Political Uncertainty and Risk Premia

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Motivation

- **Political news** moves markets
  - E.g., Eurozone debt crisis, U.S. debt ceiling talks, etc.

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  - E.g., Eurozone debt crisis, U.S. debt ceiling talks, etc.
- Yet, no role for political news in finance theory

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- Our general equilibrium model features
  - **Government** with economic and non-economic motives
  - **Uncertainty** about government policy
    1. "Political" uncertainty
    2. "Impact" uncertainty
       - ∗ We do not know what the government is going to do, nor what the impact of its actions is going to be

Main Results

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- Political uncertainty reduces the value of the "**put protection**" that the government implicitly provides to the market
  - Government's ability to change policy can $\uparrow$ or $\downarrow$ stock prices
- Political uncertainty raises stock **volatilities** and **correlations**
  - Especially when economic conditions are poor and there is much heterogeneity in the government's policy choices

Model

- Finite horizon $[0, T]$; continuum of equity-financed firms $i \in [0, 1]$
- Firm i's profitability (= growth rate of capital):

$$dB_t^i / B_t^i = (\mu + g_t)\, dt + \sigma dZ_t + \sigma_1 dZ_{i,t}$$

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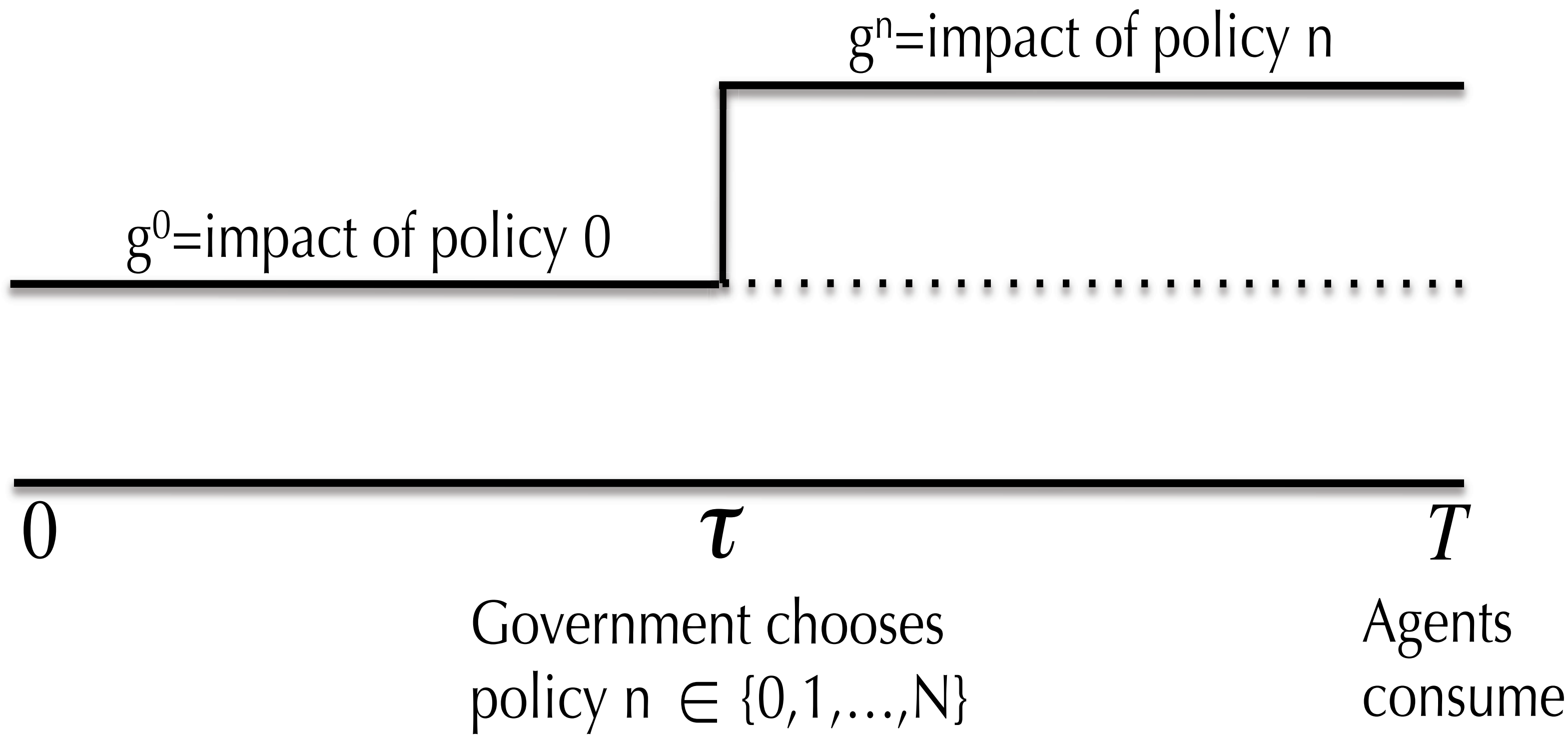
$g_t =$ **impact** of government policy on average profitability

- Government can **change policy** at time τ, $0 < \tau < T$, choosing from N potential new policies

$$g_t = \begin{cases} g^0 \text{ for } t \leq \tau \\ g^0 \text{ for } t > \tau \text{ if \textit{old} policy is retained} \\ g^n \text{ for } t > \tau \text{ if \textit{new} policy } n \text{ is chosen, } n \in \{1, \ldots, N\} \end{cases}$$


gⁿ=impact of policy n
g⁰=impact of policy 0
0
τ
T
Government chooses
policy n ∈ {0,1,…,N}
Agents
consume

Impact Uncertainty

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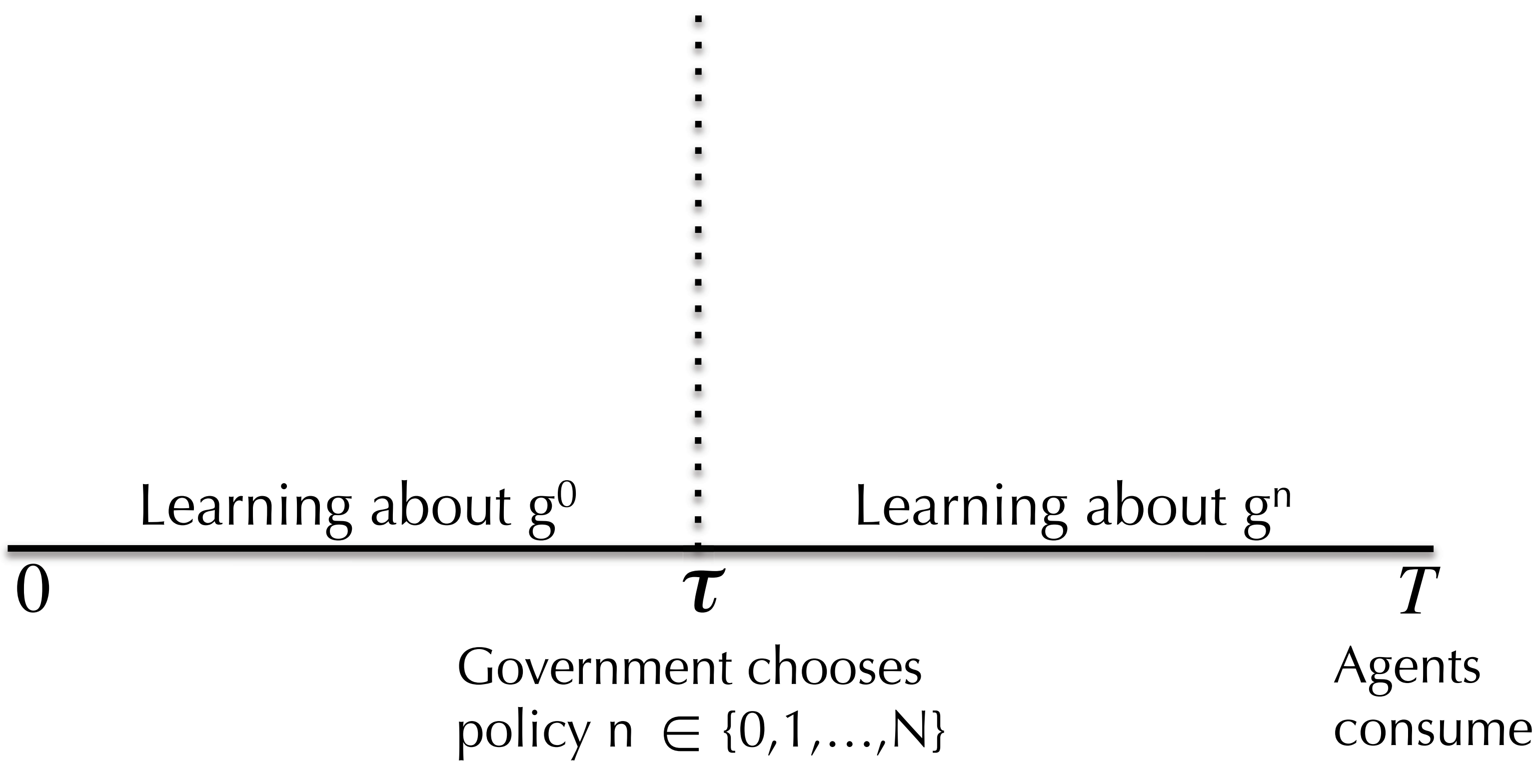
- Policy change $\Rightarrow$ Beliefs change from posterior of g^0 to prior of g^n


Learning about g0
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0
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- **"Quasi-benevolent" government** maximizes

$$\max_{n \in \{0,1,\ldots,N\}} \mathrm{E}_\tau \left[\frac{C^n W_T^{1-\gamma}}{1-\gamma} \mid \text{policy } n \right]$$

C^n = **political cost** of choosing policy n; we set $C^0 = 1$

($C^n > 1 \Rightarrow$ cost; $C^n < 1 \Rightarrow$ benefit)

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- **Prior** beliefs: $c^n = \log(C^n) \sim N\left(-\frac{1}{2}\sigma_c^2, \sigma_c^2\right) \quad \Rightarrow \quad \mathrm{E}_0[C^n] = 1$

