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# Investors Must be Bribed: An Inquiry into Options and Skewness

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In a recent paper, Turan G. Bali and two other scholars looked into the relationship between expected (*ex ante*) stock returns on the one hand, and the characteristics of their risk-neutral distribution as implied from option prices on the other.

The three implied characteristics they tested are: **volatility, skewness, and kurtosis.**

In terms of the continued vitality or otherwise of CAPM in finance, the most intriguing result involves skewness.  For the risk-neutral option prices don't skew the way one might expect, given an important strain in modern financial theory, the strain I like to think of as the "Investors Must be Bribe" (IMBB) principle.

As a refresher, the standard definitions of the tested-for characteristics are as follows: *volatility* is the variation of price – in graphic terms, it is the width of the bell curve; but *skewness* is the measure of the extent to which the bell is lopsided one way of the other. If the tail on the right hand side is longer or fatter than that on the left, the bell is said to have "positive" skewness. The contrary lopsidedness is "negative."  Finally, *kurtosis* is the flatness or peakedness of the curve around the mode. The kurtosis of a bell curve is 3. A kurtosis with a higher number than 3 is "leptokurtic."

Bali et al. find that each of these three moments is positively related to *ex ante* expected returns.  This is consistent with existing models with regard to volatility. Once one gets to skewness, though, the relation of these findings to the existing body of theory becomes more ambiguous.

### Investors Must Be Bribed

As the authors say, a 2000 publication by **Campbell Harvey and Akhtar Siddique** presented evidence of a *negative* relation between historical skewness and future stock returns, and that finding seemed to support theoretical predictions. After all, investing in a security with negative skewness looks a lot like playing a sport in which the field is tilted to one's disadvantage. You would do that only if you were bribed to do that: right? So higher returns – the premium or bribe — should accompany the negative skew. This is one application of the principle: IMBB.

I don't of course mean anything either penal or technical by the word "bribe" in this context. It's just that IMBB is a punchier way of speaking of this than saying "investors must expect a premium in order to justify their purchase of certain sorts of product." IMEAPIOTJTPOCSOP?

Bali et al also mention, in a rapid literature review at the opening of their paper, that other scholars have made a finding contrary to that of Harvey/Siddique. For example, Zahid Rehman and Grigory Vikov (2012) found what Bali et al. call "*positive* relations between measures of risk-neutral skewness and future stock returns." [I've added the italics.]

But Bali et al. don't really engage that debate. Rather, they change the subject, though in a way that leads to distinctive theoretical consequences. While Harvey and Siddique wrote of historical skews, as did Rehman/Vikov, Bali et al write of implied skews. And they find a positive relationship between skew and return.

**Option Market Demand Pressure**

So what happens to the notion that IMBB? In this case, it is trumped, the authors suggest, by a different aspect of theoretical models, the modeling of option pricing on demand-based equilibria. They cite a paper by Nicholas Bollen and Robert Whaley paper from 2004 setting out this view.

To be sure I had a fix I this, I contacted one of the authors, Scott Murray, Assistant Professor of Finance at the University of Nebraska, Lincoln. He said in an email that it is the "physical skewness of the underlying stock's return" that stands behind the IMBB phenomenon. Risk neutral option-implied skewness, on the other hand, is "subject to option market demand pressures" that delink it from the underlying in this respect.

So: mystery solved, I gather. It is still the case that investors must be bribed.

Aside from Turan G. Bali, a professor of Business Administration at the McDonough School of Business at Georgetown, portrayed above, and Murray, the paper was co-authored by Jianfeng Hu (Lee Kong Chian School of Business, Singapore Management University).

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**Author Bio:**
Christopher Faille is a **Jamesian pragmatist**. William James has taught him, for example, that "you can say of a line that it runs east, or you can say that it runs west, and the line per se accepts both descriptions without rebelling at the inconsistency."

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1. **Peter Urbani** <u>January 6th, 2014 12:29 am</u> :

   Nice Article. In a portfolio setting it is actually the co-skewness and co-kurtosis terms, which make up skewness and kurtosis, that make the major contribution to whether the portfolio distribution is positively or negatively skewed. Whilst we can never know the shape of the future distribution with great accuracy we can decompose the risk of a portfolio into its four moment contributions after the fact and thus gain a greater understanding of where our performance is / isn't coming from and more importantly of the interaction between assets within the portfolio. It is perfectly possible to combine two assets each of which has a negatively skewed distribution at some weighting and obtain a positively skewed outcome. One consequence of investors preference for positive odd moments ( Mean & Skew ) is that if you remember the raw formula for variance is $(X - \bar{X})^2$ and recall the rate at which systematic volatility declines so that portfolio volatility is typically 'diversified' at around 30 – 35 stocks you will then see that because raw skewness is $(X-\bar{X})^3$ the rate at which the skewness term is diversified away is higher thus to obtain a positively skewed portfolio distribution this argues for more concentration into around 16 or so holdings with the larger portfolio weigtings being concentrated on those holdings with the largest positive co-skewness. For a toy example see:
   **http://www.scribd.com/doc/94727221/Portfolio-Analytics-Coskew-and-CoKurt-VBA3** ( Download as an .xls file )

2. **Peter Urbani** <u>January 6th, 2014 12:32 am</u> :

   Sorry for the duplicate postings my browser kept posting while I was editing – please delete the first two and this oneobviously. Tks

3. kfox <u>January 6th, 2014 11:04 am</u> :

   Hope I've got the right one posted. Drop me an email if I didn't. I haven't deleted anything just in case.
   Best,
   Kristin

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