

# Festschrift in honor of Andy Abel

Dick Startz

UCSB



# First Year Grad School, MIT

Left to right:

Francesco Giavazzi

Virgulino "Vic" Duarte

Andy Abel

John Donnelly

Miguel Belezza

Hiroaki Nagatani

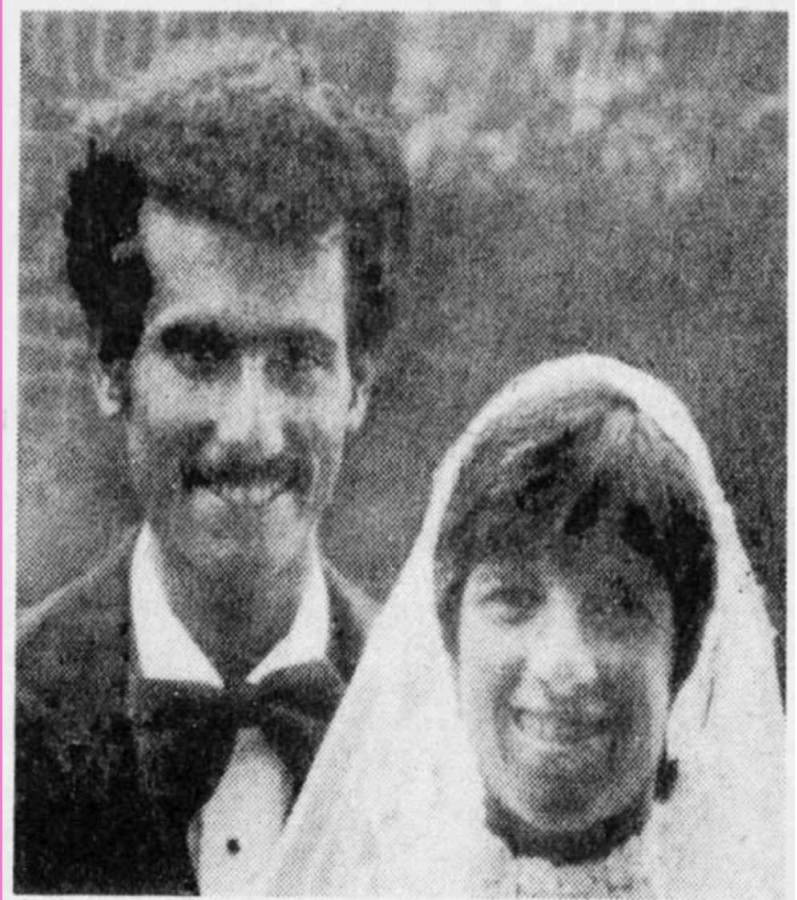


Photo courtesy of Bud Collier

From: *The Boston Globe*  
(Oct 29, 1978)

<https://www.firstpersonlive.com/storytellersapril>

<https://www.youtube.com/watch?v=vm66u57oou0>



**MR. AND MRS. ANDREW B. ABEL**

### **Abel-Charm**

Anne Sima Charm and Andrew Bruce Abel were married in Newton at Temple Reyim. The bride, whose parents are Prof. and Mrs. Stanley E. Charm, Newton, is a graduate of Tufts University, while her husband, son of Mr. and Mrs. Leonard Abel, Silver Spring, Md., holds degrees from Princeton University and MIT. Both the bride and the bridegroom are at University of Chicago; she, as a candidate for the MBA; he, as a professor of economics.

Photo courtesy of Bud Collier

# Recessions and Leverage

Yu-Fan Huang\*, Sui Luo\*, and Richard Startz†

\* International School of Economics and Management, Capital  
University of Economics and Business

