

*Discussion of*  
***Making Sense of the  
Subprime Crisis***  
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Brookings Panel on Economic Activity  
September, 11-12 2008

**What were investors thinking?**

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# Specifically, could high foreclosure rates have been anticipated?

- Change in foreclosure rate over time ( $df/dt$ ) divided into two components:

- $df/dt = (df/dp) \times (dp/dt)$



(1) Sensitivity of foreclosures to house price changes



(2) Change in house prices over time

# Summary of Findings

- Data reveal high, non-linear, sensitivity of foreclosures to house price declines
  - Consistent with default as a put option
  - Other risk factors (LTV, 2<sup>nd</sup> liens, looser underwriting) increasing over time, but less important
  - True even during period of rapid *average* price appreciation
  - Can estimate sensitivity using much higher regional variation in house prices

# Summary of Findings

- Authors conclude (from data and analysts' reports)
  - $df/dp$  mostly understood
  - $dp/dt$  less well understood
- Note  $df/dp_A$  inferred from  $df/dp_i$ 
  - Simulations suggest response to regional ( $p_i$ ) price shocks are decent predictor of response to aggregate shock ( $p_A$ )
  - But need not be, since optimal default rule likely sensitive to source of shock and expected price dynamics

# The Debate

- Investors were ignorant
  - Short time series of subprime performance data
  - Benign historical foreclosure rates on asset class
  - Complex structures, agency problems, masked risk
- Events were extremely unlikely
  - Long history of positive average house price appreciation; recent high growth rates in house prices
- Investors were foolhardy

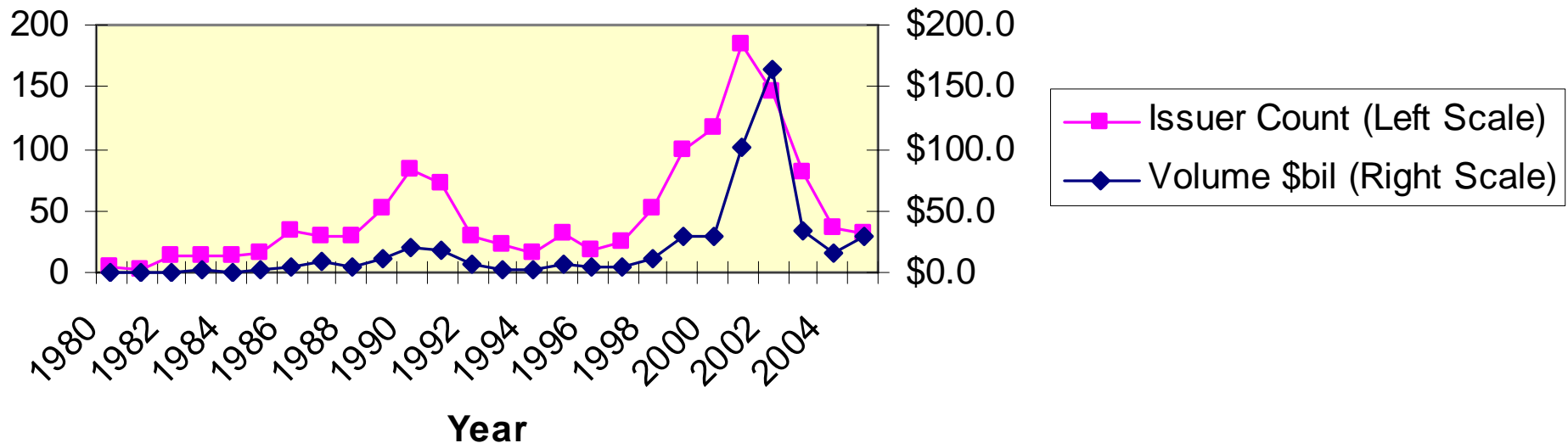
# Answers matter for policy

- e.g.,
  - Ignorance => discourage opaque financial structures
  - Unforeseeable => intervene to limit immediate damage, but no fundamental changes needed
  - Purposeful risk-taking => look for ways to improve institutional and policy incentives for prudence (reduce reliance on call options for compensation)

**What else did investors know?**

# Historically, episodes of high default rates are rare, but there are a few in recent memory

**Annual Global Default Counts and Volume Totals, 1980-2005**  
(source: Moody's)



# Investor risk tolerance was at historical highs in mid-2000's

## Credit Risk Reprices

### S&P Composite Spreads



Data as of April 24, 2008. Source: Standard & Poor's Global Fixed Income Research

