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# Risk

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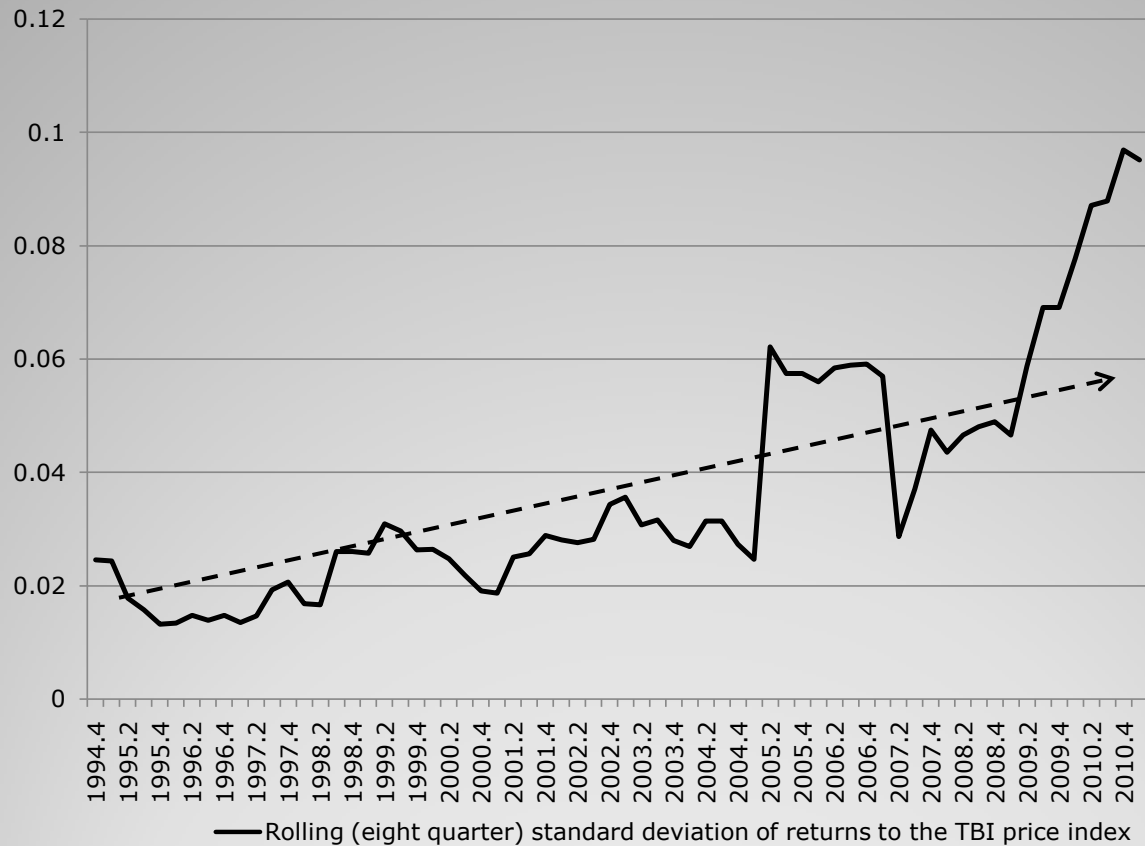


- **Risk deals with chance that results will be worse than initially expected, and possible magnitude of disappointment.**
  
- **Issues:**
  1. How do you measure risk?
  2. What the underlying factors that drive returns (and therefore risk)?
  3. Issues that came to fore during financial crisis (but people have been thinking about for a while): liquidity, changing correlations, tail risk