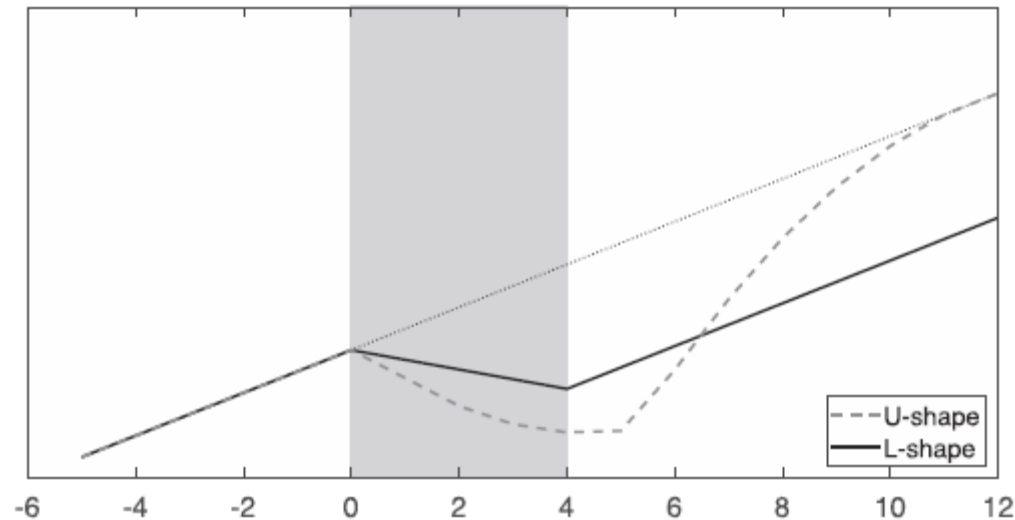
† University of California, Santa Barbara



# Recession shapes

- Luo, Sui, Yu-Fan Huang, and Richard Startz, “Are Recoveries all the Same: GDP and TFP?,” *Oxford Bulletin of Economics and Statistics*, 2021.
- Eo, Yunjong and James Morley, “Why has the US economy stagnated since the Great Recession?,” *Review of Economics and Statistics*, 2022.

FIGURE 1.—ILLUSTRATION OF DIFFERENT TYPES OF RECESSIONS

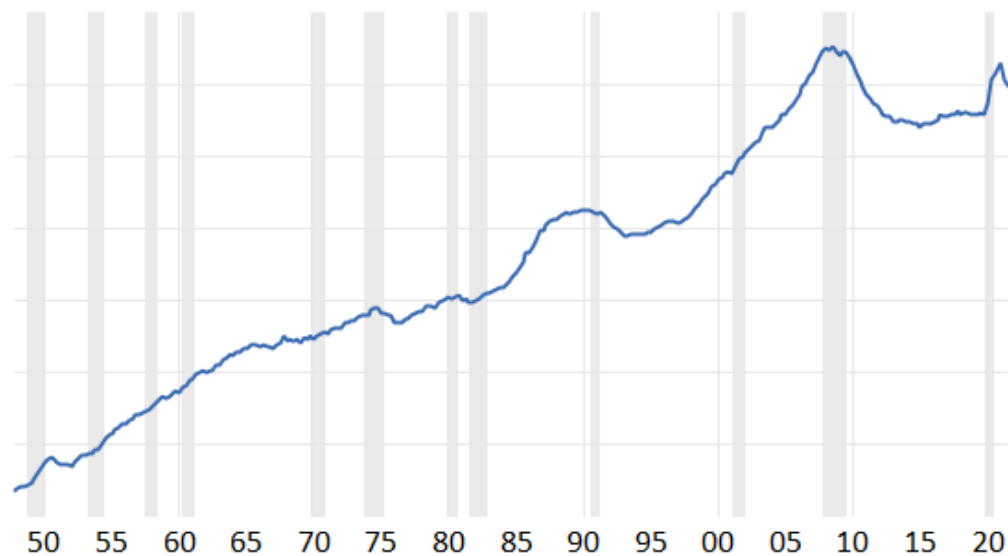


The shaded area denotes the contractionary regime.