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# Investors were taking more risk on debt securities across sectors

## A Speculative Grade World – Two-Thirds of U.S. Nonfinancials are Speculative Grade

### U.S. Speculative-Grade Share of Ratings For Non-financial Sectors

Sector	Speculative Grade Share of Industry (%)		
	20 Years Ago	10 Years Ago	Now
Auto/capital goods/aero/metals	52	59	74
Consumer & service	52	58	71
Energy/natural resources	46	48	62
Forestry, homebuilders	52	60	72
Health care/chemicals	44	50	75
High technology/office equipment	66	57	73
Media and entertainment	77	73	86
Real estate	24	12	30
Telecommunications	4	51	73
Transportation	25	39	61
Utility	8	10	18

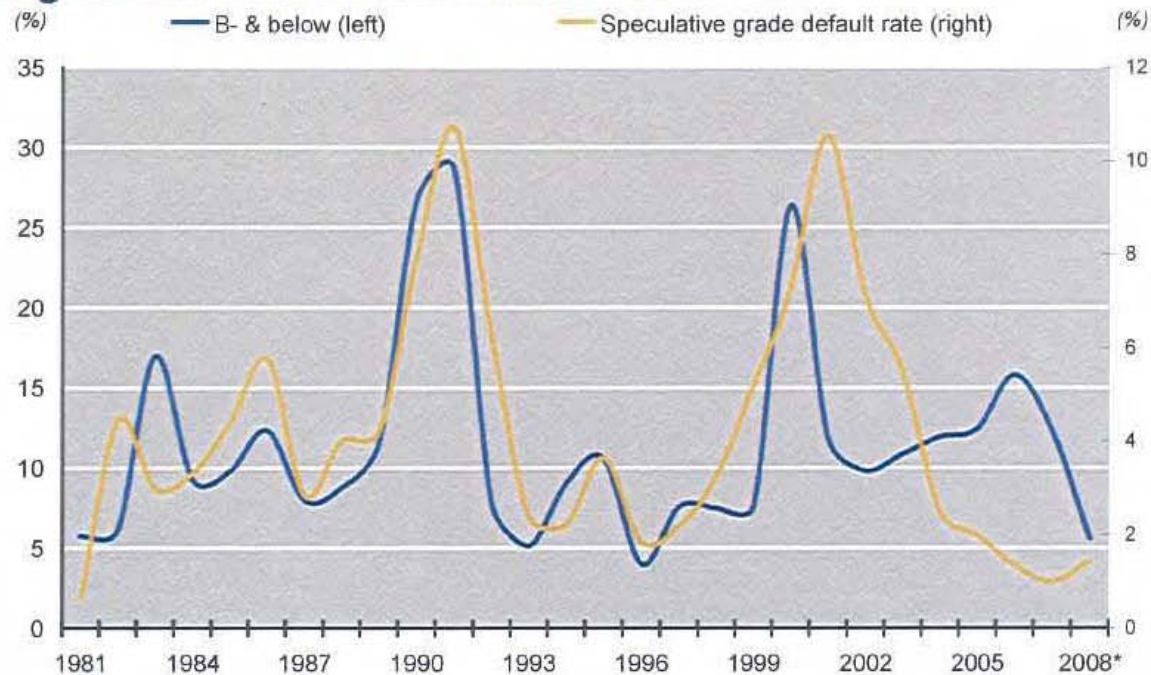
Data as of Mar. 31, 2008. Includes parent and subsidiary level issuers.  
 Source: Standard & Poor's Global Fixed Income Research, Standard & Poor's CreditPro®.

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# Speculative grade issue volume is a leading indicator of defaults

## Reversion to the Mean?

### Origination Trends and Default Rate : U.S.



\* 2008 through March 31. B- and lower ratings calculated as a share of total speculative-grade. U.S. Region defined as the United States, Bermuda, and the Cayman Islands.