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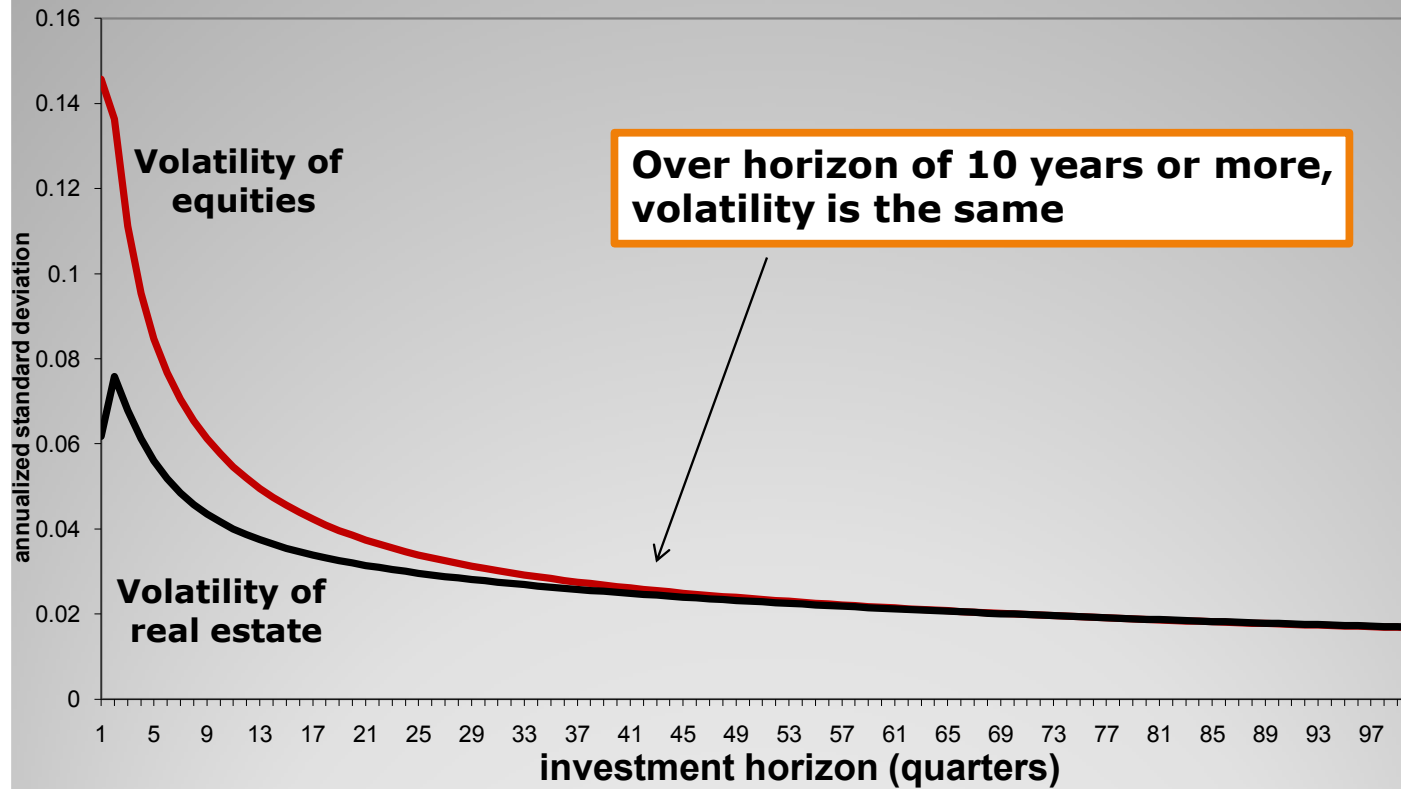
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Source: "The Changing Face of Real Estate Investment Management", 2011, *The Journal of Portfolio Management*, Vol. 37, No. 5

