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# **DECLINING DYNAMISM, ALLOCATIVE EFFICIENCY, AND THE PRODUCTIVITY SLOWDOWN**

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# AGENDA

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# INTRODUCTION

What has caused the noticeable decline in the U.S. economy's dynamism and how does it relate to the slowdown in productivity growth?

# UNDERSTANDING U.S. PRODUCTIVITY SLOWDOWN



## Study Focus:

- Decker et al. (2017) investigate causes behind U.S. productivity slowdown.

## Key Findings:

- Decline in entrepreneurship and labour market fluidity.
- Inefficient allocation of resources.

## Impact:

- These trends significantly affect living standards and economic growth, particularly post-2000 and in high-tech sectors.

# UNDERSTANDING U.S. PRODUCTIVITY SLOWDOWN



## Approach:

- Utilizes firm-level data for an in-depth analysis of productivity trends.

## Conclusion:

- Highlights the need for reassessment of productivity changes, emphasizing allocative efficiency and evolving business dynamics.

# METHODOLOGY

All methods start with a definition of aggregate productivity at time  $t$  as a share-weighted average of firm productivity  $\varphi_{it}$ :

$$\phi_t = \sum_i s_{it} \varphi_{it} \Rightarrow P_{it} = \sum_{f \in i} \theta_{ft} p_{ft}$$

where the shares  $s_{it} \geq 0$  sum to 1. The key variable of interest is the change in aggregate productivity over time (from  $t = 1$  to 2)  $\Delta\phi = \phi_2 - \phi_1$ .

# METHODOLOGY

Griliches and Regev (1995) use the average aggregate productivity level between the two periods,  $\bar{\phi} = (\phi_1 + \phi_2)/2$ , as the reference productivity level. Their decomposition is then given by:

$$\begin{aligned}\Delta\phi &= \sum_{i \in S} [s_{i2}(\varphi_{i2} - \bar{\phi}) - s_{i1}(\varphi_{i1} - \bar{\phi})] + \sum_{i \in E} s_{i2}(\varphi_{i2} - \bar{\phi}) - \sum_{i \in X} s_{i1}(\varphi_{i1} - \bar{\phi}) \\ &= \sum_{i \in S} \bar{s}_i(\varphi_{i2} - \varphi_{i1}) + \sum_{i \in S} (s_{i2} - s_{i1})(\bar{\varphi}_i - \bar{\phi}) + \sum_{i \in E} s_{i2}(\varphi_{i2} - \bar{\phi}) - \sum_{i \in X} s_{i1}(\varphi_{i1} - \bar{\phi})\end{aligned}$$

1                    2                    3                    4

In the second line, the contribution of surviving firms is broken into within-and between-firm subcomponents using an average (between periods) firm share  $\bar{s}_i = (s_{i1} + s_{i2})/2$  and an average firm productivity  $\bar{\varphi}_i = (\varphi_{i1} + \varphi_{i2})/2$  constructed in the same way as the average aggregate productivity  $\bar{\phi}$ .

# METHODOLOGY

Foster, Haltiwanger, and Krizan (2001) use the aggregate productivity level in period 1  $\phi_1$  instead of the time average  $\bar{\phi}$  as a reference productivity level. Their decomposition is then given by:

$$\begin{aligned}\Delta\phi &= \sum_{i \in S} [s_{i2}(\varphi_{i2} - \phi_1) - s_{i1}(\varphi_{i1} - \phi_1)] + \sum_{i \in E} s_{i2}(\varphi_{i2} - \phi_1) - \sum_{i \in X} s_{i1}(\varphi_{i1} - \phi_1) \\ &= \sum_{i \in S} s_{i1}(\varphi_{i2} - \varphi_{i1}) + \sum_{i \in S} (s_{i2} - s_{i1})(\varphi_{i1} - \phi_1) + \sum_{i \in S} (s_{i2} - s_{i1})(\varphi_{i2} - \varphi_{i1}) \\ &\quad * * *\end{aligned}$$
$$+ \sum_{i \in E} s_{i2}(\varphi_{i2} - \phi_1) - \sum_{i \in X} s_{i1}(\varphi_{i1} - \phi_1)$$

