time.



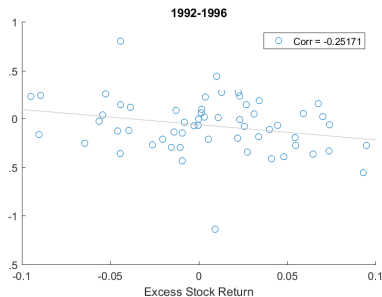
Source: Baele-Van Holle 2017

- Attempts to explain the switch need also “work” in other countries.

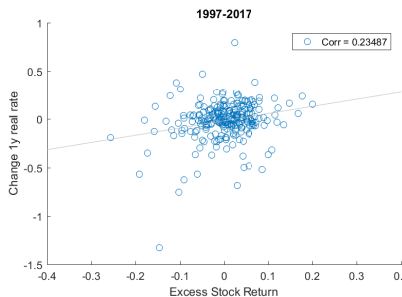
How about $\text{Corr}(\Delta r_t, ex_t)$ in other countries?

- Suggestion: check correlation between stock returns and real short rates in other countries.
- I take inflation expectations from Consensus Economics and correlate stock returns with changes in real rates for DE, FR, UK.

DE: Excess Stock return vs Change in 1-year Real Rate

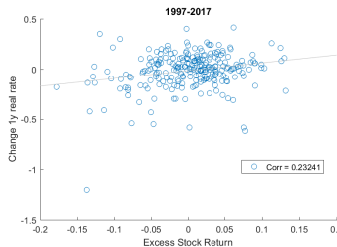
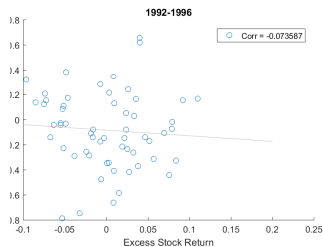


Source: Haver, Consensus Economics, own calculations

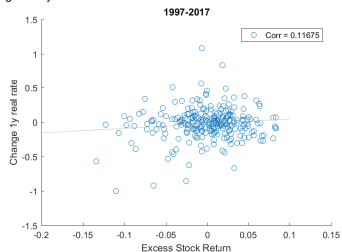


Weak evidence for sign switch also in FR and UK

FR: Excess Stock return vs Change in 1-year Real Rate



UK: Excess Stock return vs Change in 1-year Real Rate



Conclusion

- Nice paper that provides some interesting food for thought on stock-bond correlations.
- Interesting new fact: correlation between stocks and real short rate also switched sign in late 1990s.
- As the switch in the stock-bond correlation, this seems to be an international phenomenon.
- So far, we only learn what does *not* explain this change.
- Look forward to future versions of the paper digging in deeper.