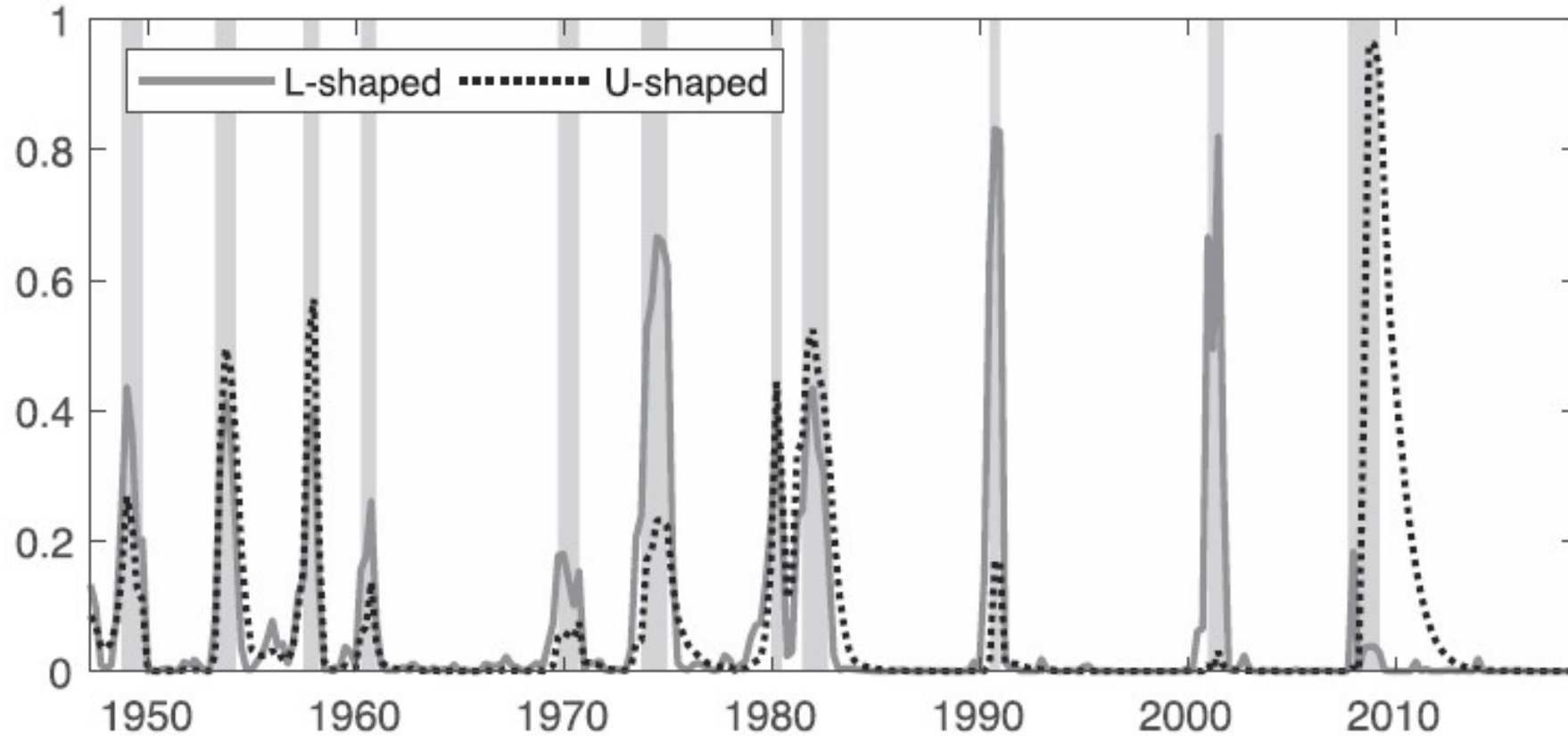
# Leverage and business cycle asymmetry

- Jensen, Henrik, Ivan Petrella, Søren Hove Ravn, and Emiliano Santoro, “Leverage and deepening business-cycle skewness,” *American Economic Journal: Macroeconomics*, 2020.

