

# Differential Impacts of Structural and Cyclical Unemployment on Mortgage Default and Prepayment

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*Research and analysis on the  
transformative power of capital*



# Summary of Presentation

- Results of research conducted by:
  - Roberto G. Quercia
  - Anthony Pennington-Cross
  - Chao Yue Tian
- Background
- Empirical strategies
- Findings
- Conclusions

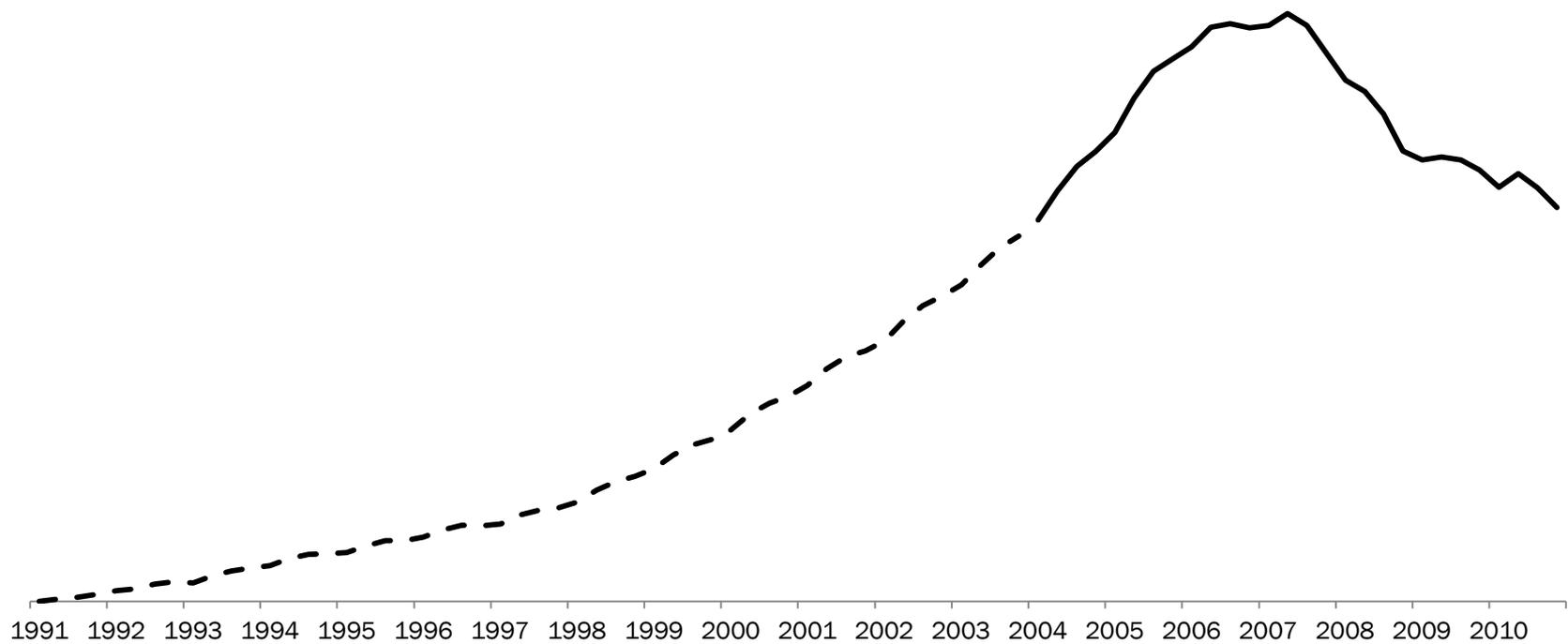


## Structural Unemployment Matters

- Structural unemployment ► important
- Cyclical unemployment ► less important
- Economic environment ► important