Learning about Political Costs

- For $t \in (t_0, \tau)$, agents observe signals about C^n:

$$ds_t^n = c^n \, dt + h \, dZ_{c,t}^n \qquad \text{for } n = 1, \ldots, N$$

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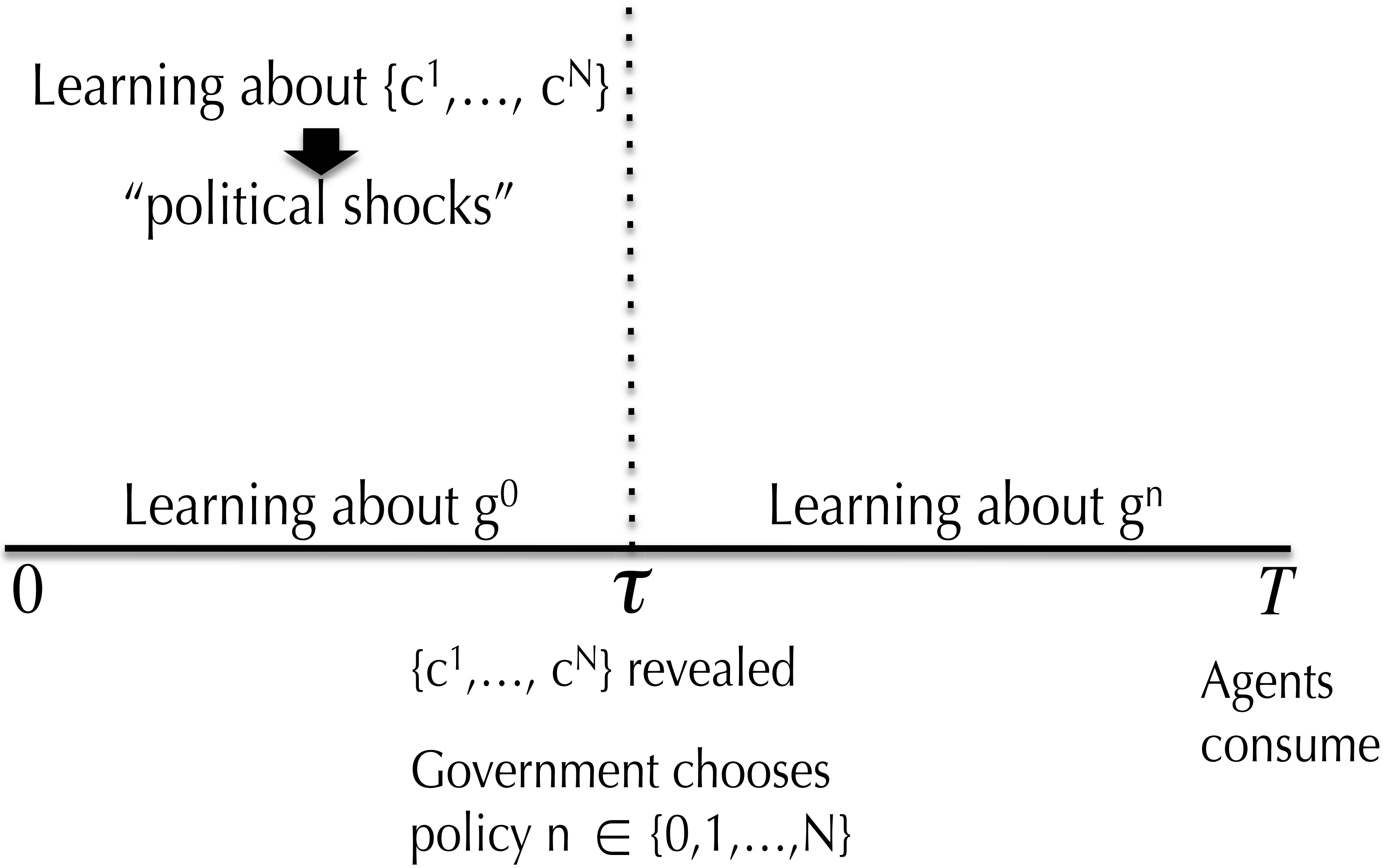
- $dZ_{c,t}^n$ = **political shocks**
  - Orthogonal to economic shocks dZ_t, $dZ_{i,t}$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Utility Score

- **Result:** Given any two policies $m, n \in \{0, 1, \dots, N\}$,

$$\mathrm{E}_\tau \left[\frac{W_T^{1-\gamma}}{1-\gamma} | \text{ policy } m \right] > \mathrm{E}_\tau \left[\frac{W_T^{1-\gamma}}{1-\gamma} | \text{ policy } n \right] \iff \widetilde{\mu}^m > \widetilde{\mu}^n$$

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Optimal Government Policy Choice

- **Result:** Government chooses the policy $n \in \{0, 1, \ldots, N\}$ whose value of $\widetilde{\mu}^n - \widetilde{c}^n$ is the largest, where $\widetilde{c}^n = c^n / (\gamma - 1)(T - \tau)$

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- **Corollary:** Government changes its policy iff

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- Investors don't know $c^n \Rightarrow$ cannot fully anticipate a policy change

Stock Prices

- Firm i's stock is a claim on the firm's liquidating dividend B_T^i
- Market value of stock i:

$$M_t^i = E_t\left[\frac{\pi_T}{\pi_t} B_T^i\right]$$

- Complete markets $\Rightarrow$ State price density:

$$\pi_t = \frac{1}{\lambda} E_t\left[W_T^{-\gamma}\right] \ , \quad \text{where } W_T = \int_0^1 B_T^i di$$

- Risk-free bond as numeraire (or risk-free rate = 0)

Three Types of Shocks

- **Result:** Before time τ, SDF follows the process

$$\frac{d\pi_t}{\pi_t} = \underbrace{-\gamma\sigma d\widehat{Z}_t}_{\text{Capital shocks}} + \underbrace{\sigma_{\pi,0} d\widehat{Z}_t}_{\text{Impact shocks}} + \underbrace{\sum_{n=1}^{N} \sigma_{\pi,n} d\widehat{Z}_{c,t}^{n}}_{\text{Political shocks}}$$

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2. **Impact** shocks: Learning about policy impact ($d\widehat{g}_t$)
   - Capital + Impact shocks = **Economic** shocks ($d\widehat{Z}_t$)
3. **Political** shocks: Learning about political costs ($d\widehat{c}^n_t$)
   - Orthogonal to economic shocks
   - $\sigma_{\pi,n} \to 0$ when $\widehat{g}_t \to \infty$

The Equity Risk Premium and Its Components

- **Result:** Stock returns of firm i at time $t \leq \tau$ follow

$$\frac{dM_t^i}{M_t^i} = \mu_M^i dt + \left(\sigma + \sigma_{M,0}\right) d\widehat{Z}_t + \sum_{n=1}^{N} \sigma_{M,n} d\widehat{Z}_{c,t}^n + \sigma_1 dZ_t^i \ ,$$

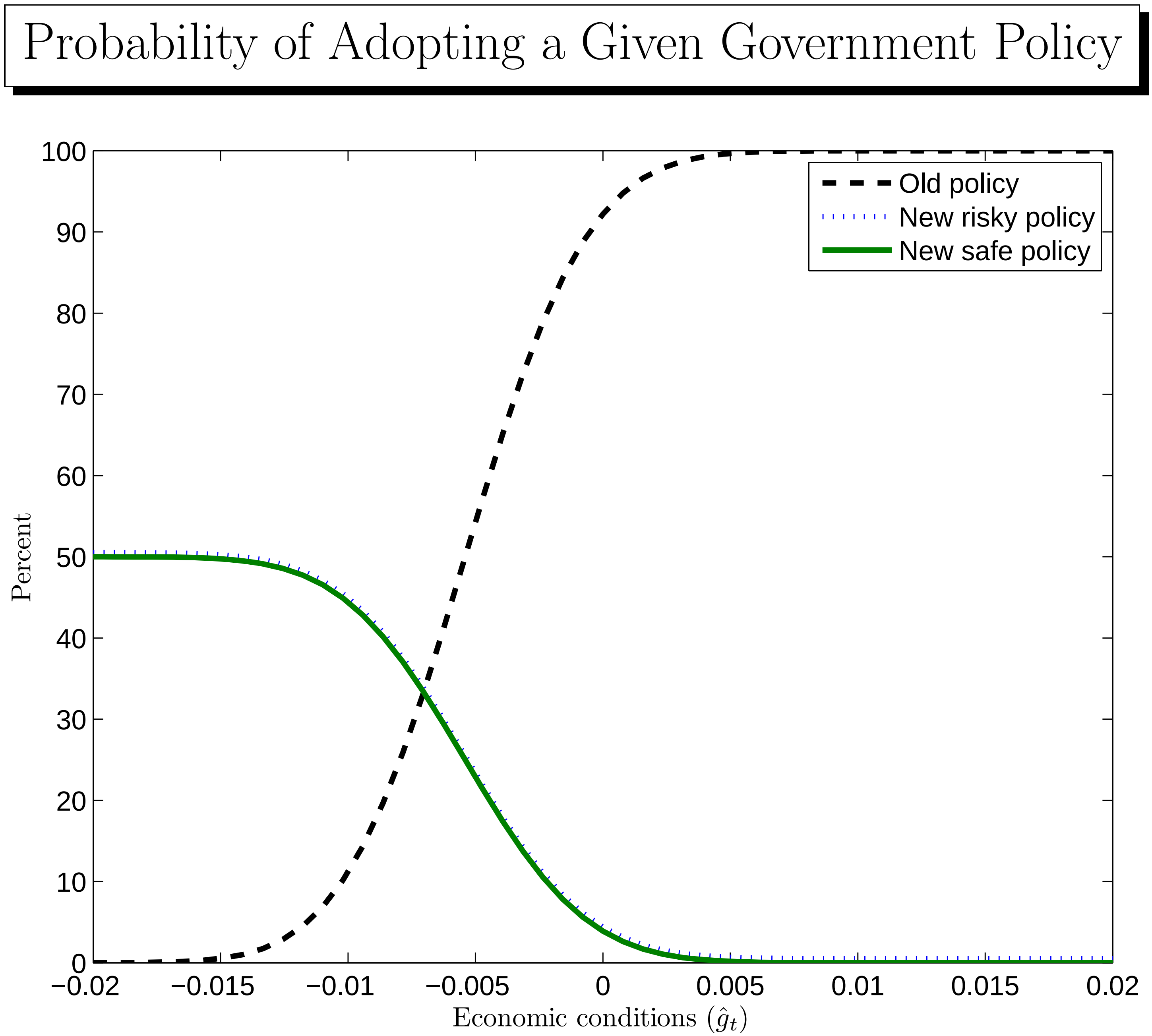
where the expected stock return is

$$\mu_M^i = \underbrace{\underbrace{\gamma\sigma^2}_{\text{Capital shocks}} + \underbrace{\left(\gamma\sigma\sigma_{M,0} - \sigma\sigma_{\pi,0} - \sigma_{M,0}\sigma_{\pi,0}\right)}_{\text{Impact shocks}}}_{\text{Economic shocks}} - \underbrace{\sum_{n=1}^{N} \sigma_{\pi,n}\sigma_{M,n}}_{\text{Political shocks}}$$

