Financial Frictions and the Cleansing Effects of Recessions

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A historical hint about recessions

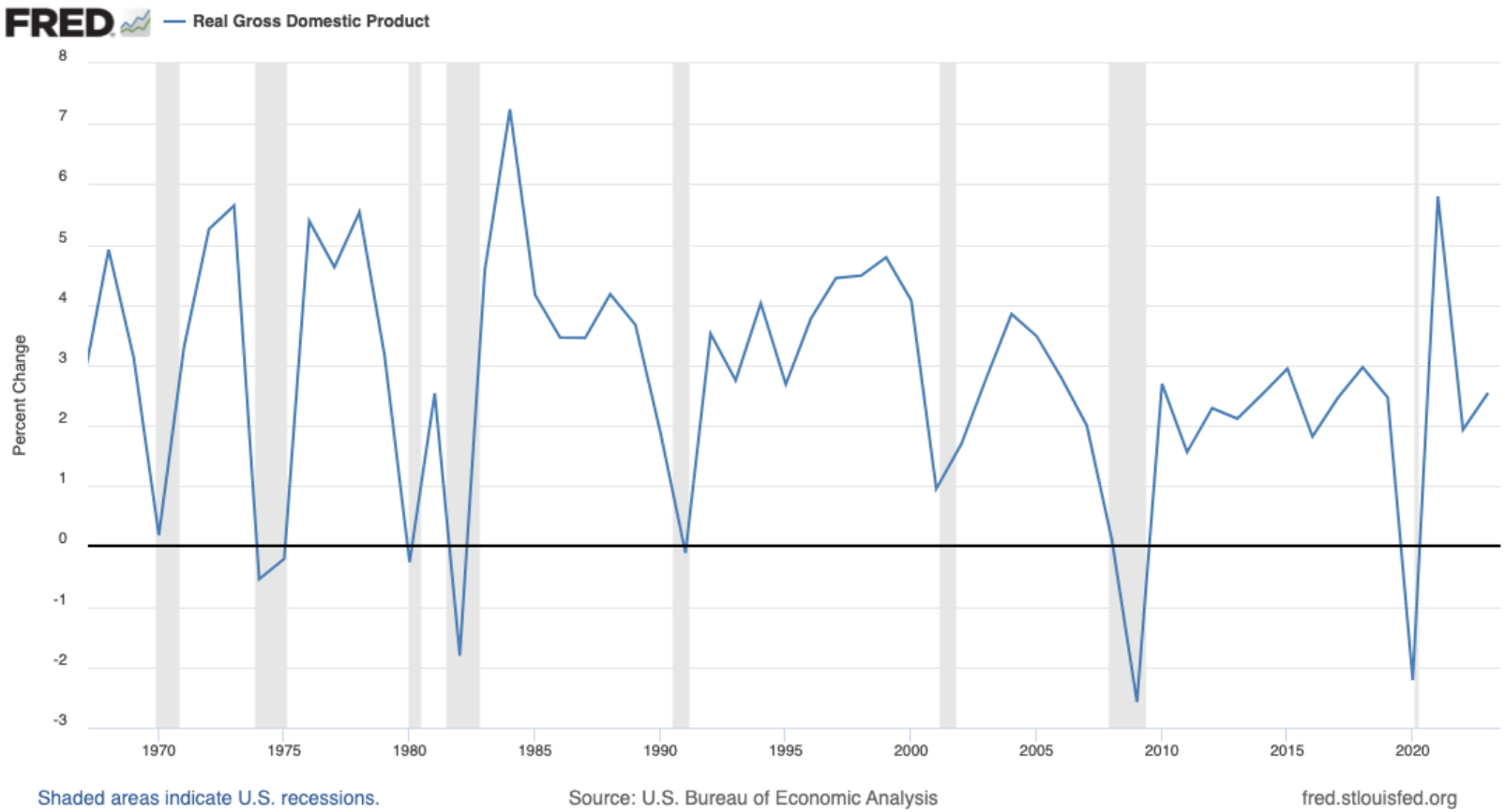
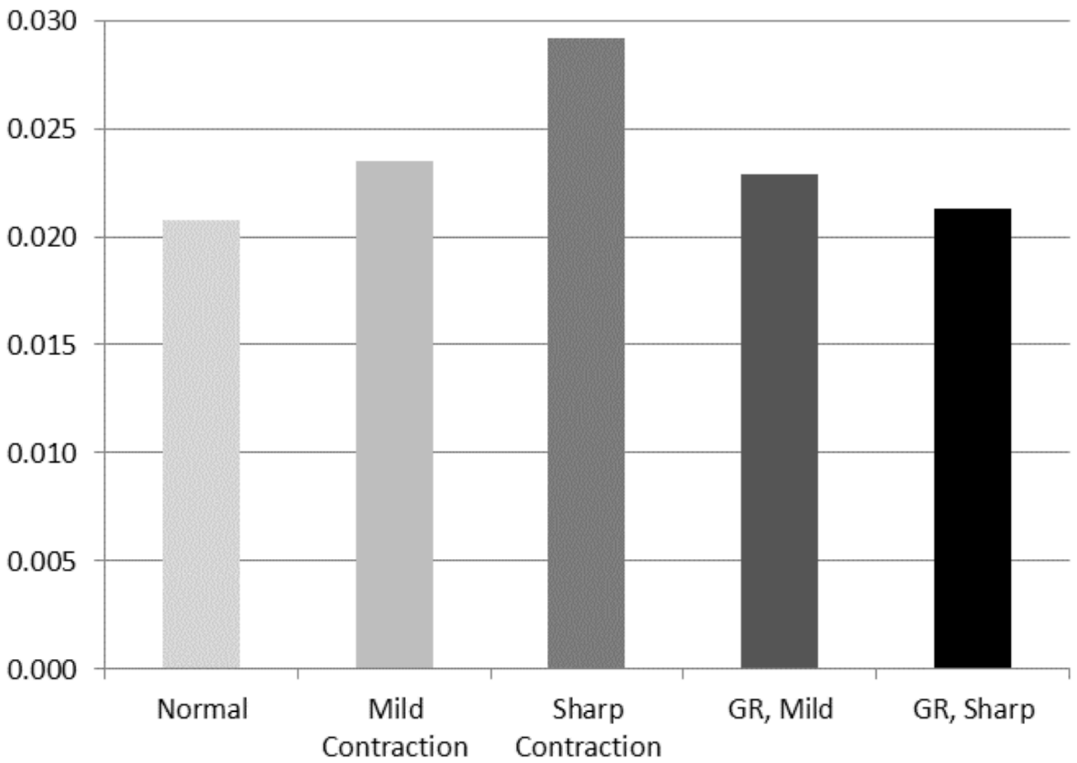