Credit-to-GDP ratios - United States

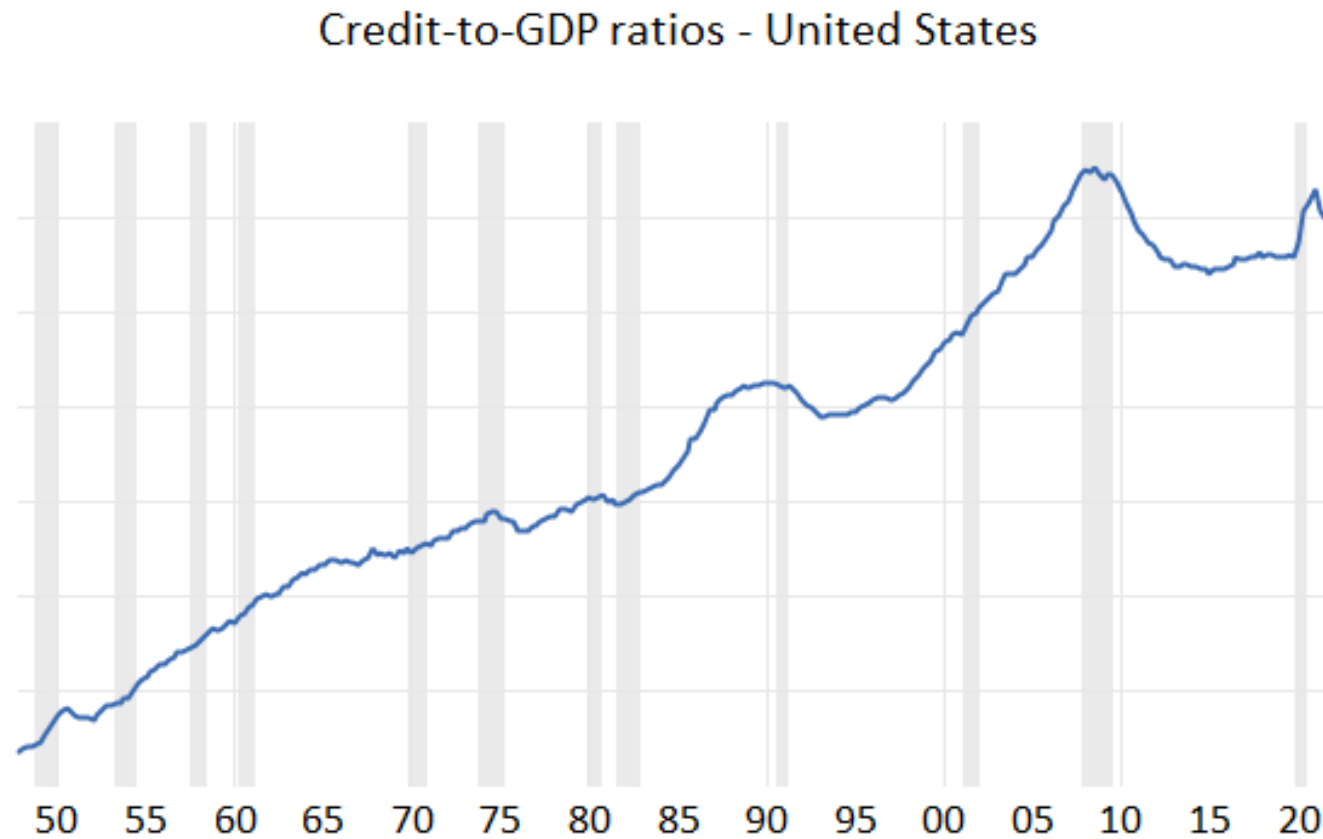


# Recession shapes from Eo and Morley



(b) L- and U-shaped regimes

# Leverage and NBER recession dates





# What we do and results (preliminary\*)

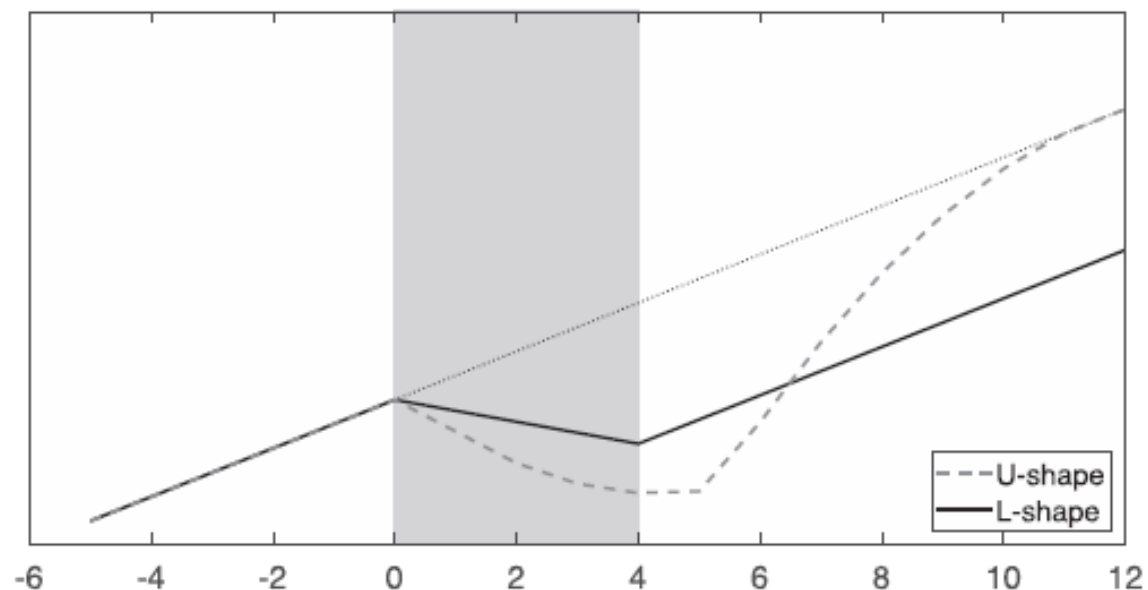
- We estimate the Eo-Morley model, but allow switching to depend on leverage.
- We estimate a classic trend/cycle decomposition, but allow switching to depend on leverage.
- Leverage matters a lot for the probability of a recession shape.
  - The Great Recession is indeed L-shaped.