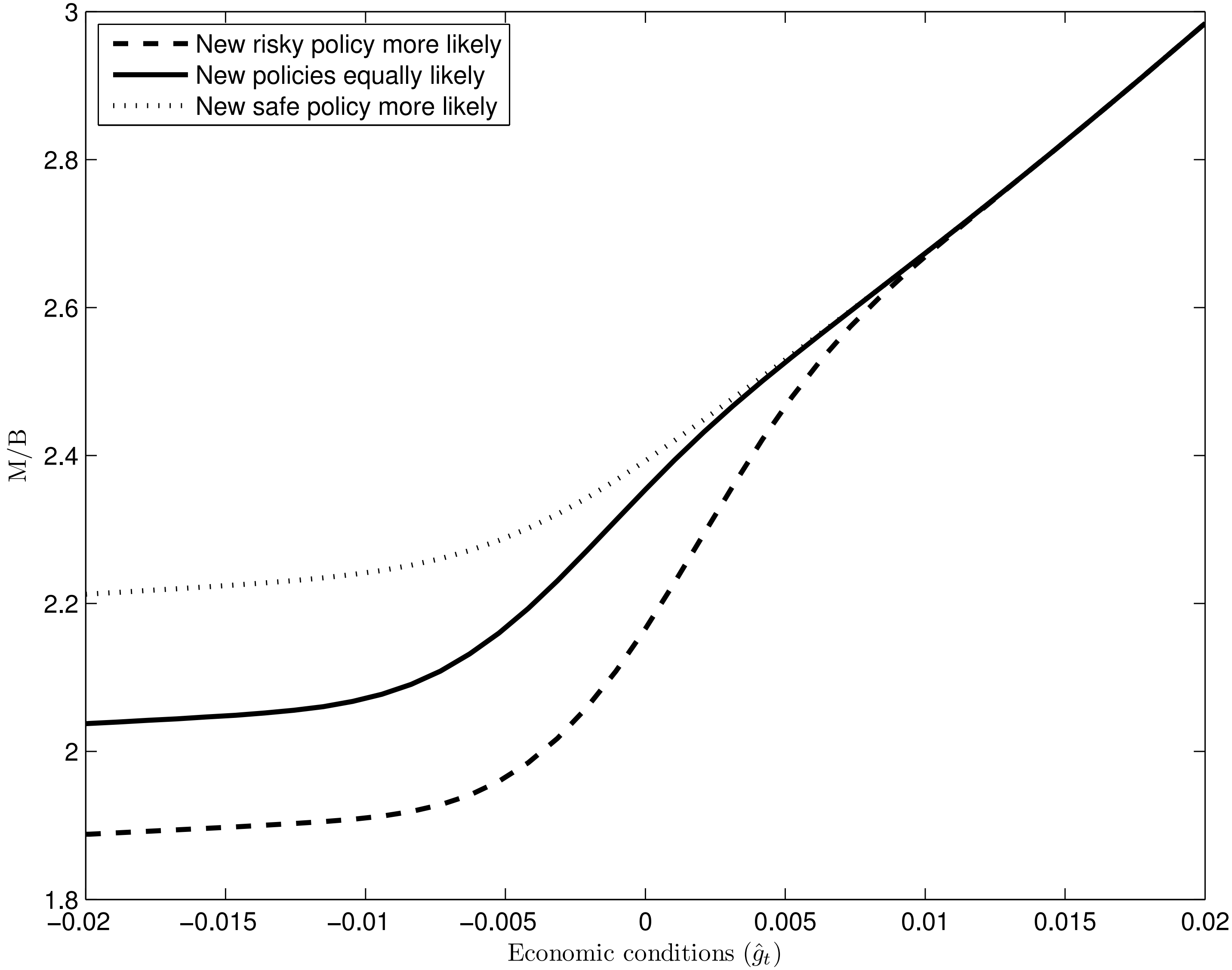
A Two-Policy Example

- Consider policies H and L, with $\sigma_{g,H} > \sigma_{g,L}$
- Choose $\mu_{g,H} > \mu_{g,L}$ so that both policies yield **same utility**
- Parameters:

σ_g	σ_c	μ	σ	σ_1	T	τ	γ	h	$\sigma_{g,L}$	$\sigma_{g,H}$
2%	10%	10%	5%	10%	20	10	5	5%	1%	3%


Probability of Adopting a Given Government Policy
Old policy
New risky policy
New safe policy
Percent
100
90
80
70
60
50
40
30
20
10
0
−0.02
−0.015
−0.01
−0.005
0
0.005
0.01
0.015
0.02
Economic conditions ($\hat{g}_t$)

The Level of Stock Prices: Economic vs Political Shocks



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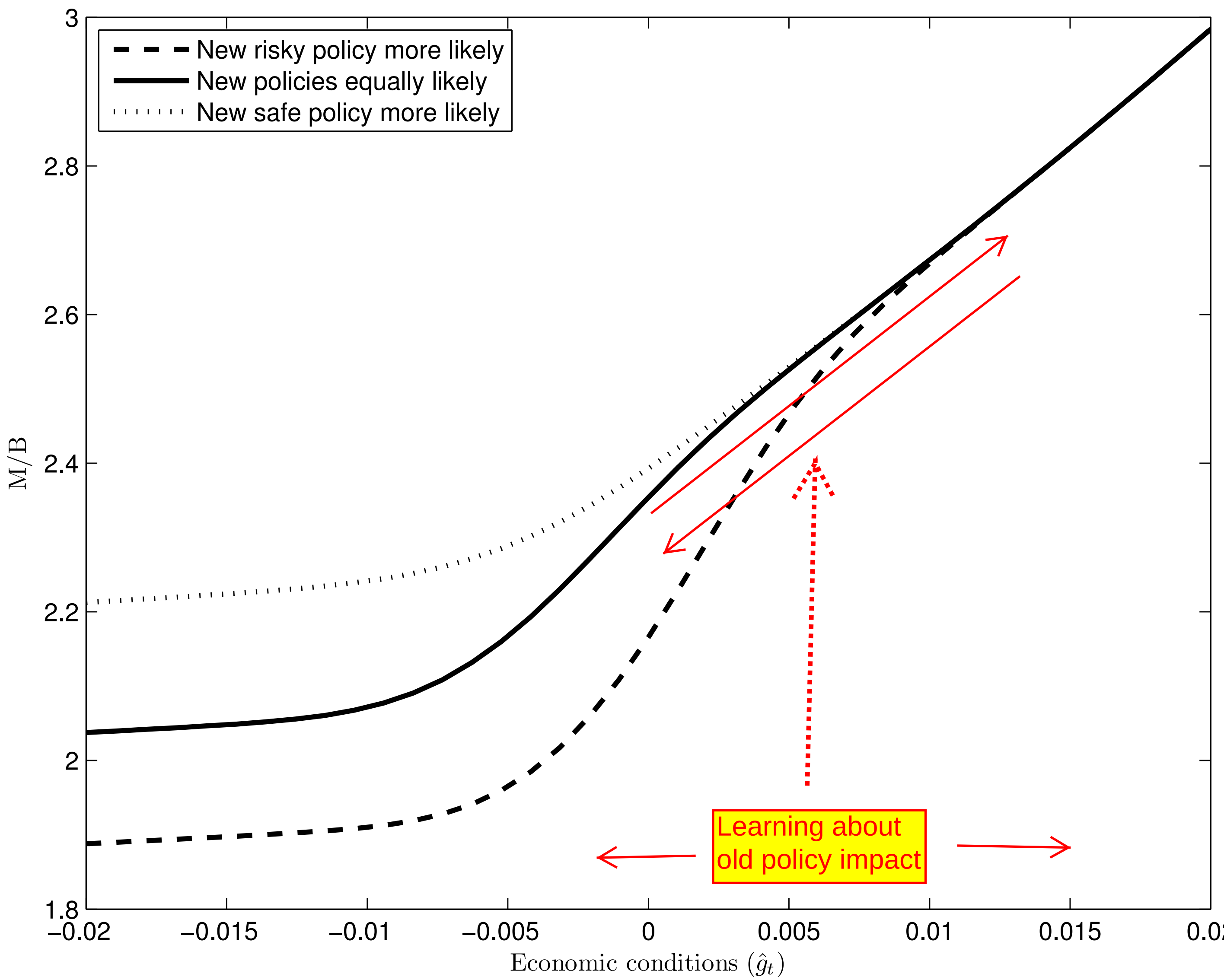