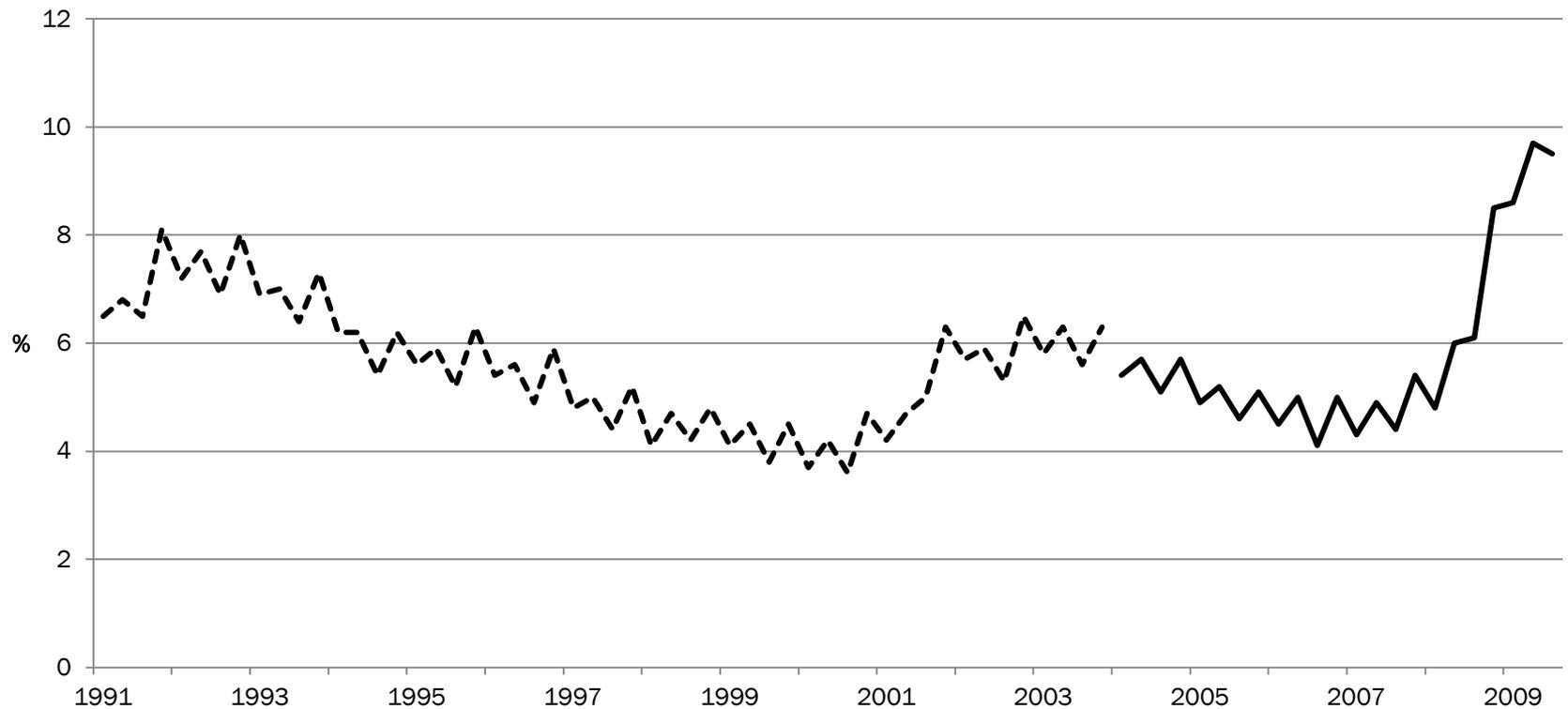


# The Great Recession: House Price



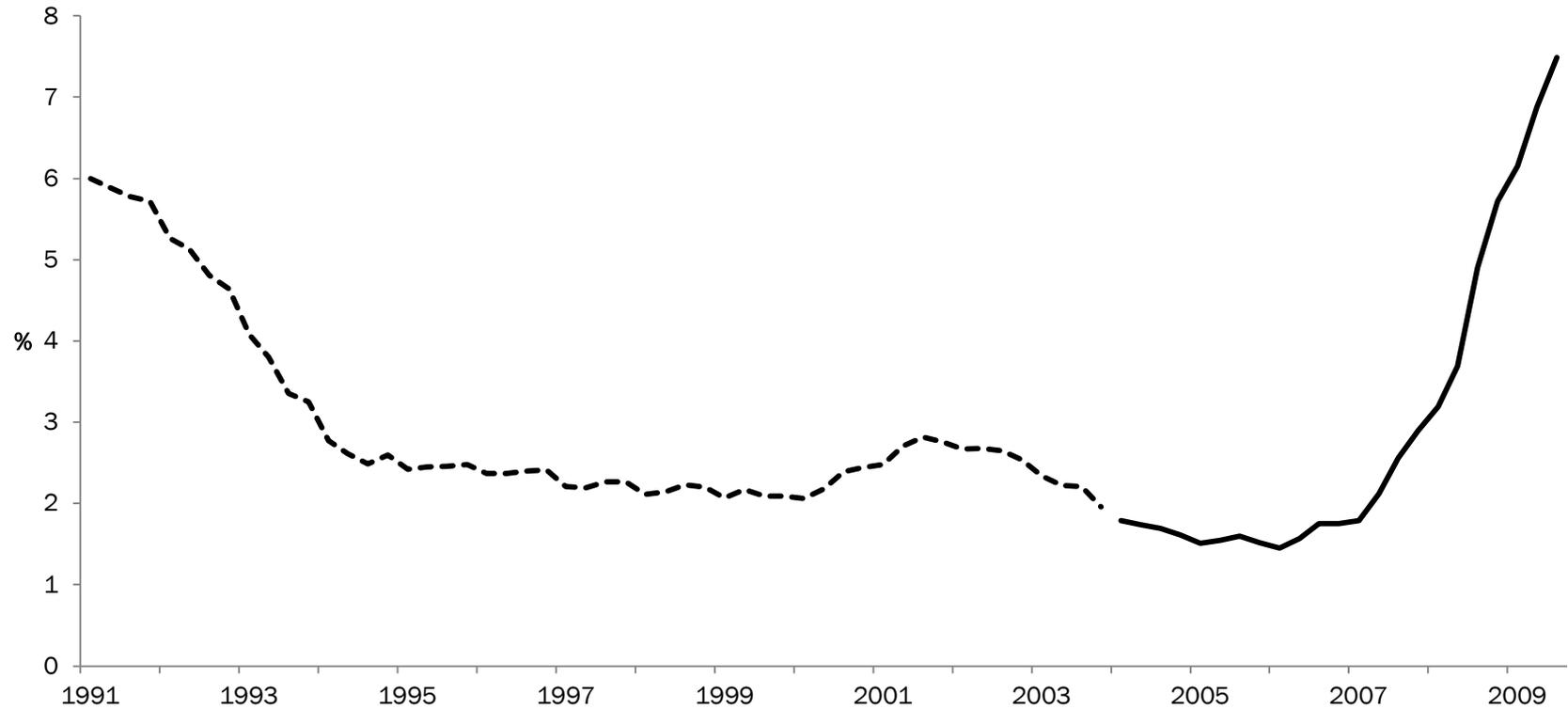


# The Great Recession: Unemployment Rate



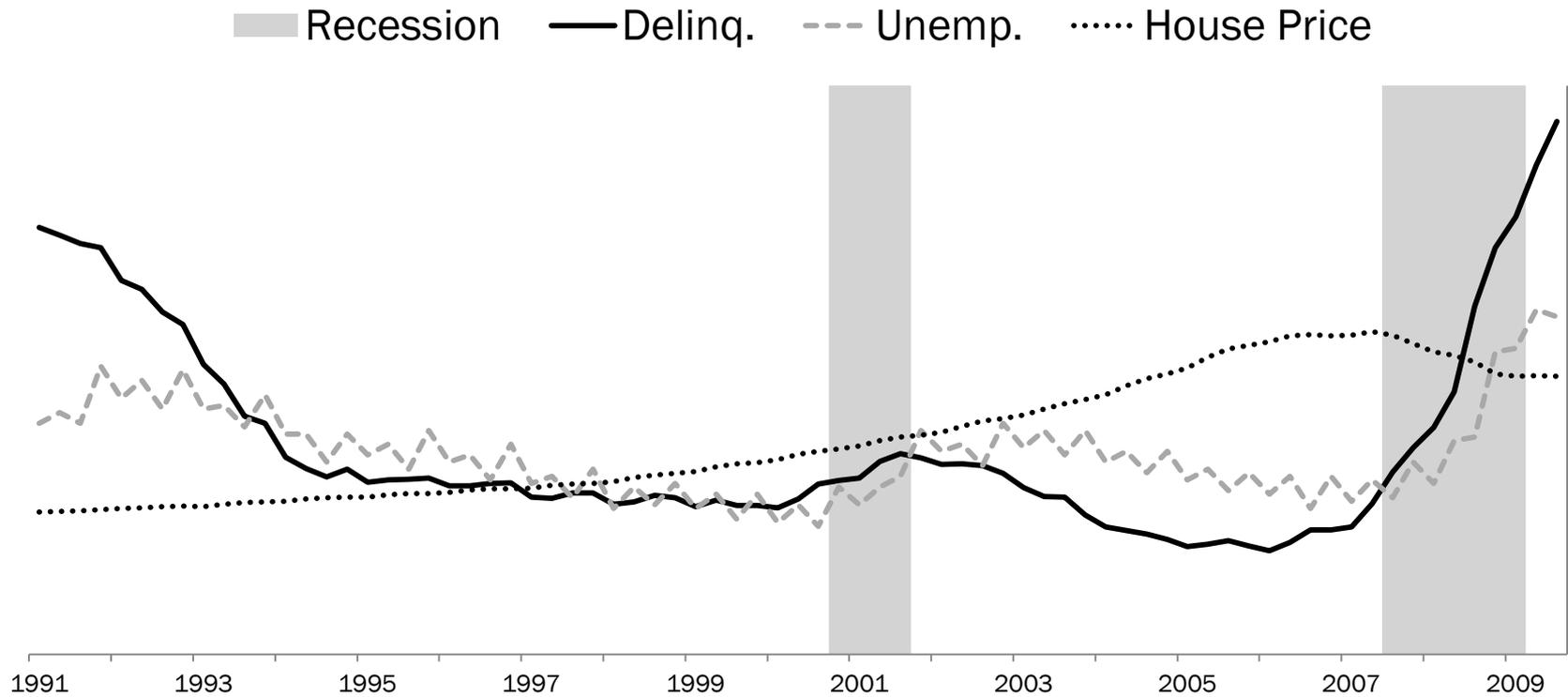


# The Great Recession: Delinquency Rate





# Delinquency and House Price: Unemployment



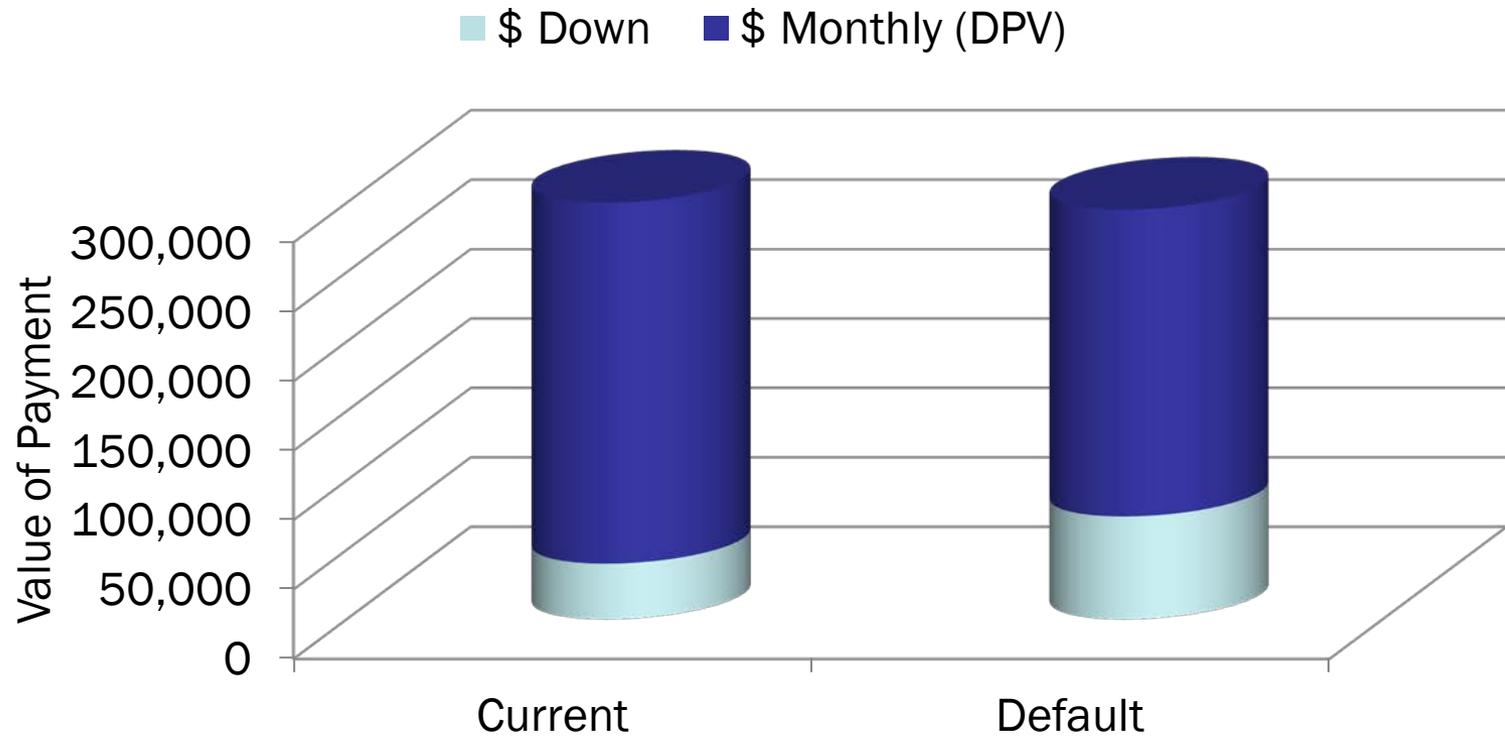


# What Explains Mortgage Default

- Option based theory
- Negative equity