# METHODOLOGY

The other commonly used decomposition proposed by Olley and Pakes (1996) eschews following firms over time and instead is based on a decomposition of the aggregate productivity level  $\phi_t$  in each period. This decomposition is:

$$\phi_t = \bar{\varphi}_t + \sum_i (s_{it} - \bar{s}_t)(\varphi_{it} - \bar{\varphi}_t) = \bar{\varphi}_t + cov(s_{it}, \varphi_{it}) \Rightarrow P_i = \bar{p}_i + cov(\theta_f, p_f)$$

where  $\bar{\varphi}_t = \frac{1}{n_t} \sum_{i=1}^{n_t} \varphi_{it}$  is the unweighted firm productivity mean and  $\bar{s}_t = 1/n_t$  is the mean market share.

# METHODOLOGY

Let  $s_{Gt} = \sum_{i \in G} s_{it}$  represent the aggregate market share of a group  $G$  of firms and define  $\phi_{Gt} = \sum_{i \in G} (s_{it} / s_{Gt}) \varphi_{it}$  as that group's aggregate (average) productivity. We can then write aggregate productivity in each period as a function of the aggregate share and aggregate productivity of the three groups of firms (survivors, entrants, and exiters):

$$\begin{aligned}\phi_1 &= s_{S1} \phi_{S1} + s_{X1} \phi_{X1} = \phi_{S1} + s_{X1} (\phi_{X1} - \phi_{S1}) \\ \phi_2 &= s_{S2} \phi_{S2} + s_{E2} \phi_{E2} = \phi_{S2} + s_{E2} (\phi_{E2} - \phi_{S2})\end{aligned}$$

From this, we obtain the productivity change in  $\Delta\phi$  in terms of those components and then separately apply the OP decomposition to the contribution of the surviving firms:

$$\begin{aligned}\Delta\phi &= (\phi_{S2} - \phi_{S1}) + s_{E2} (\phi_{E2} - \phi_{S2}) + s_{X1} (\phi_{S1} - \phi_{X1}) \\ &= \Delta\bar{\varphi}_S + \Delta cov_S + s_{E2} (\phi_{E2} - \phi_{S2}) + s_{X1} (\phi_{S1} - \phi_{X1})\end{aligned}$$

-----  $\Rightarrow$  -----

$$\Delta P_i = \Delta \bar{p}_{i,C} + \Delta cov_C(\theta_f, p_f) + \theta_{E2}(P_{E2} - P_{C2}) + \theta_{X1}(P_{C1} - P_{X1})$$