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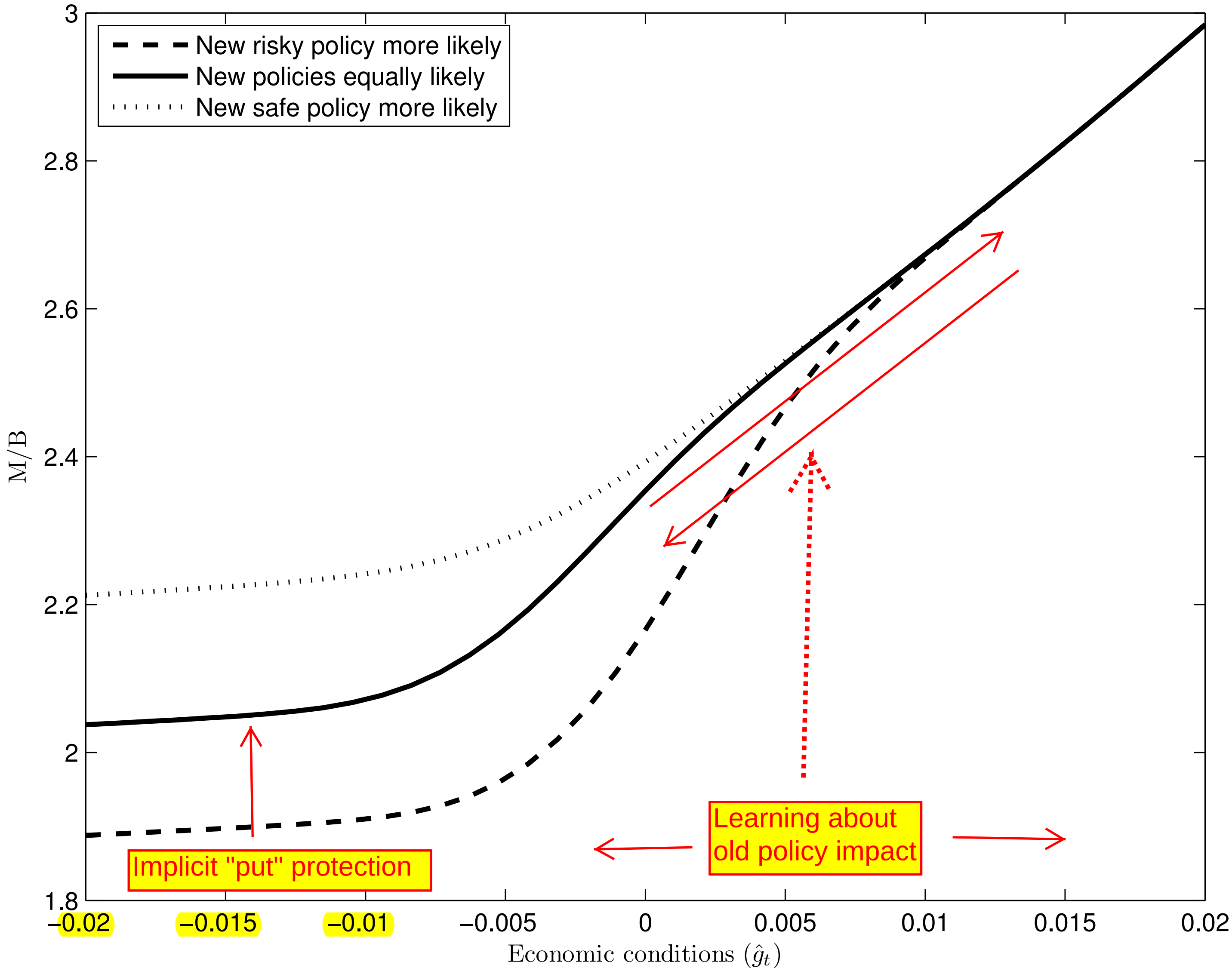