  - House prices



# Example: Option-Based Theory





## Adverse Trigger Events & Default

- Borrowers default due to inability-to-pay
- Local unemployment as a proxy



# Business Cycle Theory and Unemployment Rate

$$y_t = c_t + \tau_t$$

- $y$  ► level
- $c$  ► cyclical component
- $\tau$  ► structural component



## Research Questions

- Structural / cyclical unemployment and mortgage default
- Local economic environment and mortgage default
  - Local unemployment and default drivers



## Empirical Strategies

- Identify structural / cyclical component of local unemployment rate
- Model mortgage default
- Simulate the impact of risk factors on default



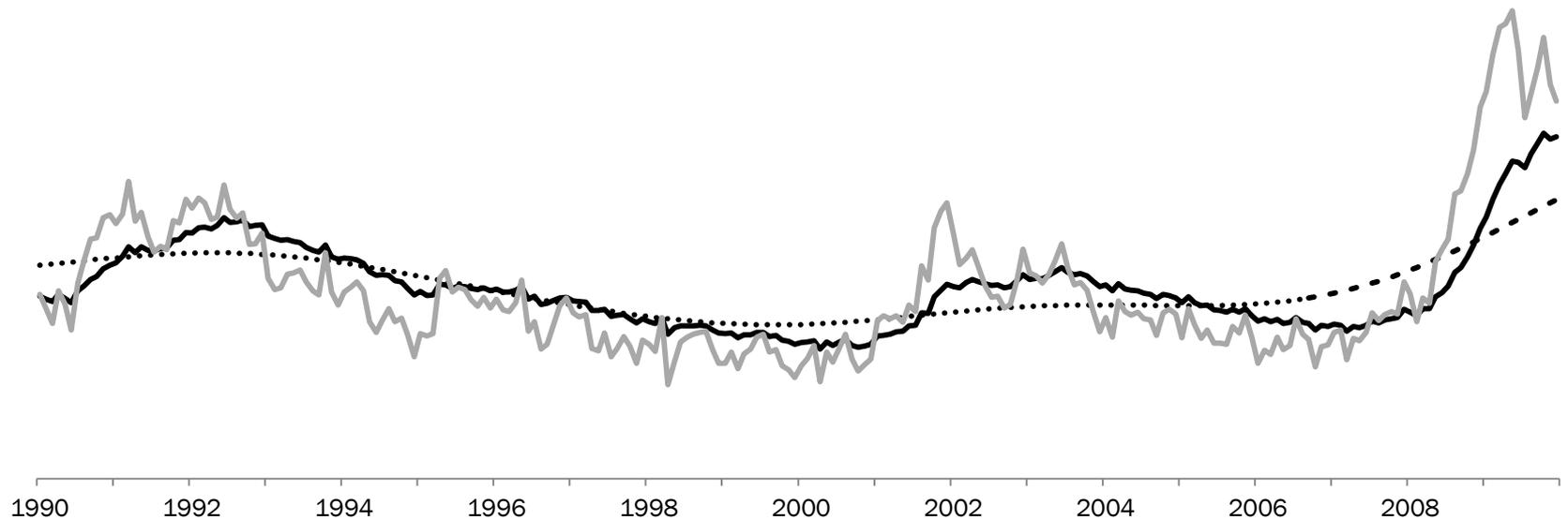
## Trend Decomposition

- Hodrick-Prescott (HP) Filter (1997)
- Beveridge and Nelson (BN) Decomposition (1981)