Source: Standard & Poor's Global Fixed Income Research; Standard & Poor's CreditPro®

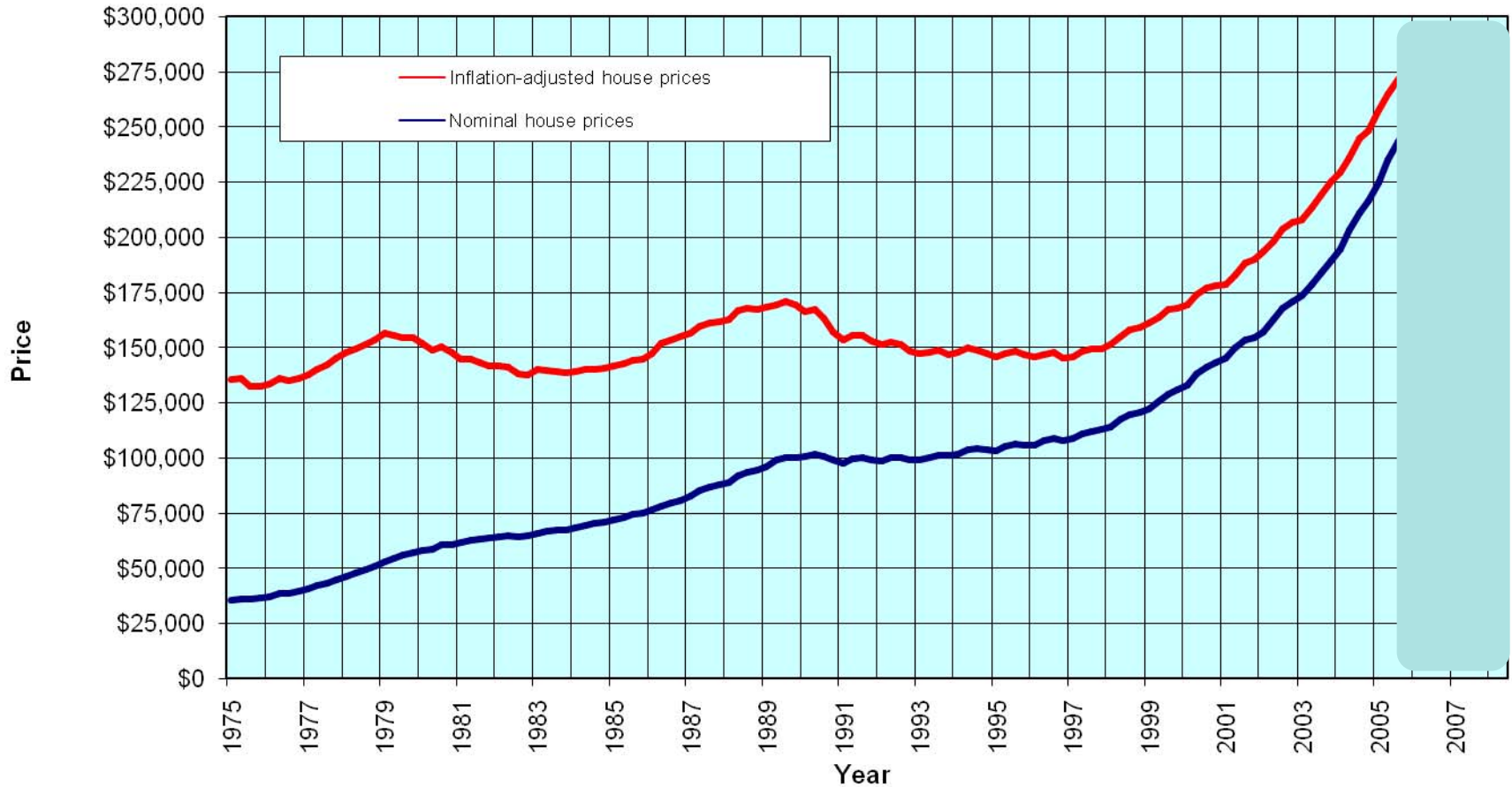
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Benign historical default rate on subprime unlikely to be a reliable predictor of future performance

- New market (until recently mostly FHA)
  - Born of risk tolerance, increased reliance on FICO scores
- Weaker underwriting standards, more aggressive products