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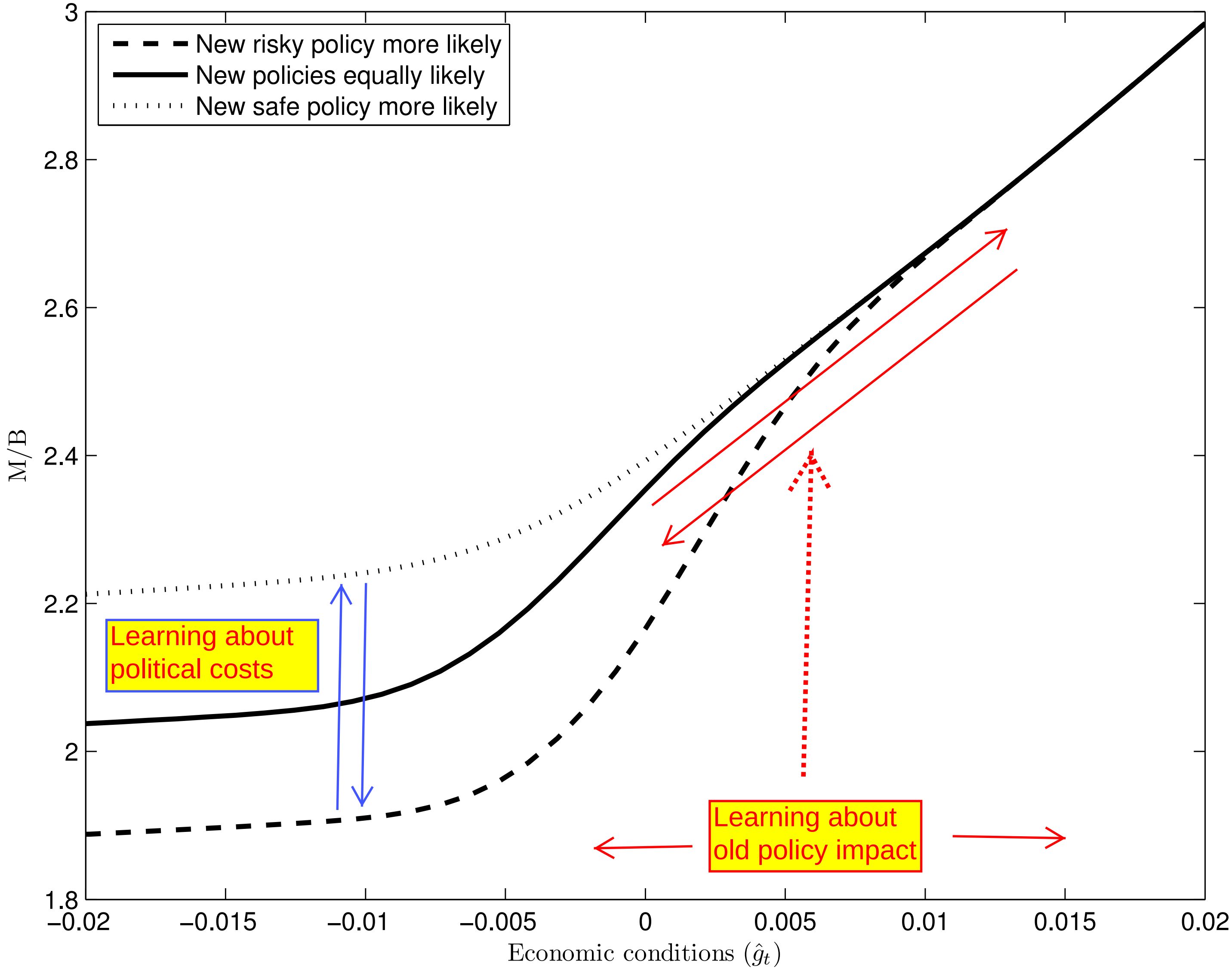
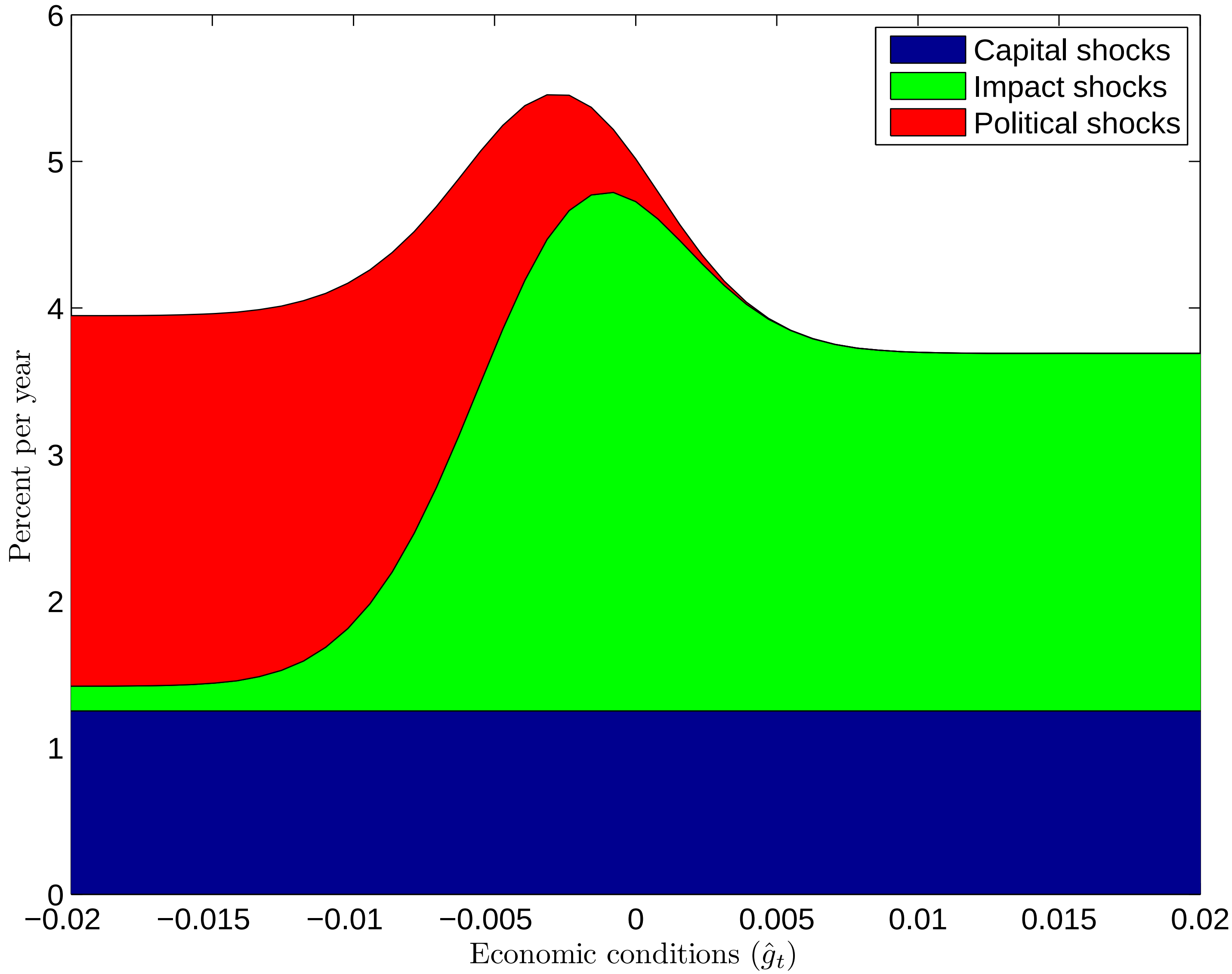
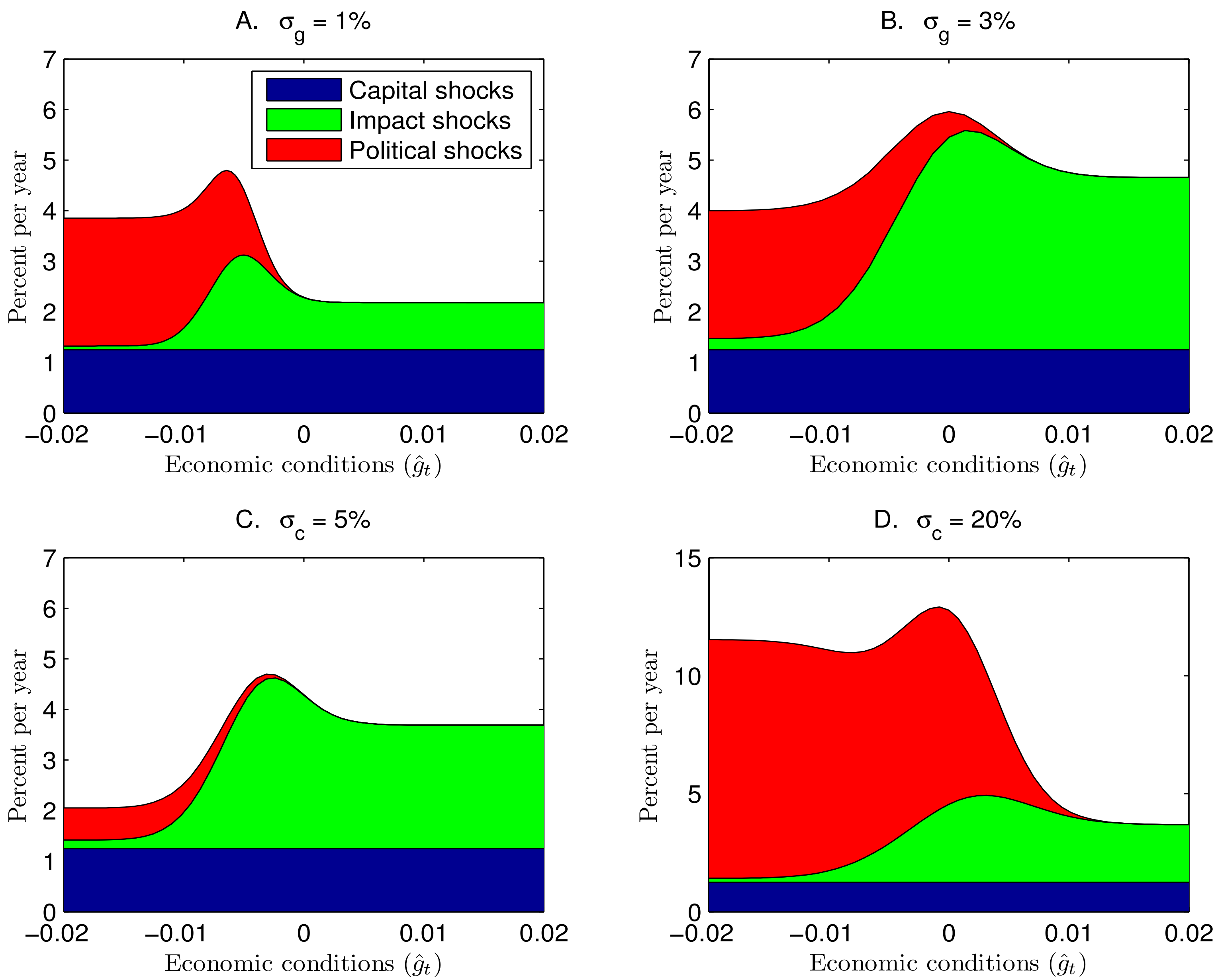
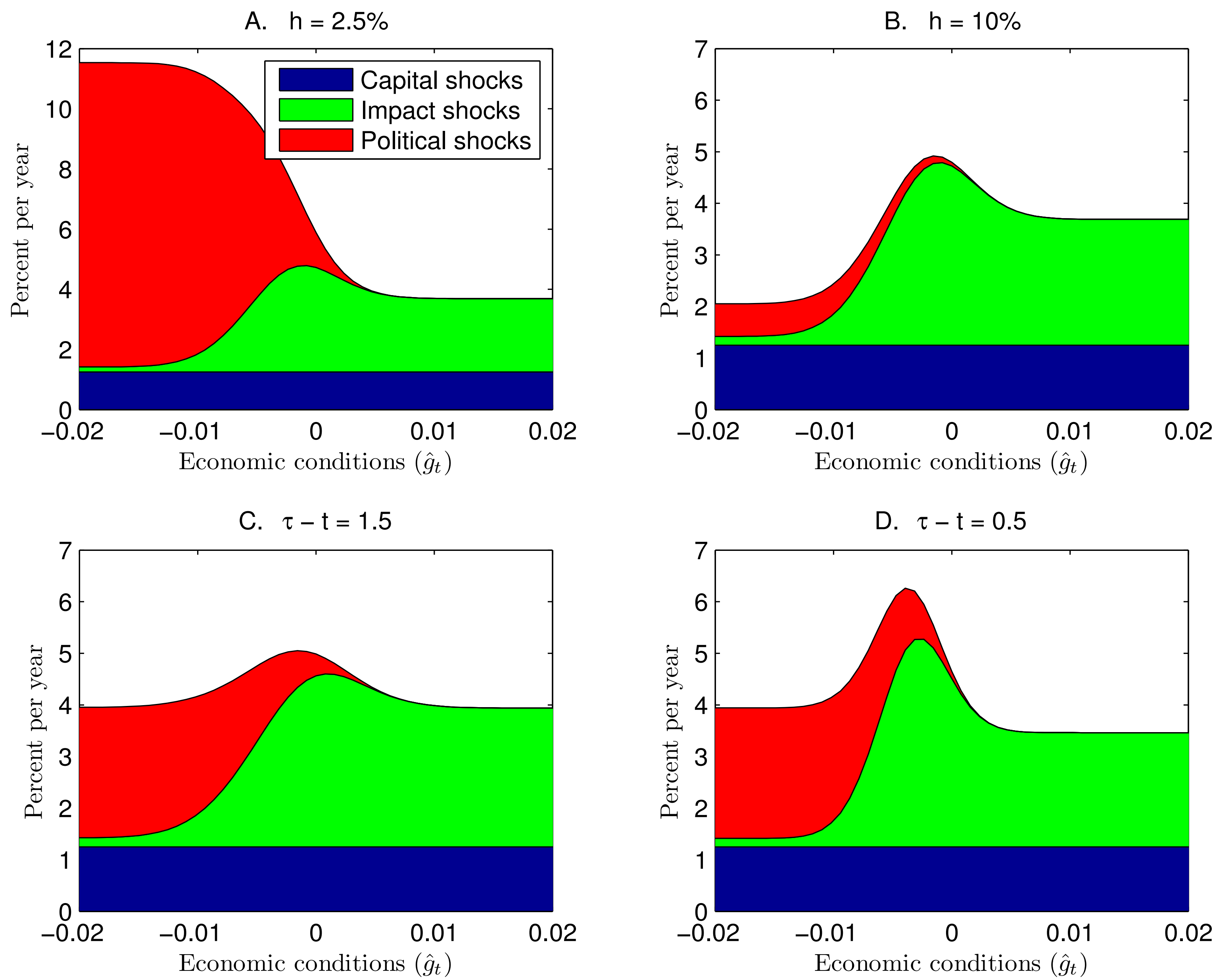


The Equity Risk Premium and Its Components



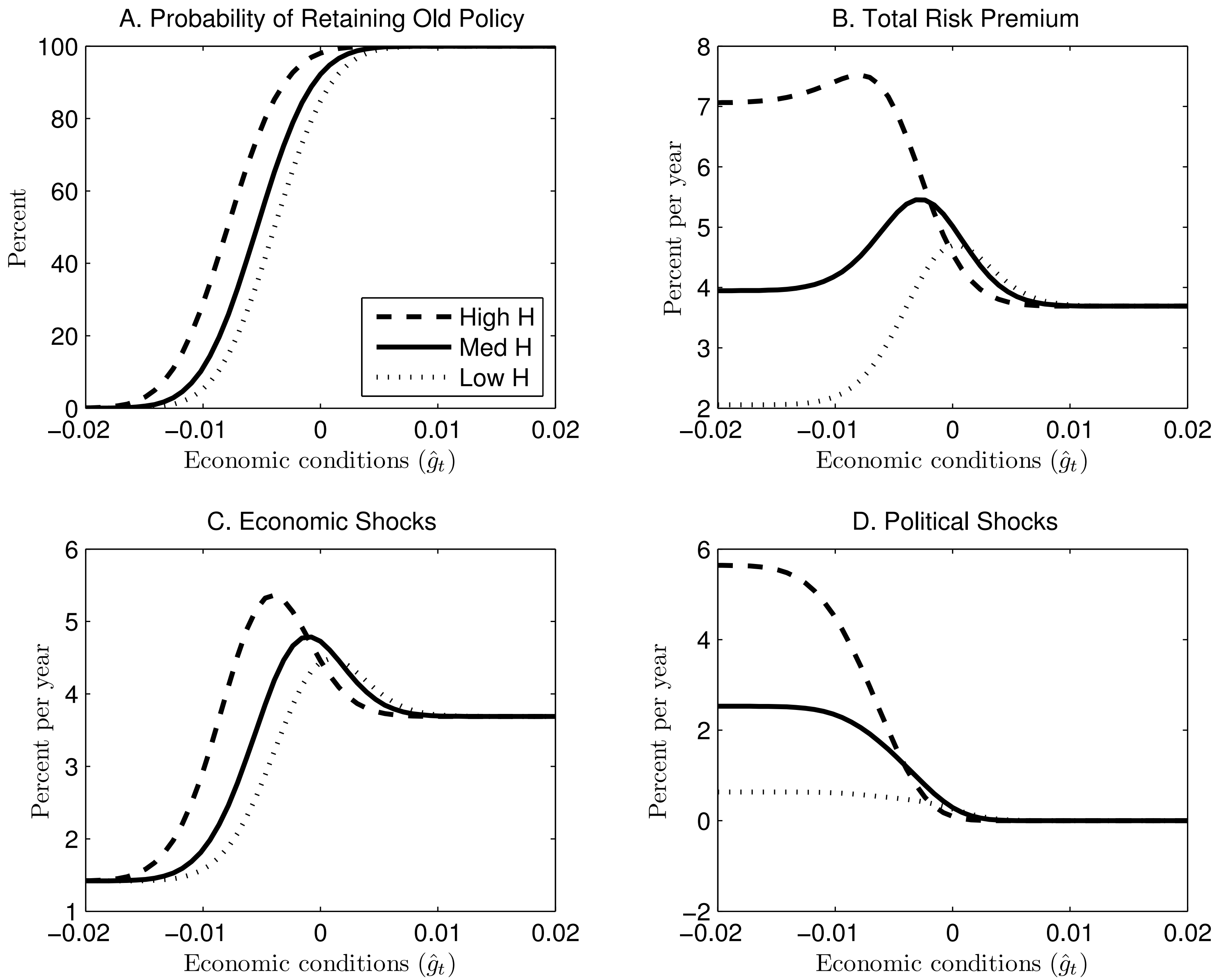

A. σg = 1%
B. σg = 3%
C. σc = 5%
D. σc = 20%
Capital shocks
Impact shocks
Political shocks
Percent per year
Economic conditions ($\hat{g}_t$)