\* I really mean it, *preliminary*.

Why do we care about the shape of a recession?

# Why do we care about the shape of a recession?

FIGURE 1.—ILLUSTRATION OF DIFFERENT TYPES OF RECESSIONS



The shaded area denotes the contractionary regime.

- A permanent drop from normal trend is likely to mean a greater present value loss.
- Identifying shapes might say something about source of shocks.
- Identifying shapes might say something about propagation mechanisms.
- Does leverage effect what kind of physical/human/network capital is lost?

# Why do we care about the role of leverage?

- Institutions affect leverage and maybe the effects of leverage.
  - Some extremely preliminary evidence that effect of leverage on recession shape is different in the U.S. versus the rest of the G7.
- Policies affect leverage, whether by commission or omission.

# Eo and Morley model

$$\Delta y_t = \mu_0 + \delta \times I(t > \tau) + \mu_1 \times I(S_t = 1) + \mu_2 \times I(S_t = 2) + \lambda_2 \times \sum_{k=1}^m I(S_{t-k} = 2) + e_t$$

where  $e_t \sim N(0, \sigma_t^2)$ , with  $\sigma_t^2 = \sigma_{v0}^2 \times I(t \leq \tau_v) + \sigma_{v1}^2 \times I(t > \tau_v)$ ,  $\tau = 2006Q1$ ,  $\tau_v = 1984Q2$ ,  $p_{12} = 0$ ,  $p_{21} = 0$ ,  $\mu_2 + m \times \lambda_2 = 0$ .  $S = 0$  is expansion,  $S = 1$  is L-shaped,  $S = 2$  is U-shaped.

# Eo and Morley model – Our version

$$\Delta y_t = \mu_0 + \delta \times I(t > \tau) + \mu_1 \times I(S_t = 1) + \mu_2 \times I(S_t = 2) + \lambda_2 \times \sum_{k=1}^m I(S_{t-k} = 2) + e_t$$

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$$\Pr[S_t = j | S_{t-1} = 0] = \frac{\exp(\alpha_{c,j} + \alpha_{v,j} v_{t-1})}{1 + \exp(\alpha_{c,1} + \alpha_{v,1} v_{t-1}) + \exp(\alpha_{c,2} + \alpha_{v,2} v_{t-1})}, \quad j = 1, 2.$$

$v_{t-1}$  is (lagged) leverage. Probabilities of leaving recession are constant.

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$\alpha_{v,1}$  and  $\alpha_{v,2}$  are jointly significant at the 0.05 level.