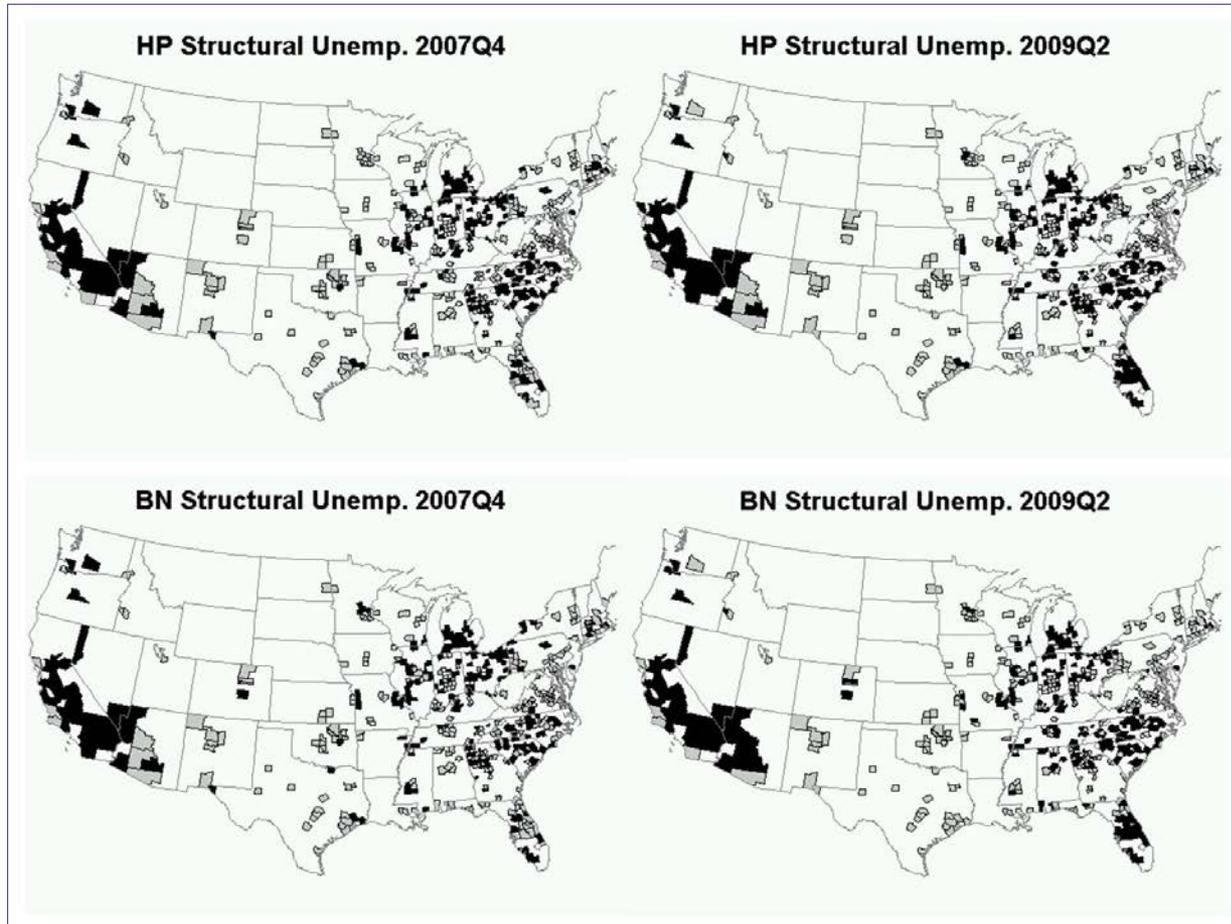
# U.S. Unemployment Rate Decomposition

— US level    ..... HP struc.    — BN struc.





# County Structural Unemployment





## What Is Hazard?

- Conditional probability
- Example:  $\lambda(49|Asian, Male)$ 
  - Age: 49
  - Race: Asian
  - Sex: Male
- Survival rate



## Loan Performance Data

- Self-Help loans
  - Fixed rate, 30-year, purchase loans
- CRA loans, low- and moderate-income borrowers, minority neighborhoods



## Variables at Origination

|                 | Mean   | Std dev |
|-----------------|--------|---------|
| Income/AMI      | 0.589  | 0.158   |
| DTI (front end) | 0.275  | 0.074   |
| Credit Score    | 678    | 64      |
| Loans           | 22,538 |         |