A. h = 2.5%
B. h = 10%
C. τ − t = 1.5
D. τ − t = 0.5
Capital shocks
Impact shocks
Political shocks
Percent per year
Economic conditions ($\hat{g}_t$)

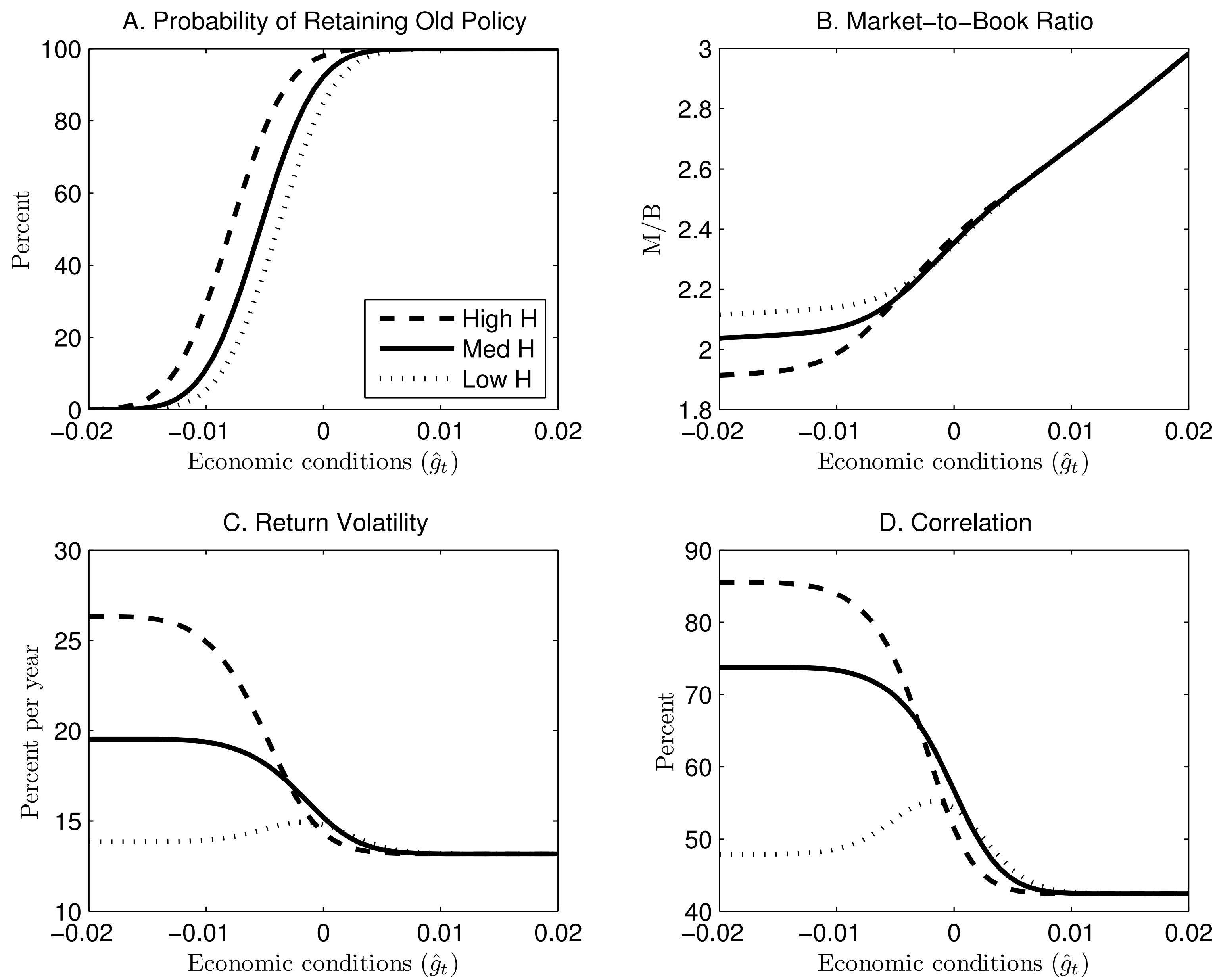
The Effect of Policy Heterogeneity

- Heterogeneity = $\mathcal{H} = \sigma_{g,H} - \sigma_{g,L}$
- Three values: $\mathcal{H} = 1\%, 2\%, 3\%$

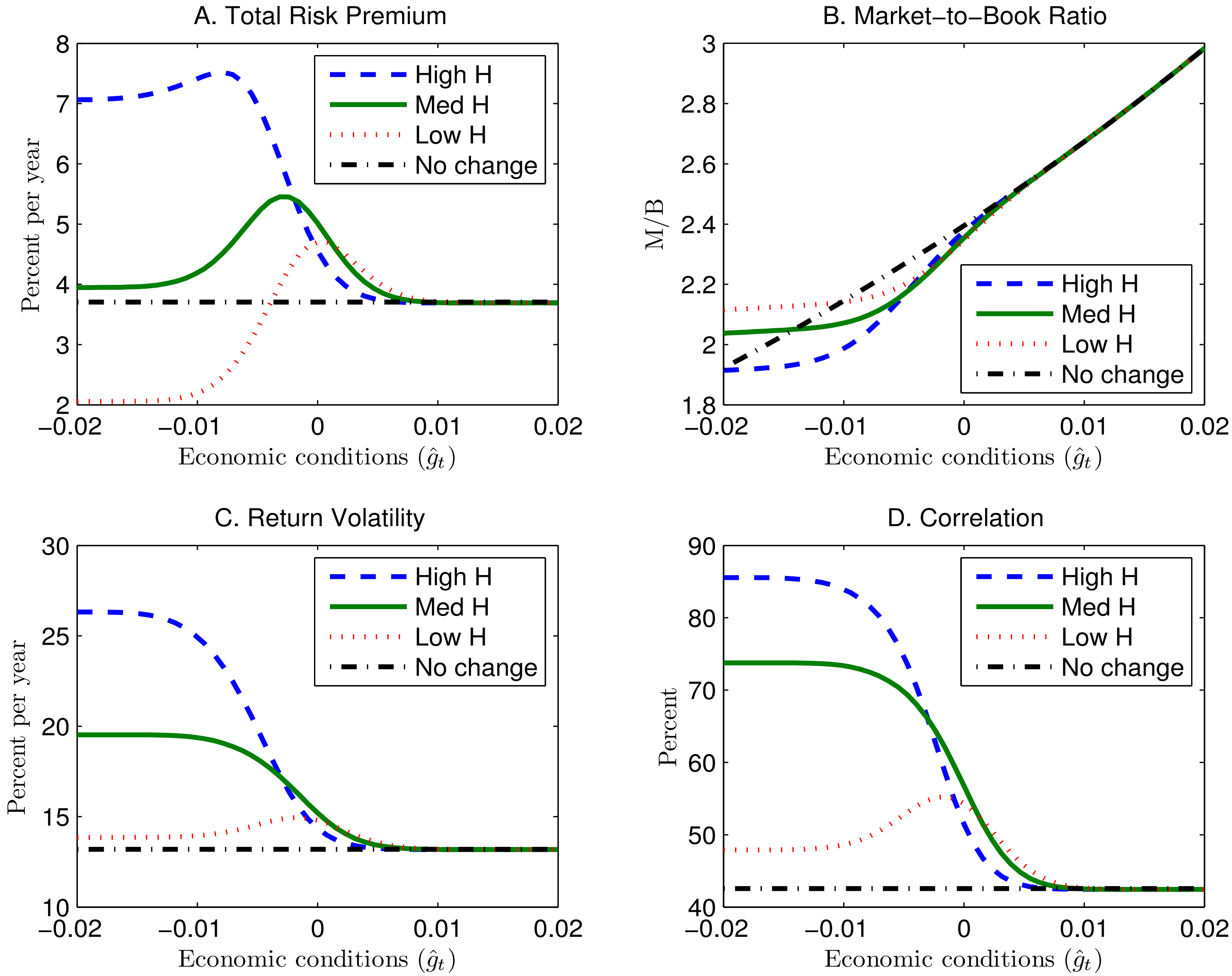
- To vary $\mathcal{H}$, we vary $\sigma_{g,H}$ and $\sigma_{g,L}$ keeping other parameters fixed
- Both policies H and L deliver the **same utility**



A. Probability of Retaining Old Policy
Percent
100
80
60
40
20
0
−0.02
−0.01
0
0.01
0.02
Economic conditions ($\hat{g}_t$)
High H
Med H
Low H
B. Total Risk Premium
Percent per year
8
7
6
5
4
3
2
−0.02
−0.01
0
0.01
0.02
Economic conditions ($\hat{g}_t$)
C. Economic Shocks
Percent per year
6
5
4
3
2
1
−0.02
−0.01
0
0.01
0.02
Economic conditions ($\hat{g}_t$)
D. Political Shocks
Percent per year
6
4
2
0
−2
−0.02
−0.01
0
0.01
0.02
Economic conditions ($\hat{g}_t$)