# Volatility increasing



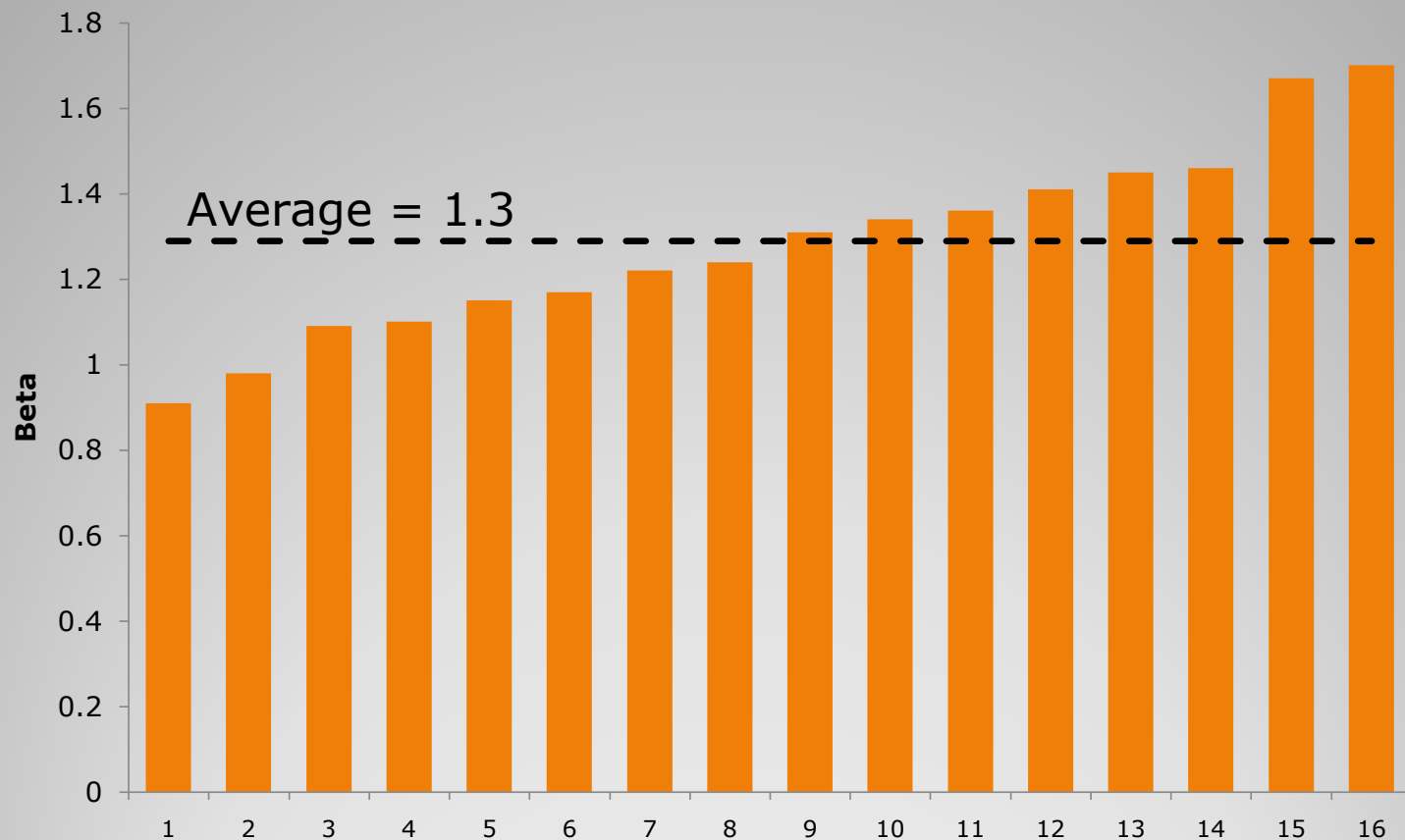
Source: MacKinnon and Al Zaman, "Real Estate for the Long Term: The Effect of Return Predictability on Long Horizon Allocations", 2009, *Real Estate Economics*, Vol. 37, No. 1