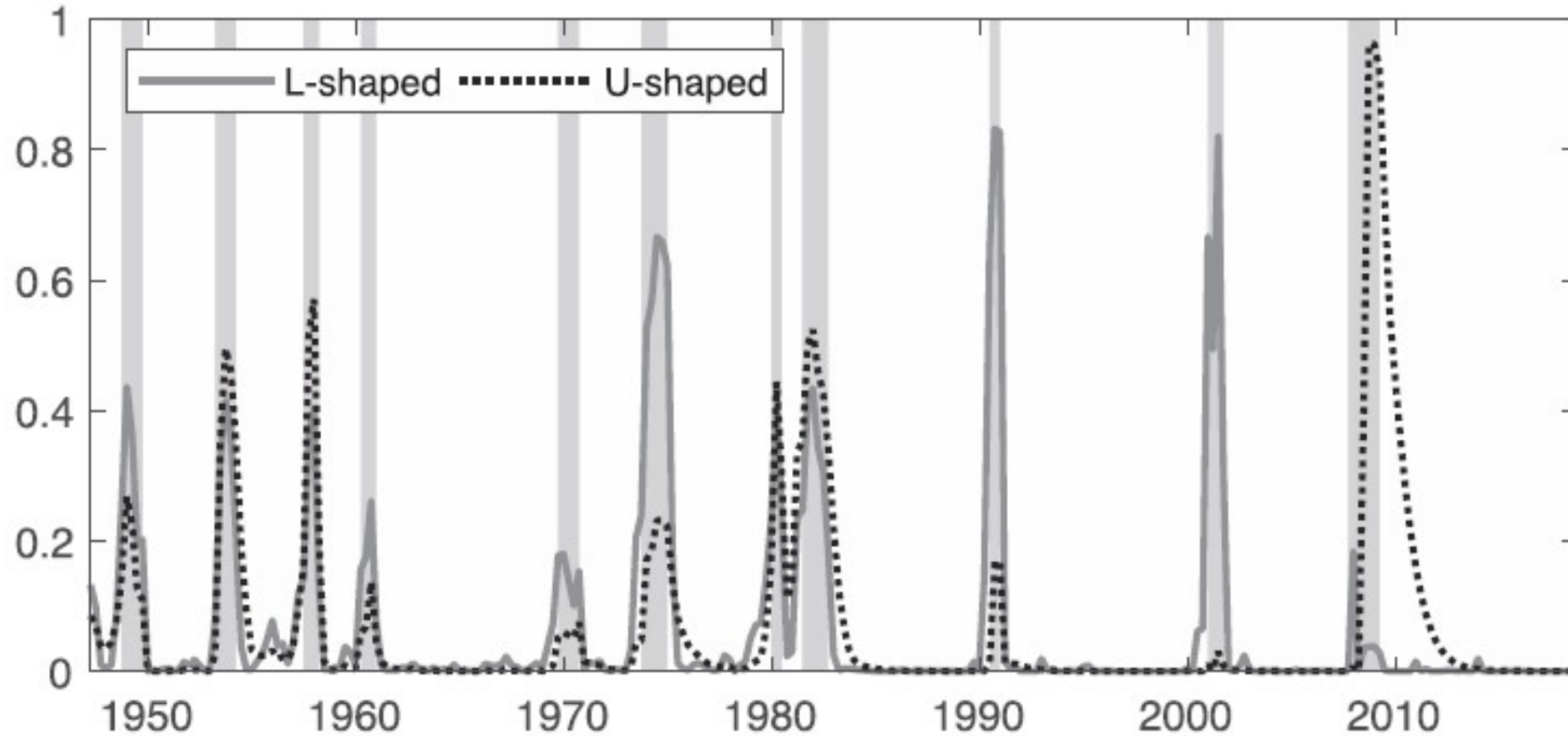
Parameter	Leverage Model		Restricted Model	
	Estimate	S.E.	Estimate	S.E.
$p_{01}^{high}$ (%)	2.66	(1.89)	2.27	(1.45)
$p_{02}^{high}$ (%)	0.07	(0.17)	1.51	(0.99)
$p_{01}^{low}$ (%)	0.86	(1.64)	2.27	(1.45)
$p_{02}^{low}$ (%)	3.88	(2.70)	1.51	(0.99)

Restricted is Eo-Morley model

*high* evaluates at 80<sup>th</sup> percentile of leverage distribution; *low* at 20<sup>th</sup> percentile