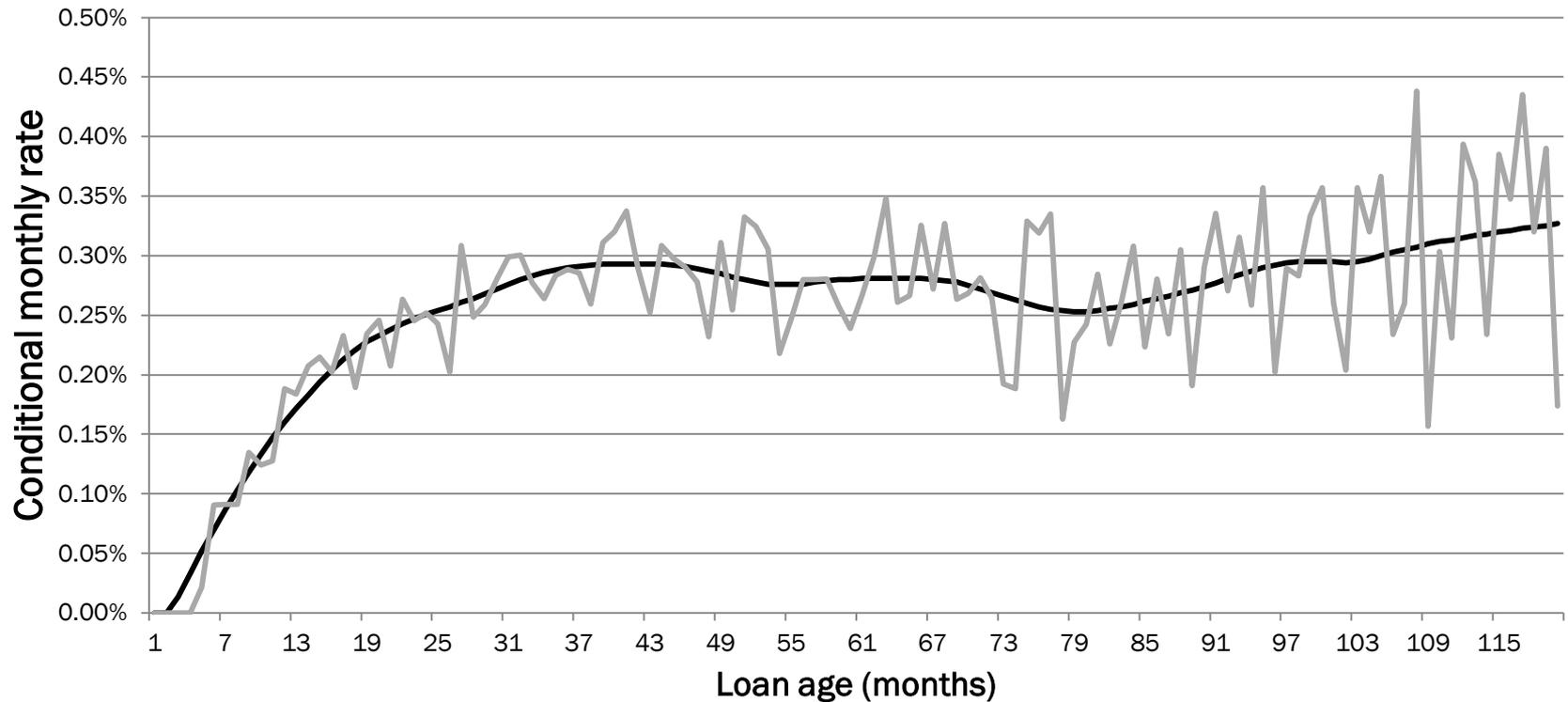
## Time Varying Variables

|                   | Mean    | Std dev |
|-------------------|---------|---------|
| Current LTV       | 0.788   | 0.150   |
| Unemp. Rate       | 5.430   | 1.814   |
| Cyclical HP       | 0.001   | 0.994   |
| Cyclical BN       | 0.006   | 0.864   |
| Structural HP     | 5.429   | 1.530   |
| Structural BN     | 5.436   | 2.186   |
| Loan age (months) | 45      | 28      |
| Obs. (monthly)    | 968,561 |         |