A. Probability of Retaining Old Policy
Percent
High H
Med H
Low H
Economic conditions ($\hat{g}_t$)
B. Market−to−Book Ratio
M/B
Economic conditions ($\hat{g}_t$)
C. Return Volatility
Percent per year
Economic conditions ($\hat{g}_t$)
D. Correlation
Percent
Economic conditions ($\hat{g}_t$)

Policy Changes Allowed vs Precluded



Stock Market Reaction to the Policy Announcement

- **Result:** Closed-form solution for announcement return $R^n\left(\widehat{g}_\tau\right)$
- **Corollary:** For any pair of policies $m, n \in \{0, 1, \ldots, N\}$,

$$\frac{1 + R^m\left(\widehat{g}_\tau\right)}{1 + R^n\left(\widehat{g}_\tau\right)} = e^{(\widetilde{\mu}^m - \widetilde{\mu}^n)(T-\tau) - \frac{\gamma}{2}(T-\tau)^2\left(\sigma^2_{g,m} - \sigma^2_{g,n}\right)}$$

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- Government policies cannot be **judged** by stock market reactions
  - Can have $R^m(x_\tau) < R^n(x_\tau)$ and $\widetilde{\mu}^m > \widetilde{\mu}^n$, or vice versa

Stock Market Reaction to the Policy Announcement

- **Result:** Closed-form solution for announcement return $R^n(\widehat{g}_\tau)$
- **Corollary:** For any pair of policies $m, n \in \{0, 1, \ldots, N\}$,

$$\frac{1+R^m(\widehat{g}_\tau)}{1+R^n(\widehat{g}_\tau)} = e^{(\widetilde{\mu}^m - \widetilde{\mu}^n)(T-\tau) - \frac{\gamma}{2}(T-\tau)^2\left(\sigma^2_{g,m} - \sigma^2_{g,n}\right)}$$

- Government policies cannot be **judged** by stock market reactions
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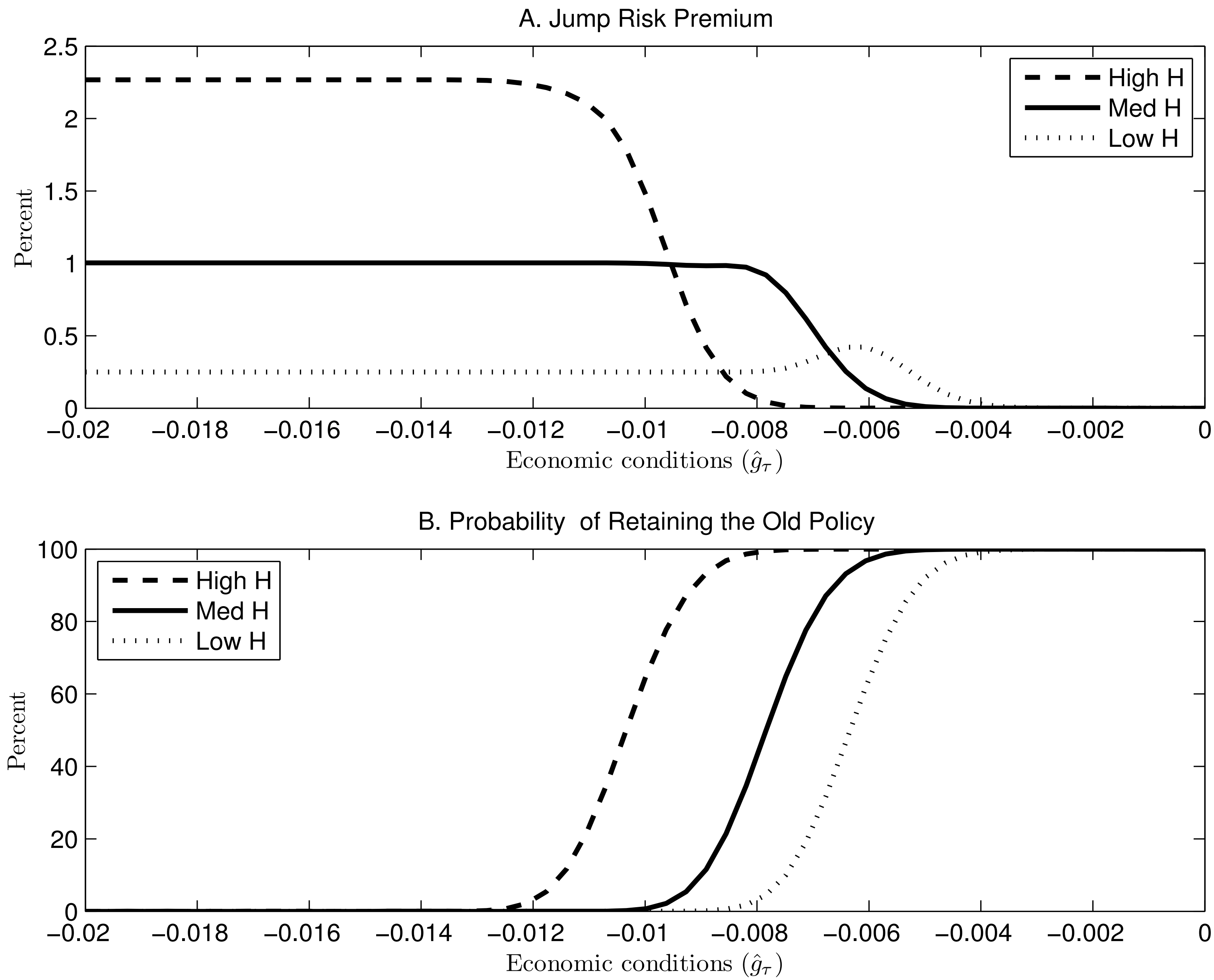
- Note: $M_t = \frac{1-\gamma}{\lambda \pi_t} \mathrm{E}_t \left[\frac{W_T^{1-\gamma}}{1-\gamma} \right]$. A policy change can affect π_t.

The Jump Risk Premium

- Stock prices jump at the policy announcement at time τ
- Expected stock return at time τ $=$ Compensation for jump risk
  - Covariance between jumps in market value and SDF
  - Closed-form solution for the jump risk premium


A. Jump Risk Premium
High H
Med H
Low H
Percent
2.5
2
1.5
1
0.5
0
−0.02
−0.018
−0.016
−0.014
−0.012
−0.01
−0.008
−0.006
−0.004
−0.002
0
Economic conditions ($\hat{g}_\tau$)
B. Probability of Retaining the Old Policy
High H
Med H
Low H
Percent
100
80
60
40
20
0
−0.02
−0.018
−0.016
−0.014
−0.012
−0.01
−0.008
−0.006
−0.004
−0.002
0
Economic conditions ($\hat{g}_\tau$)

Empirical Analysis

- Test model's predictions about political uncertainty (PU)
  - PU is higher in weaker economic conditions
  - PU commands a risk premium, larger when economy is weak
  - PU makes stocks more volatile and more correlated, especially when the economy is weak