Figure: Annual US GDP growth rates from 1966 to 2022

The Cleansing Effect of Recessions

- Economic downturns are associated with increased patterns of reallocation.
- Literature on the Cleansing Effect suggests this is a productivity-enhancing phenomenon: during economic downturns, less productive units are eliminated, leaving only the most productive ones to survive (Caballero & Hammour, 1993)
- However, this pattern shifted during the Great Recession (as identified by Foster, Grim, & Haltiwanger, 2016): the intensity of reallocation fell rather than rose, and the reallocation that did occur was less productivity-enhancing than in the prior recessions.

Predicted Contribution of Reallocation to Aggregate (Industry-Level) Productivity



Research Questions

1. How do **financial frictions** influence firms' decisions on optimal *capital* and *dividend* paths?
   - By developing a **theoretical model** incorporating financial frictions to derive a *closed-form solution* for the firm's optimization problem.
2. What are the *aggregate-level* effects of financial frictions on the **cleansing effect**?
   - Employing Monte Carlo simulations to investigate the impact of financial frictions within an economy with *heterogeneous firms*.

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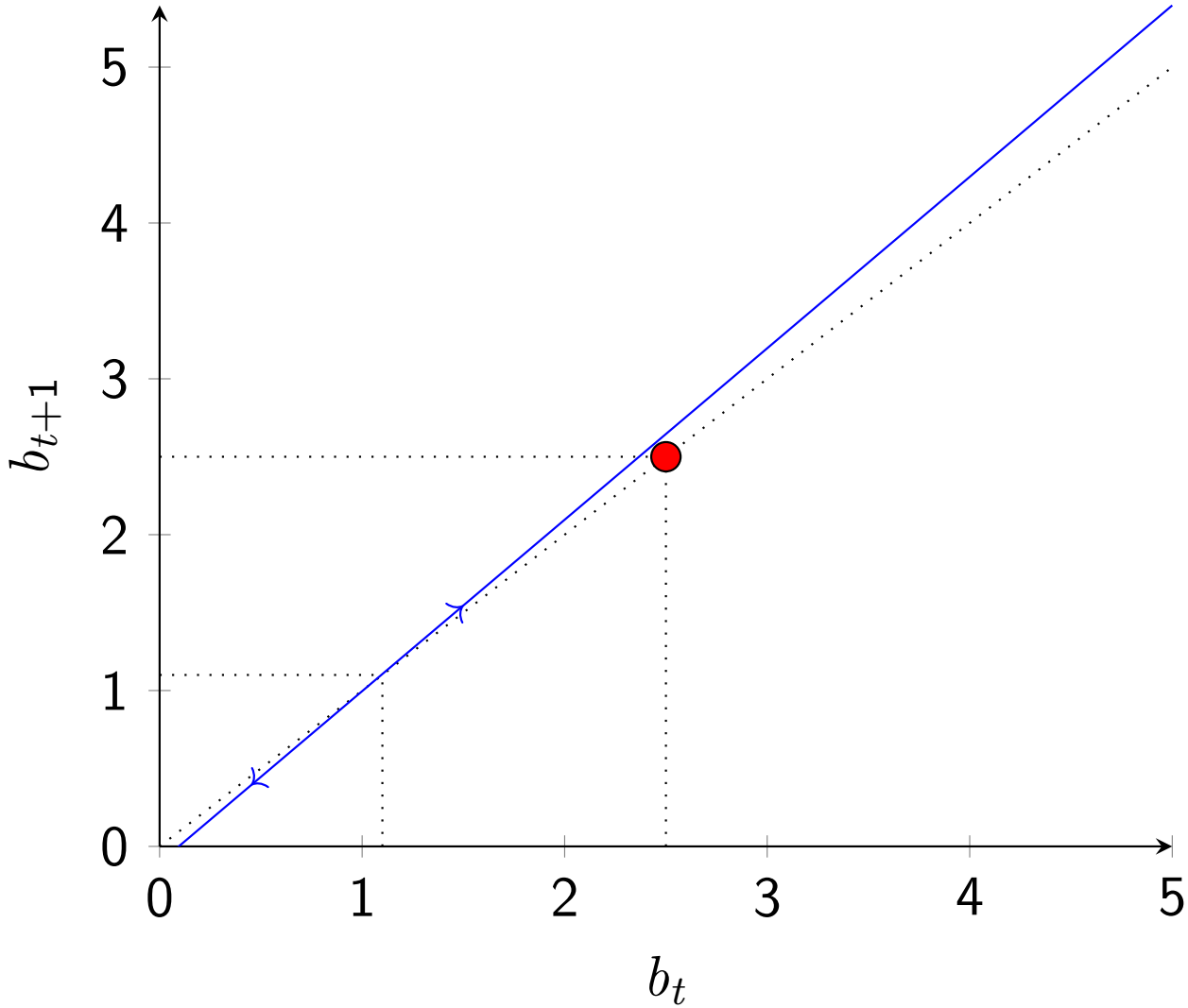
Flow of fund costraints

$$k_{t+1} = k_t(1-\delta) - Rb_t - d_t + f(k_t) + b_{t+1} \tag{1}$$



Financial frictions

There are two types of financial frictions are included:

1. **Monitoring costs** of the financial intermediaries $(1-\mu)$ on the participation constraint:

$$R_t = \frac{R_f}{p} - \frac{1-p}{p}\frac{\mu f(k_t)}{b_t} \tag{2}$$

2. **Financing constraint**:

$$b_t = l \cdot k_t \quad 0 < l < 1 \tag{3}$$

The firm's inter-temporal problem

The firm's objective is to maximize:

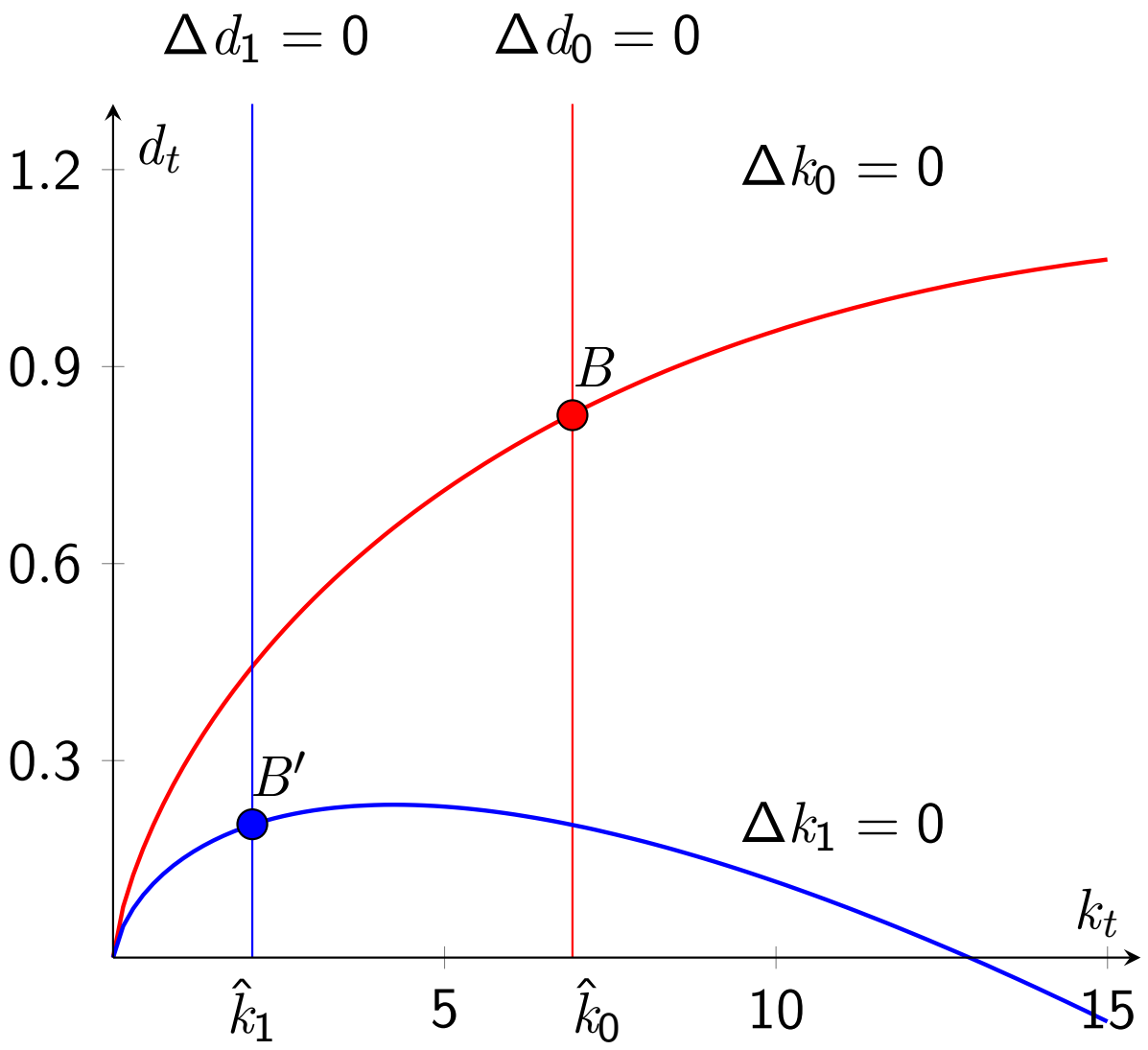
$$\max_{\{d_t\}_{t=0}^{+\infty}} V_0 = \sum_{t=0}^{+\infty} \beta^t U(d_t)$$

subject to: (1),(2),(3). Using the Lagrangian function, we get:

Euler equations for divideds

$$U'(d_t) = \frac{\beta}{(1-l)} U'(d_{t+1}) \left[f'(k_t) \frac{p + \mu - \mu p}{p} + \frac{p - \delta p - R_f l}{p} \right] \quad (4)$$

Phase Diagram



Reframing the problem with Bellman

$$\begin{cases} V(k_0) = U(d_0^*) + \beta V(k_1), \\ k_1 = \left[\frac{p+\mu-\mu p}{p} f(k_0) + \frac{p-\delta p - R_f l}{p} k_0 - d_0^* \right] \cdot (1-l)^{-1}, \\ d_0^* = [\beta V'(k_1)]^{-1}, \\ p - \delta p - R_f l = 0 \quad \text{(Assumption)}, \\ k_0 \text{ given.} \end{cases}$$