**Volatility depends on your horizon**

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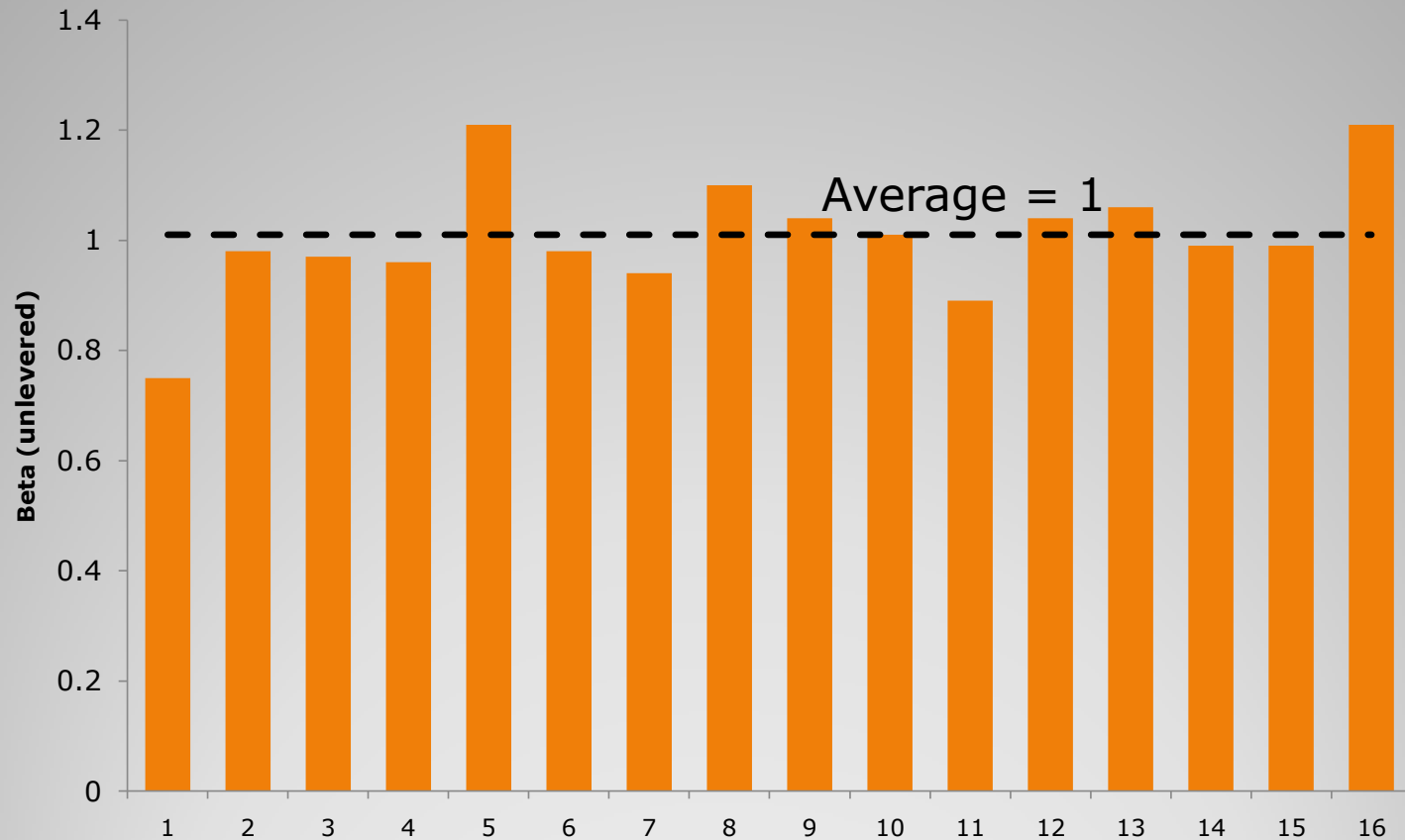
Source: Fairchild, MacKinnon and Rodrigues, "Are All Open-End Core Funds Created Equal?", 2011, *The Journal of Portfolio Management*, Vol. 37, No. 5

**Betas for 16 open-end core funds**

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Source: Fairchild, MacKinnon and Rodrigues, "Are All Open-End Core Funds Created Equal?", 2011, *The Journal of Portfolio Management*, Vol. 37, No. 5

# Unlevered betas for core funds

- **Real estate risk harder to analyze than equities – no history of returns on individual properties**
- Some research beginning to look at issues using property level data
  - e.g. Plazzi, Torous and Valkanov, “Exploiting Property Characteristics in Commercial Real Estate Portfolio Allocation”, 2011, The Journal of Portfolio Management, Vol. 37, No. 5
  - Real estate portfolio performs better if tilted towards low cap rate, low vacancy, high value properties

**Research just beginning to use property characteristics**

## Liquidity:

- See, e.g., Bond and Slezak, "The Optimal Portfolio Weight for Real Estate with Liquidity Costs, Estimation Error, and Uncertainty Aversion", 2011, working paper, University of Cincinnati
- Account for illiquidity with estimated BA spread and probability of liquidation
- Illiquidity has smaller affect on than you might think

**Recent issues being looked at**

- **Correlations change over time:**

- Copulas: describes relationship between asset classes over different conditions (unlike a static correlation)
- See, e.g., Knight, Lizieri and Satchell, "Diversification When It Hurts? The Joint Distributions of Real Estate and Equity Markets", 2005, Journal of Property Research, Vol. 22, No. 4.

**Recent issues being looked at**

- **Fat tails: extreme market conditions happen more than they “should”**
- RE returns are not normal, volatility not sufficient measure
- Can use more realistic distribution in allocation models, more realistic measures of risk (semi-variance)
- See, e.g., Coleman and Mansour, “Real Estate in the Real World: Dealing with Non-Normality and Risk in an Asset Allocation Model”, 2005, *Journal of Real Estate Portfolio Management*, Vol. 11, No. 1

**Recent issues being looked at**