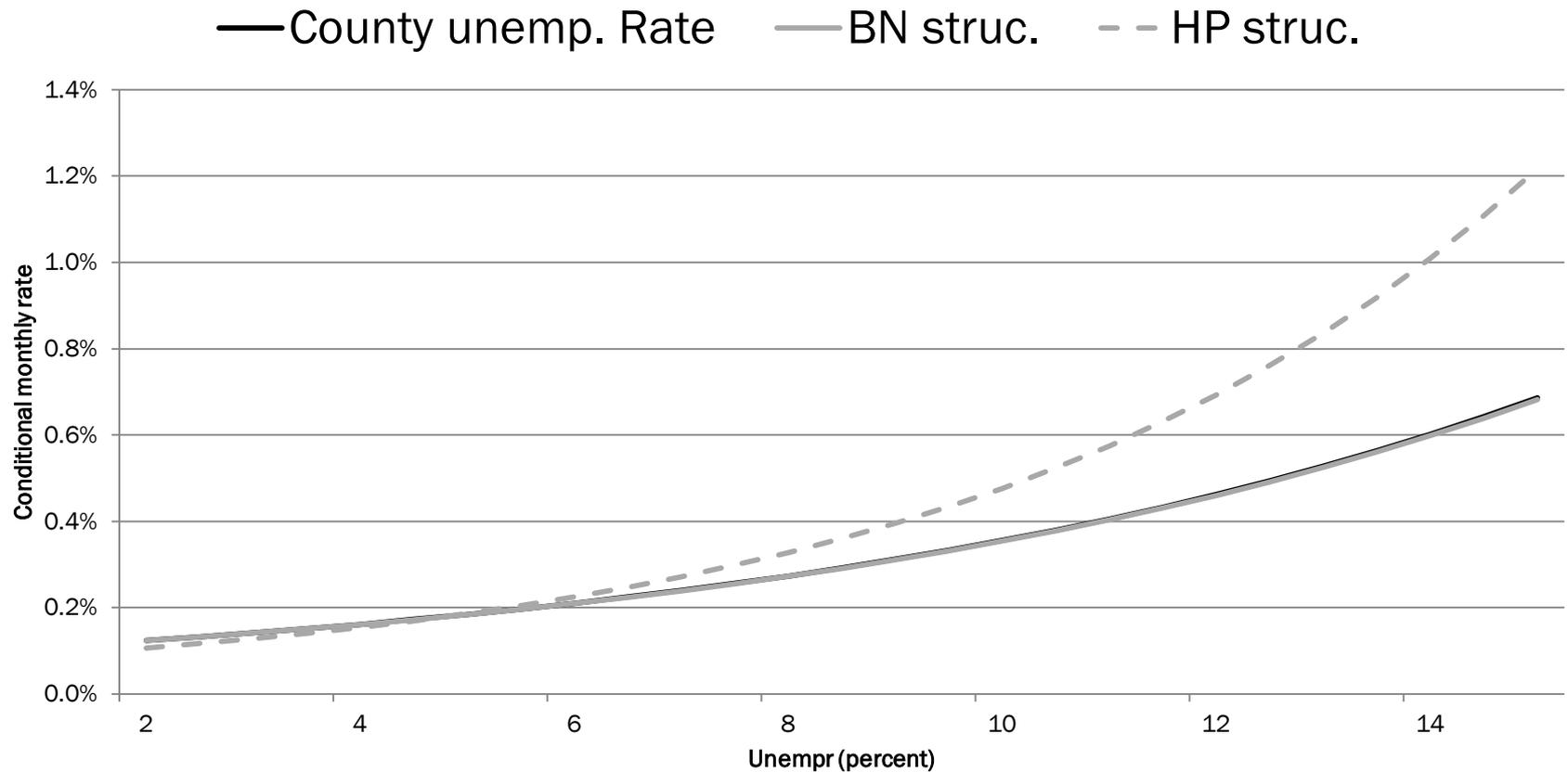
# Baseline Loan Performance: Default

— Local regression    — Kaplan-Meier



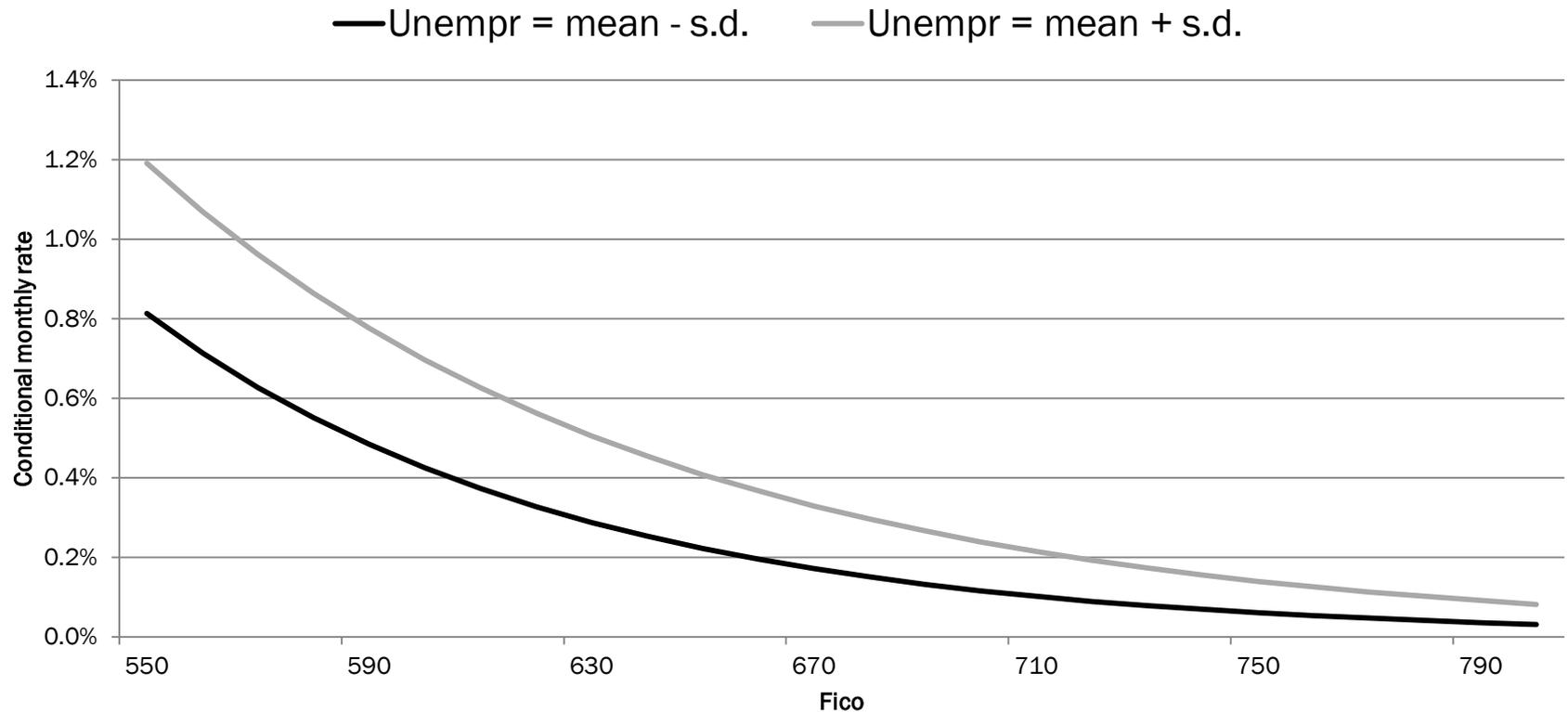


# Default vs. Unemployment Rate



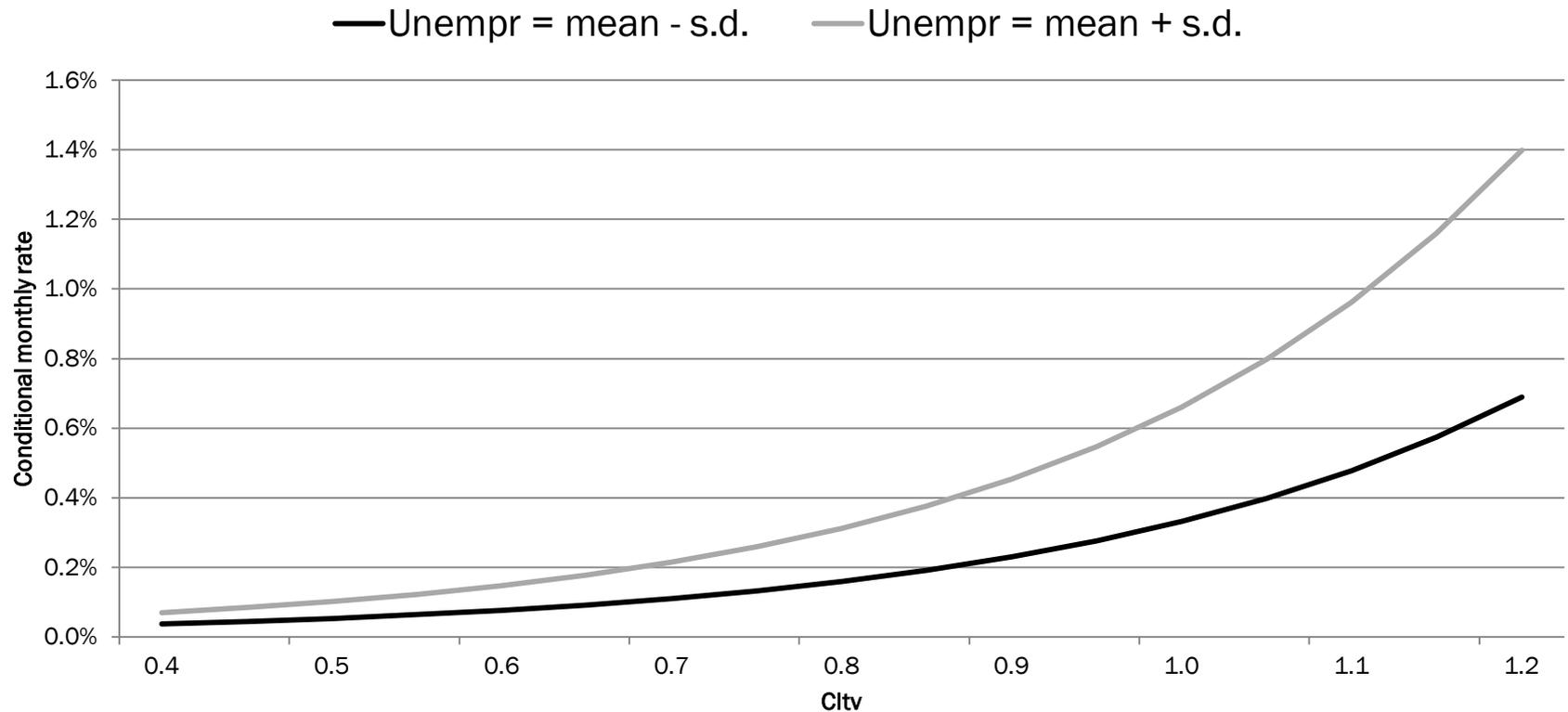


# Default vs. Credit Score under Different Economic Environment (Level & BN)



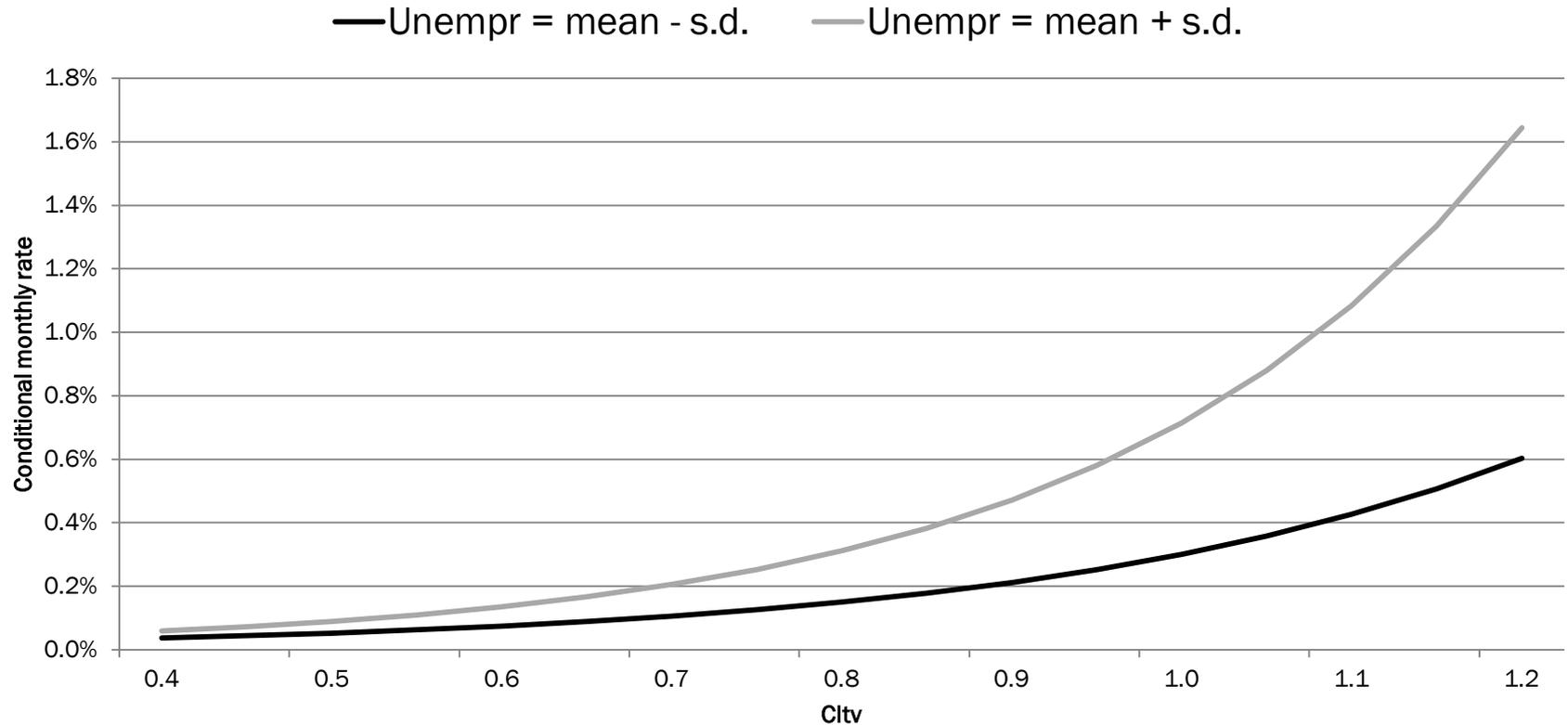


# Default vs. CLTV under Different Economic Environment (Level)





# Default vs. CLTV under Different Economic Environment (HP)





# Expectations

- Expectations and Mortgage Performance
  - Expected cltv
  - # of previous decline
  - Foreclosure costs to lenders
- Default – No
- Prepay – Yes
  - Lender foreclosure cost proxy



## Short-term Delinquency

- Local unemployment – Yes
  - HP cyclical component
- Foreclosure cost to lenders



# Structural Unemployment and Default

- Business cycle theory and mortgage performance
  - Structural and cyclical unemployment have distinct impacts
  - Local unemployment affect how risk factors drive mortgage default
- How we measure structural unemployment matters



## Policy Implications

- Focus on long-term unemployment
  - Temporary unemployment reduction measures may not work well



## Contact Us

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