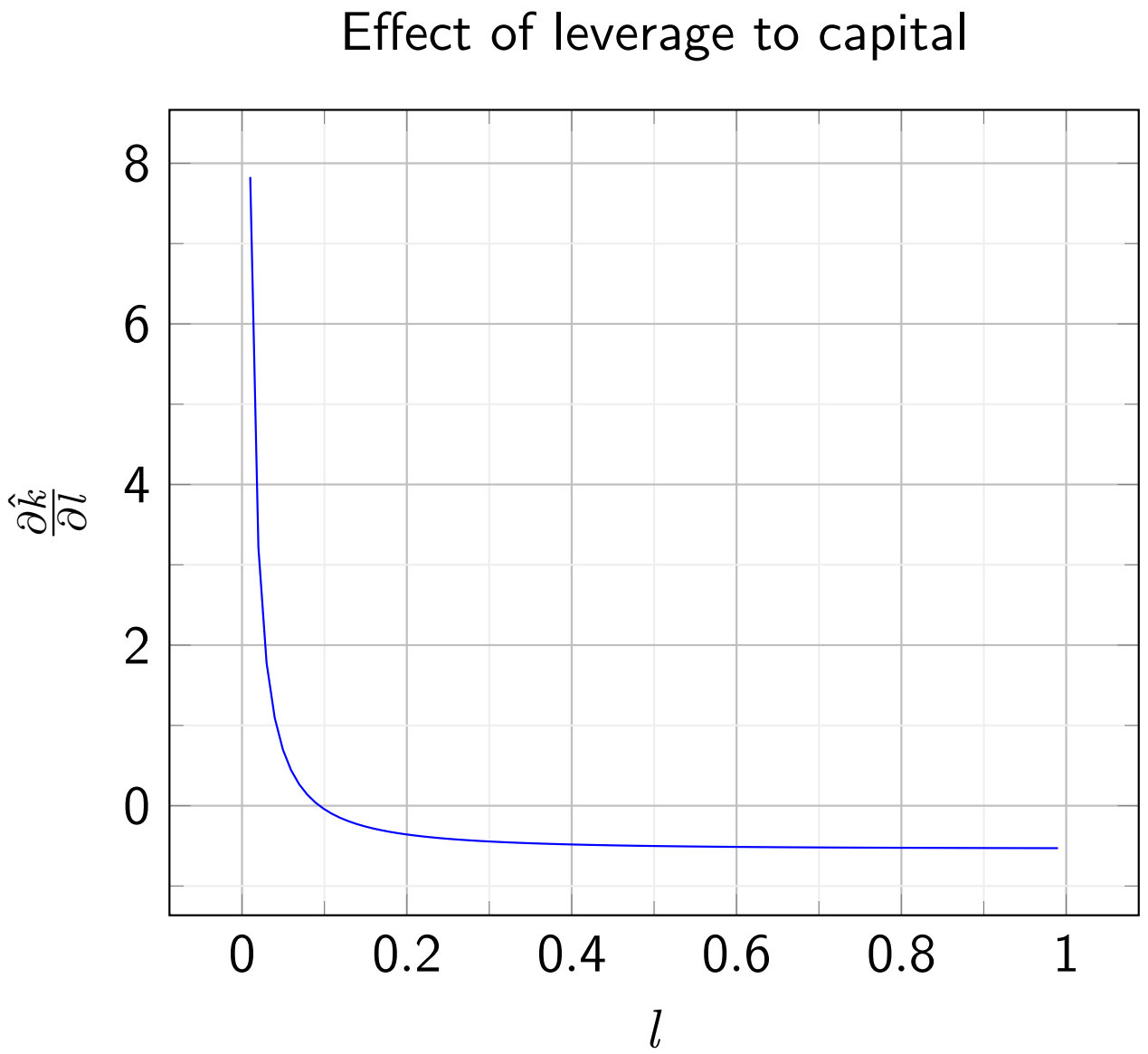
The solutions to the above systems are:

$$k_1^* = \left[\frac{p + \mu(1-p)p}{p} Z k_0^{\alpha} \right] \frac{\alpha\beta}{1 - l\alpha\beta}, \tag{5}$$

The *policy function* is:

$$d_0^* = \left[\frac{p + \mu(1-p)p}{p} Z k_0^{\alpha} \right] \frac{1 - \alpha\beta}{1 - l\alpha\beta}, \tag{6}$$