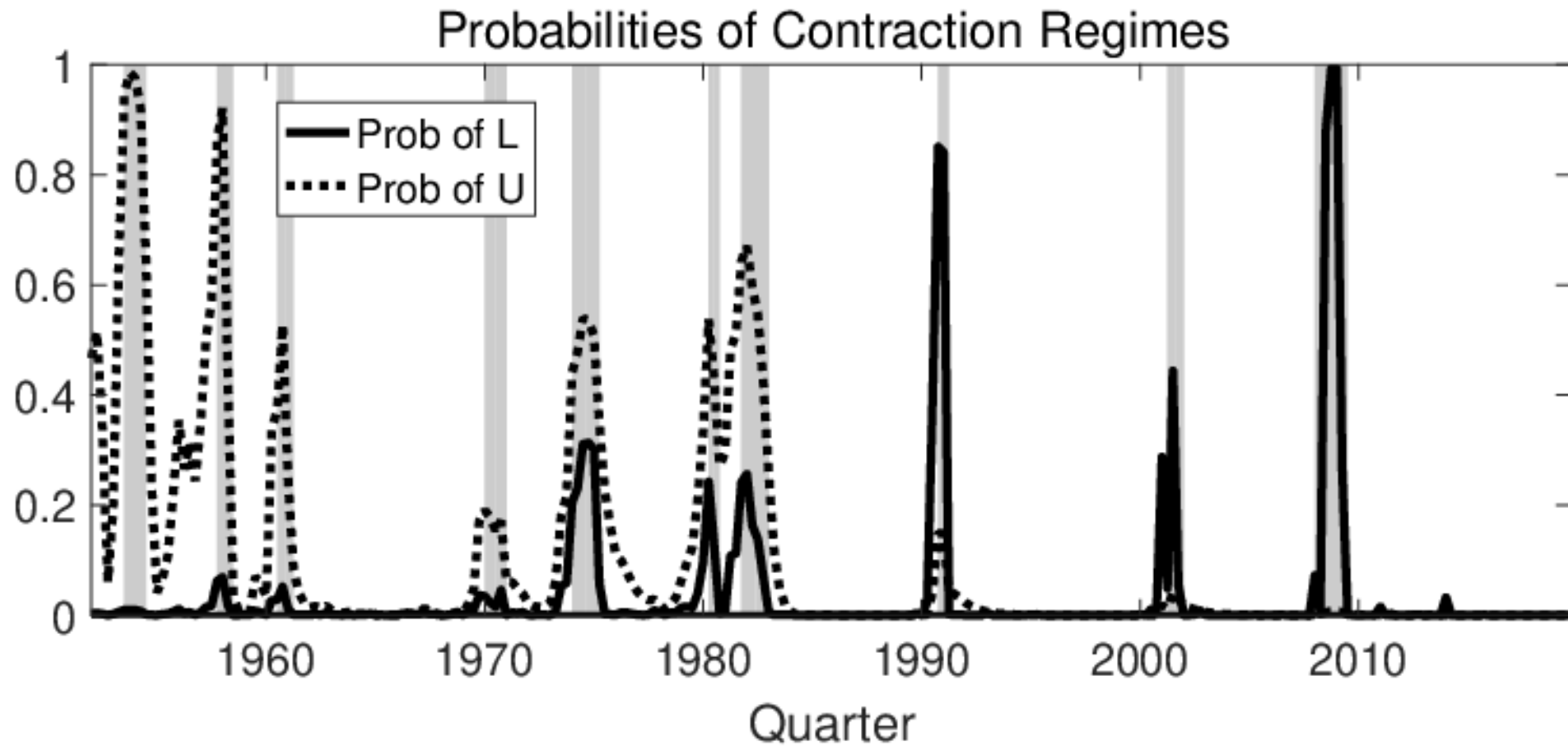


# Recession shapes from Eo and Morley



(b) L- and U-shaped regimes

# The Great Recession is L-Shaped



# Trend/Cycle Model

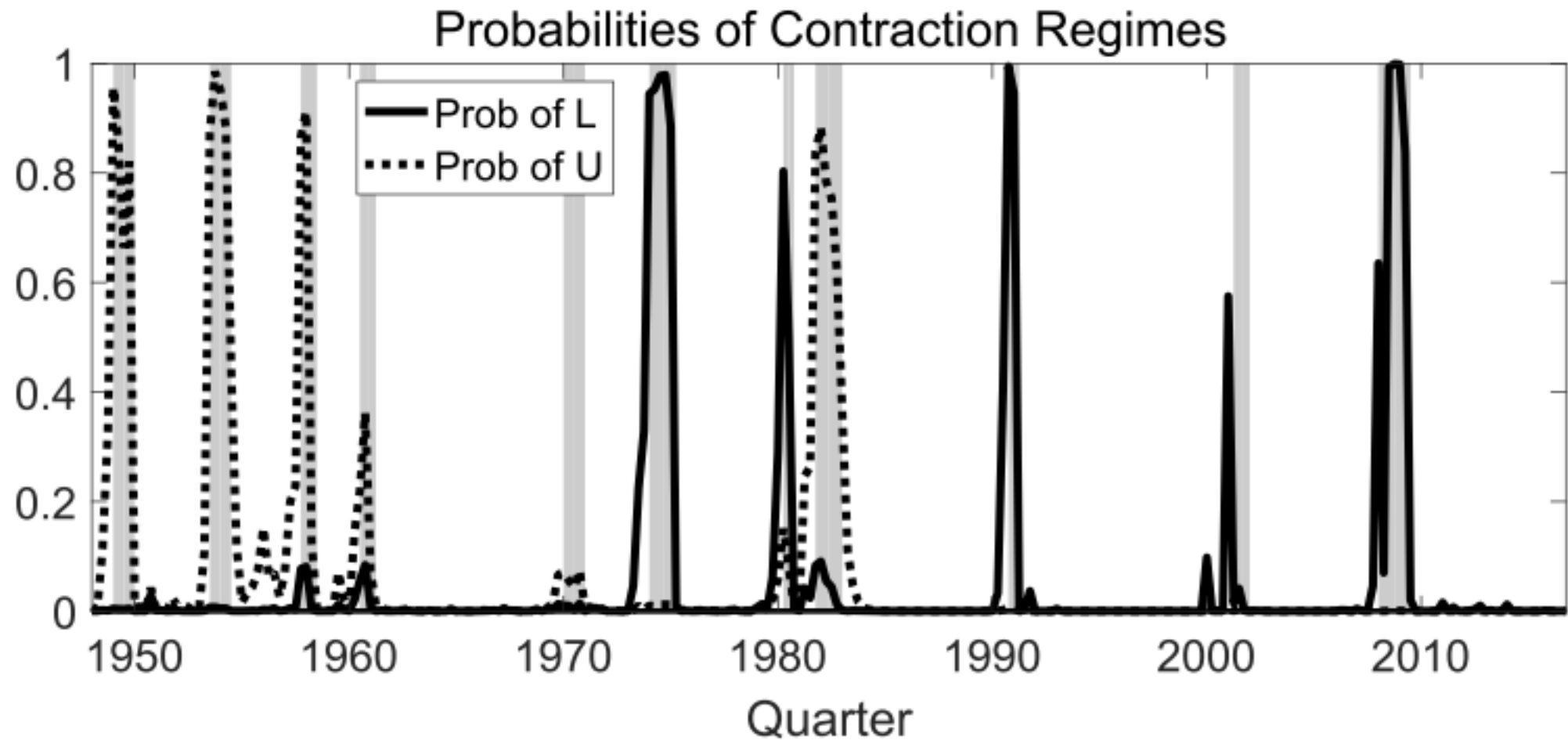
$$y_t = x_t + c_t,$$

$$x_t = \mu_0^* + S_t^P \mu_1^* + x_{t-1} + \eta_t,$$

$$\psi(L)c_t = \mu_2^* S_t^T + \omega_t$$

Parameter	Leverage Model		Restricted Model	
	Estimate	S.E.	Estimate	S.E.
$p_{0P}^{high}(\%)$	3.70	(2.03)	3.92	(2.22)
$p_{0T}^{high}(\%)$	0.06	(0.17)	3.69	(1.47)
$p_{0P}^{low}(\%)$	1.16	(1.12)	3.92	(2.22)
$p_{0T}^{low}(\%)$	3.09	(2.23)	3.69	(1.47)
$p_{PP}(\%)$	69.35	(12.69)	93.23	(2.60)
$p_{TT}(\%)$	63.84	(14.45)	50.84	(17.96)
$\mu_0^*$	0.89	(0.04)	0.91	(0.05)
$\mu_1^*$	-1.62	(0.18)	-1.34	(0.29)
$\mu_2^*$	-1.66	(0.27)	-1.66	(0.16)

# The Great Recession is L-Shaped in the Trend/Cycle Model Too



Andy circa 1968



Photo courtesy Bud Collier