# What goes up ... could come down?

United States House Prices



e.g., NASDAQ precedent

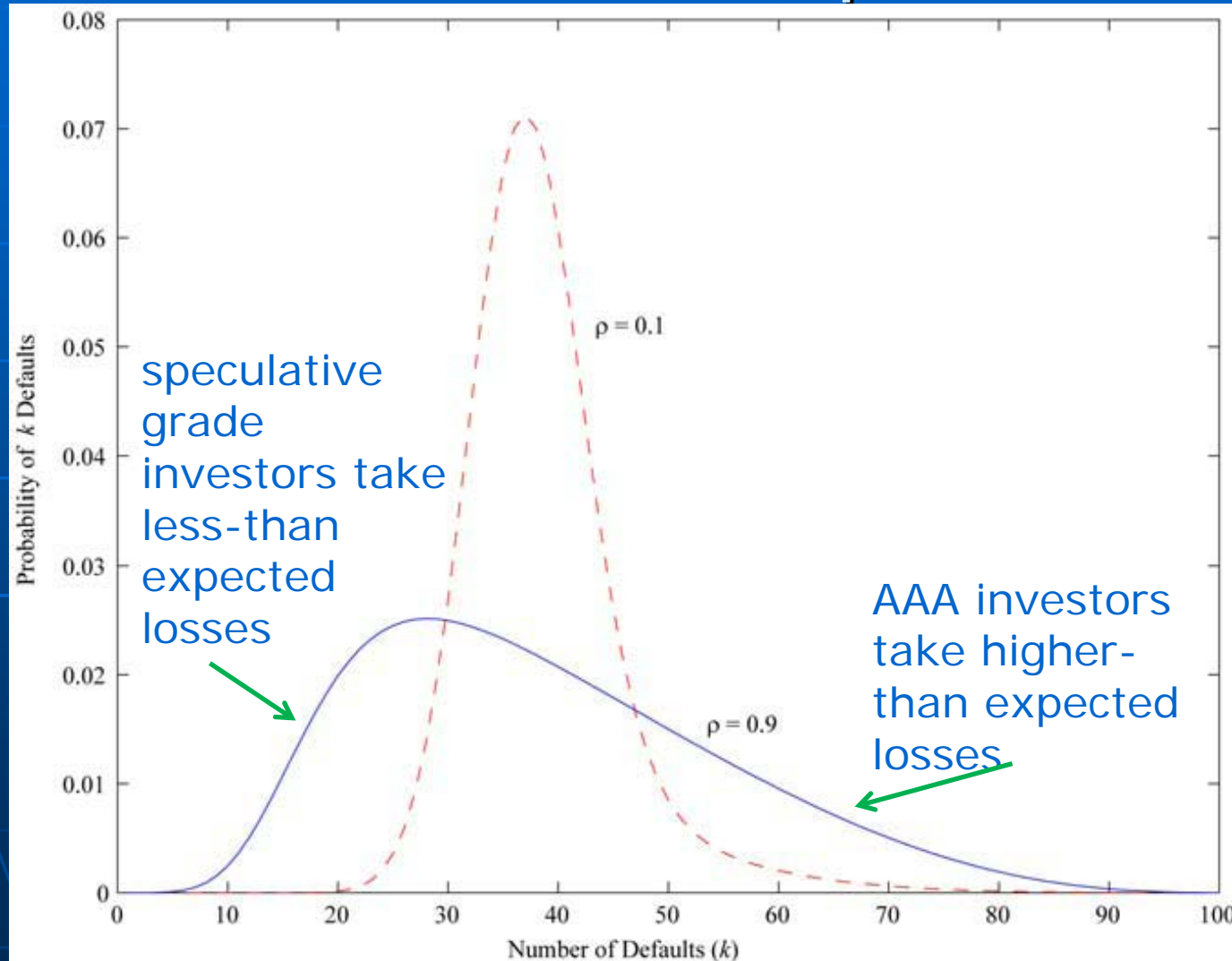
Putting the facts in this broader context points more to purposeful risk-taking than to a lack of information about the inherent risk

Still, there is evidence that the probability of a broad-based housing price decline was under-estimated...

# A different cut of the data

- Were subprime security prices consistent with ex ante risk?
  - Prices reflect foreclosure risk + recovery rates and risk premia
- Distinction between individual house price risk and the effect of correlation
- Some have argued that: (e.g., Duffie (2004), Coval et. al. (2007), i-banks)
  - high-risk securities were priced appropriately
  - AAA securities mispriced because investors did not properly estimate default correlations

# Correlation and default frequency in structured credit products



Source: D. Duffie (2004!), "Structured Credit Index Products and Default Correlation"

# In (slight) defense of rating agencies

- Authors claim "S&P apparently believed that  $df/dp$  was low"
- Probably no more wrong about individual security risk than others (i.e., micro  $df/dp_i$ )
- Mistake was about correlation of price changes and implications for the risk of structured products
- Not clear others fully recognized this either

# Final caution: should we take analysts' reports seriously?

- Objective analysis or marketing tools?
  - Some good information...
  - but marketing considerations suggest that analysts err on side of over-optimism as a selling tool in up markets
  - and exaggerate the difficulty of predicting risk once they have lost money and are looking for help (LTCM &  $6\sigma$  events)