Effect of leverage



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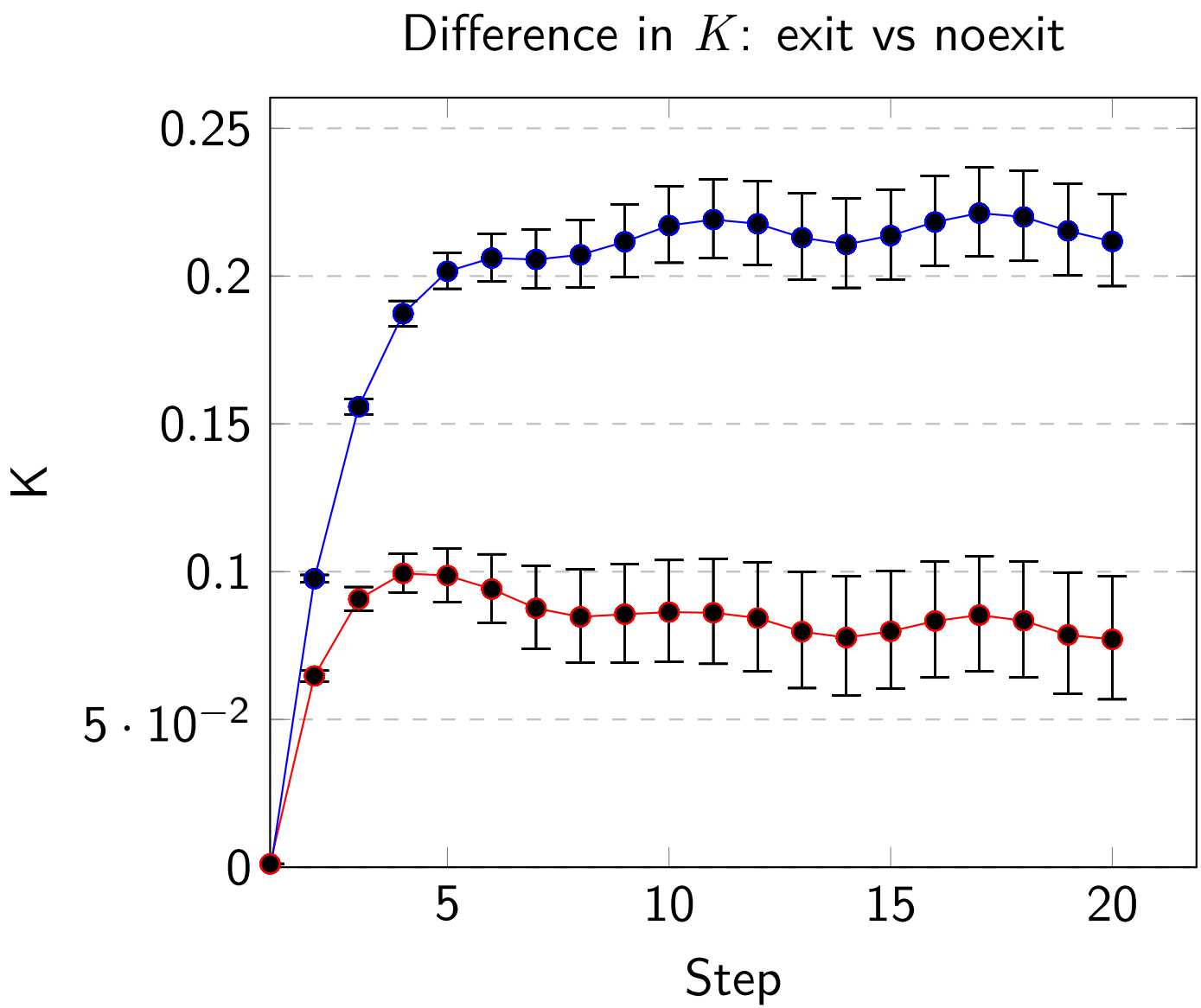
Cleansing effect of recessions



Final Remarks

- Incorporating monitoring costs and financial constraints into the model reveals a **reduction** in firms' steady-state *capital* and *dividends*.
- The impact of **fixed leverage** on capital varies and is dependent on the specific levels of capital and leverage.
- Monte Carlo simulations suggest that such financial frictions could **dampen** the cleansing effects traditionally observed in recessions.