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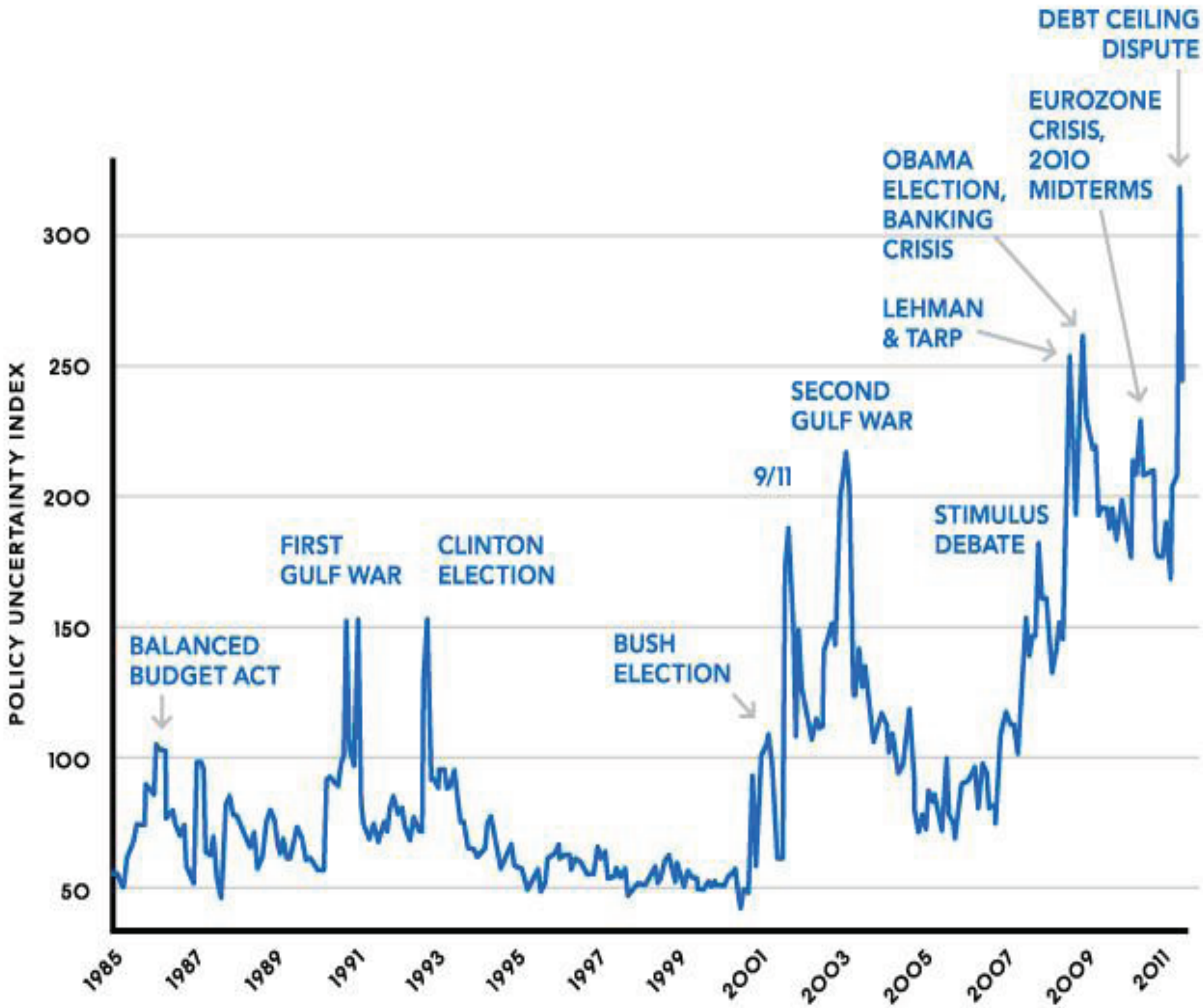
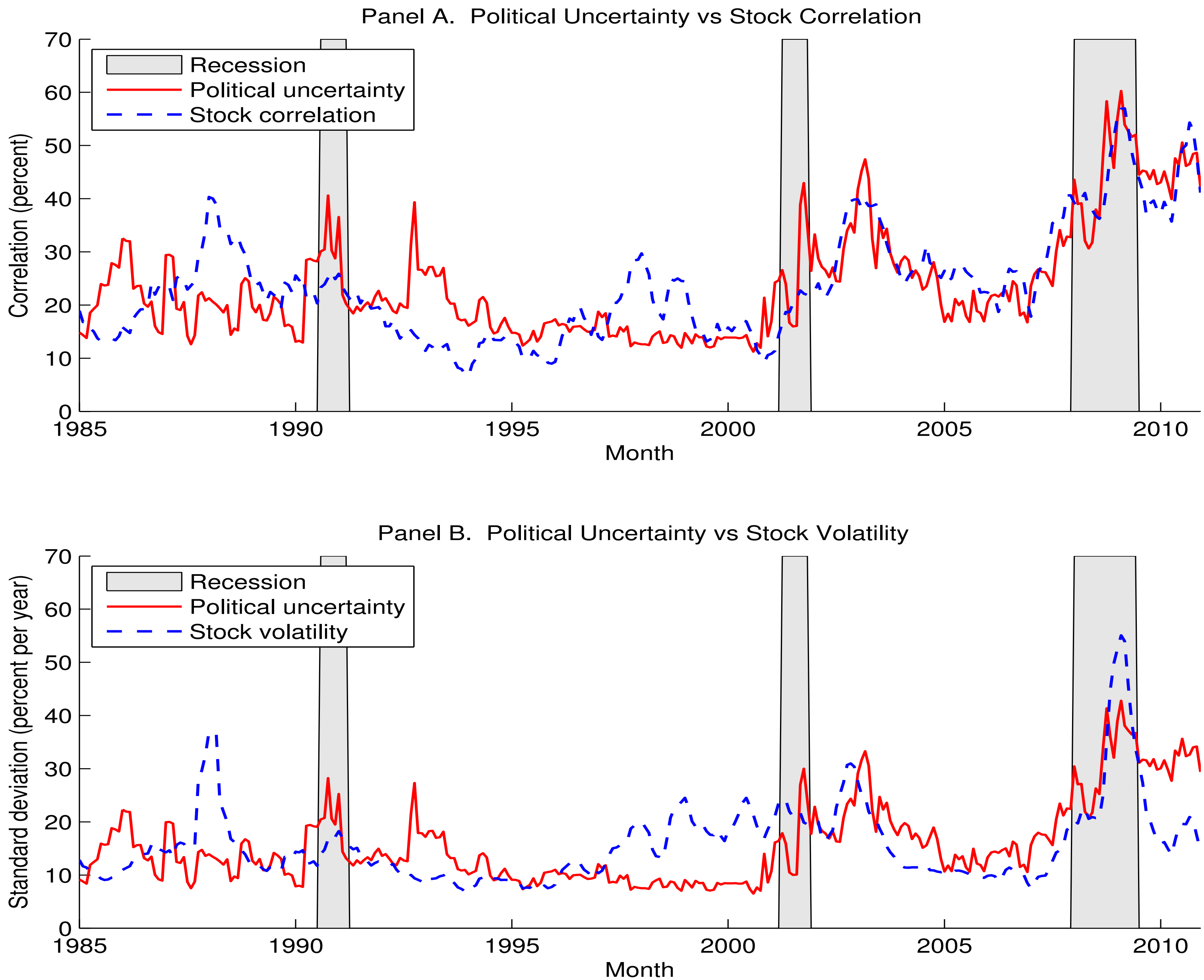
- Proxy for PU: Baker, Bloom, and Davis (2011)
  - Weighted average of 3 components:
    - News coverage of policy-related uncertainty
    - Number of expiring federal tax code provisions
    - Disagreement among forecasters of inflation and govt spending


DEBT CEILING DISPUTE
EUROZONE CRISIS, 2010 MIDTERMS
OBAMA ELECTION, BANKING CRISIS
LEHMAN & TARP
SECOND GULF WAR
9/11
STIMULUS DEBATE
FIRST GULF WAR
CLINTON ELECTION
BALANCED BUDGET ACT
BUSH ELECTION
POLICY UNCERTAINTY INDEX
300
250
200
150
100
50
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011



Panel A. Political Uncertainty vs Stock Correlation
Recession
Political uncertainty
Stock correlation
Correlation (percent)
0
10
20
30
40
50
60
70
1985
1990
1995
2000
2005
2010
Month
Panel B. Political Uncertainty vs Stock Volatility
Recession
Political uncertainty
Stock volatility
Standard deviation (percent per year)
0
10
20
30
40
50
60
70
1985
1990
1995
2000
2005
2010
Month

Is PU Higher in a Weaker Economy?

Table reports estimates of b and their t-statistics for

Specification 1: $PU_t = a + bE_t + e_t$

Specification 2: $PU_t = a + bE_t + cPU_{t-1} + e_t$

	Measure of Economic Conditions				
	CFI	-REC	IPG	P/E	-DEF
Specification 1	-0.31	-0.69	-20.95	-0.02	-0.75
	(-7.24)	(-5.12)	(-4.10)	(-3.38)	(-8.61)
Specification 2	-0.05	-0.09	-2.90	-0.00	-0.09
	(-3.90)	(-2.75)	(-1.85)	(-1.58)	(-3.06)

Are Volatility and Correlation Higher When PU Is Higher?

Table reports estimates of b and their t-statistics for

Specification 1: $VC_t = a + bPU_t + e_t$

Specification 2: $VC_t = a + bPU_t + cVC_{t-1} + e_t$

	Correlation		Volatility	
	EW	VW	Realized	Implied
Specification 1	0.17	0.15	0.01	0.08
	(9.81)	(7.25)	(4.81)	(5.27)
Specification 2	0.09	0.07	0.00	0.01
	(6.43)	(5.14)	(3.45)	(2.53)

Are VOL and COR More Linked to PU in a Weaker Economy?

Table reports estimates of b and their t-statistics for

Specification 1: $$VC_t = a + bPU_tE_t + cPU_t + dE_t + e_t$$

	Measure of Economic Conditions				
	CFI	-REC	IPG	P/E	-DEF
Correlation: EW	-0.03	-0.04	-3.53	-0.00	-0.00
	(-2.41)	(-0.96)	(-2.36)	(-0.00)	(-0.08)
Correlation: VW	-0.03	-0.03	-3.54	-0.00	0.04
	(-1.92)	(-0.60)	(-2.03)	(-0.26)	(1.28)
Volatility: Realized	-0.00	-0.01	-0.39	-0.00	-0.00
	(-5.46)	(-4.39)	(-4.52)	(-3.74)	(-3.17)
Volatility: Implied	-0.04	-0.12	-3.48	-0.01	-0.05
	(-4.50)	(-3.69)	(-3.18)	(-5.48)	(-1.91)

Are VOL and COR More Linked to PU in a Weaker Economy?

Table reports estimates of b and their t-statistics for

Specification 2: $$VC_t = a + bPU_tE_t + cPU_t + dE_t + eVC_{t-1} + e_t$$

	Measure of Economic Conditions				
	CFI	-REC	IPG	P/E	-DEF
Correlation: EW	-0.02	-0.03	-2.35	0.00	-0.00
	(-2.04)	(-1.07)	(-1.97)	(0.05)	(-0.05)
Correlation: VW	-0.02	-0.03	-2.04	-0.00	0.02
	(-1.48)	(-0.79)	(-1.54)	(-0.10)	(1.13)
Volatility: Realized	-0.00	-0.01	-0.21	-0.00	-0.00
	(-4.11)	(-3.86)	(-3.11)	(-2.77)	(-2.58)
Volatility: Implied	-0.01	-0.05	-0.19	-0.00	-0.03
	(-2.81)	(-3.71)	(-0.36)	(-2.76)	(-2.70)

Is Political Risk Premium Higher in a Weaker Economy?

Table reports estimates of b and their t-statistics for

$$R_{t+1,t+h} \; = \; a + bPU_tE_t + cPU_t + dE_t + e_t \; .$$

	Measure of Economic Conditions				
Horizon	CFI	-REC	IPG	P/E	-DEF
3 months	-0.02	-0.05	-0.89	-0.01	-0.03
	(-1.30)	(-1.24)	(-0.71)	(-2.17)	(-1.19)
6 months	-0.04	-0.11	-2.50	-0.01	-0.09
	(-2.09)	(-1.53)	(-1.17)	(-3.18)	(-1.97)
12 months	-0.09	-0.21	-6.48	-0.02	-0.15
	(-2.41)	(-1.78)	(-1.76)	(-2.85)	(-1.69)

Conclusions

- We develop a theory in which **political news** moves stock prices
- Political uncertainty
  - commands a **risk premium** that is larger in a weaker economy
  - reduces the value of the government's implicit **put protection**
  - increases stock **volatilities** and **correlations**, especially when the economy is weak and policy heterogeneity is large

Comparison with Pástor and Veronesi (JF 2012), or PV

- Different modeling
  - We: **Heterogeneous policies**
  - PV: All new policies identical a priori: $\mu_g^n = 0$, $\sigma_{g,n}^2 = \sigma_g^2 \;\; \forall n$
  - We: **Learning about political costs** $\Rightarrow$ political shocks
  - PV: No such learning
- Different **focus**
  - We: Risk premium induced by political uncertainty
  - PV: Stock market response to a policy change
- Main result of PV:
  Stock prices **fall** at announcements of policy changes, on average