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# METHODOLOGY

Table 1 Productivity Contributions of Surviving, Entering and Exiting Firms

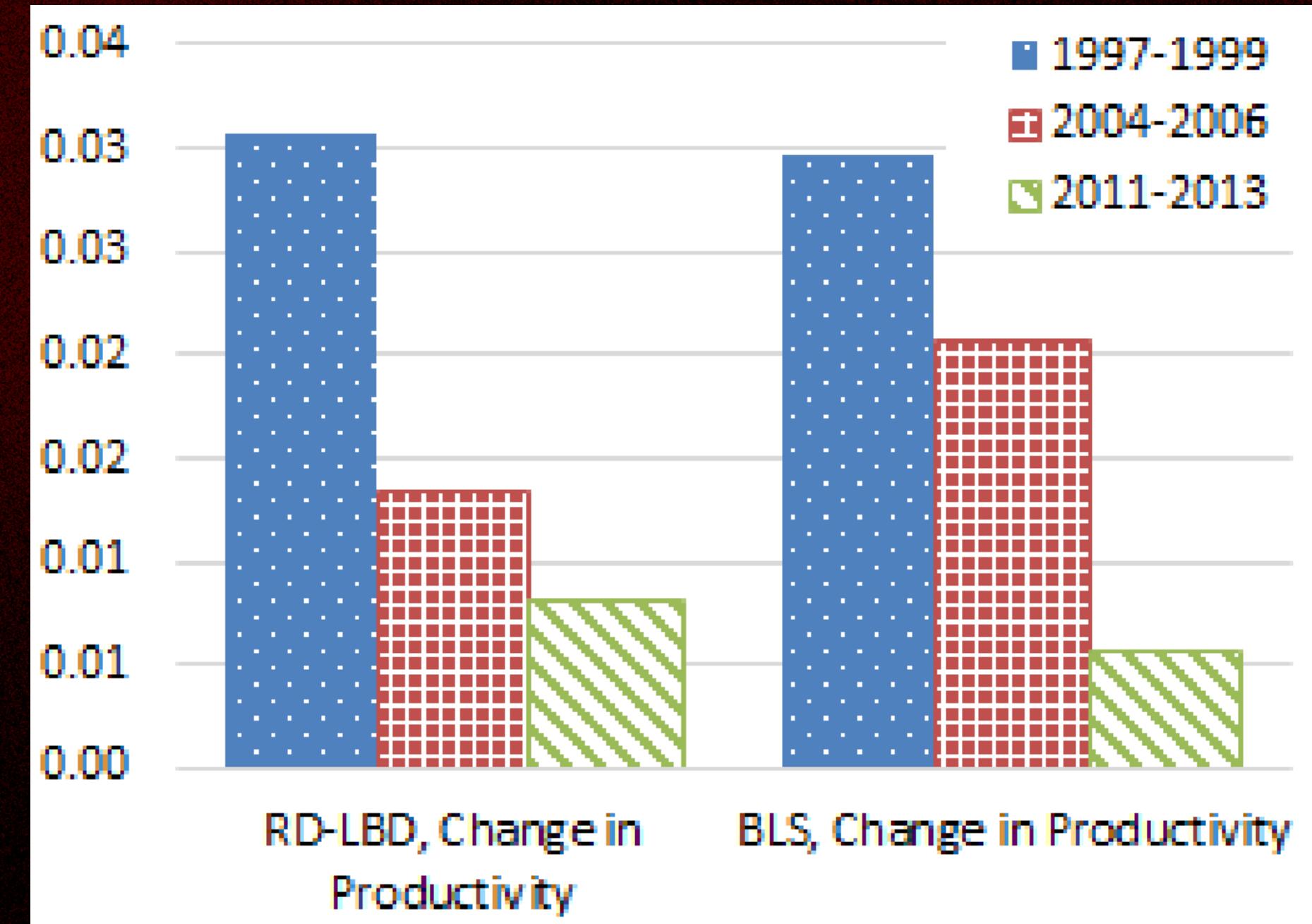
Group	GR	FHK	DOPD
<b>Surviving firms</b>	$\tilde{s}_{S2}(\phi_{S2} - \bar{\phi}) - \tilde{s}_{S1}(\phi_{S1} - \bar{\phi})$	$\tilde{s}_{S2}(\phi_{S2} - \phi_1) - \tilde{s}_{S1}(\phi_{S1} - \phi_1)$	$\phi_{S2} - \phi_{S1}$
<b>Entering firms</b>	$s_{E2}(\phi_{E2} - \bar{\phi})$	$s_{E2}(\phi_{E2} - \phi_1)$	$s_{E2}(\phi_{E2} - \phi_{S2})$
<b>Exiting firms</b>	$s_{X1}(\bar{\phi} - \phi_{X1})$	$s_{X1}(\phi_1 - \phi_{X1})$	$s_{X1}(\phi_{S1} - \phi_{X1})$

$$\sum_f \theta_{f1} \Delta p_f - \Delta \bar{p} = \sum_f \left( \theta_{f1} - \frac{1}{N} \right) \Delta p_f$$

Difference in weighted FHK ad unweighted DOPD  $\Rightarrow$  Dependent on number of firms  $N$ .

# PRODUCTIVITY SLOWDOWNS

Average annual log differences of aggregate productivity from both the RD-LBD and BLS data for three periods: 1997–1999, 2004–2006, and 2011–2013.



Source: Annual Productivity Growth BLS and author calculations from RE-LBD

**1. Average within-firm productivity growth for continuing firms**

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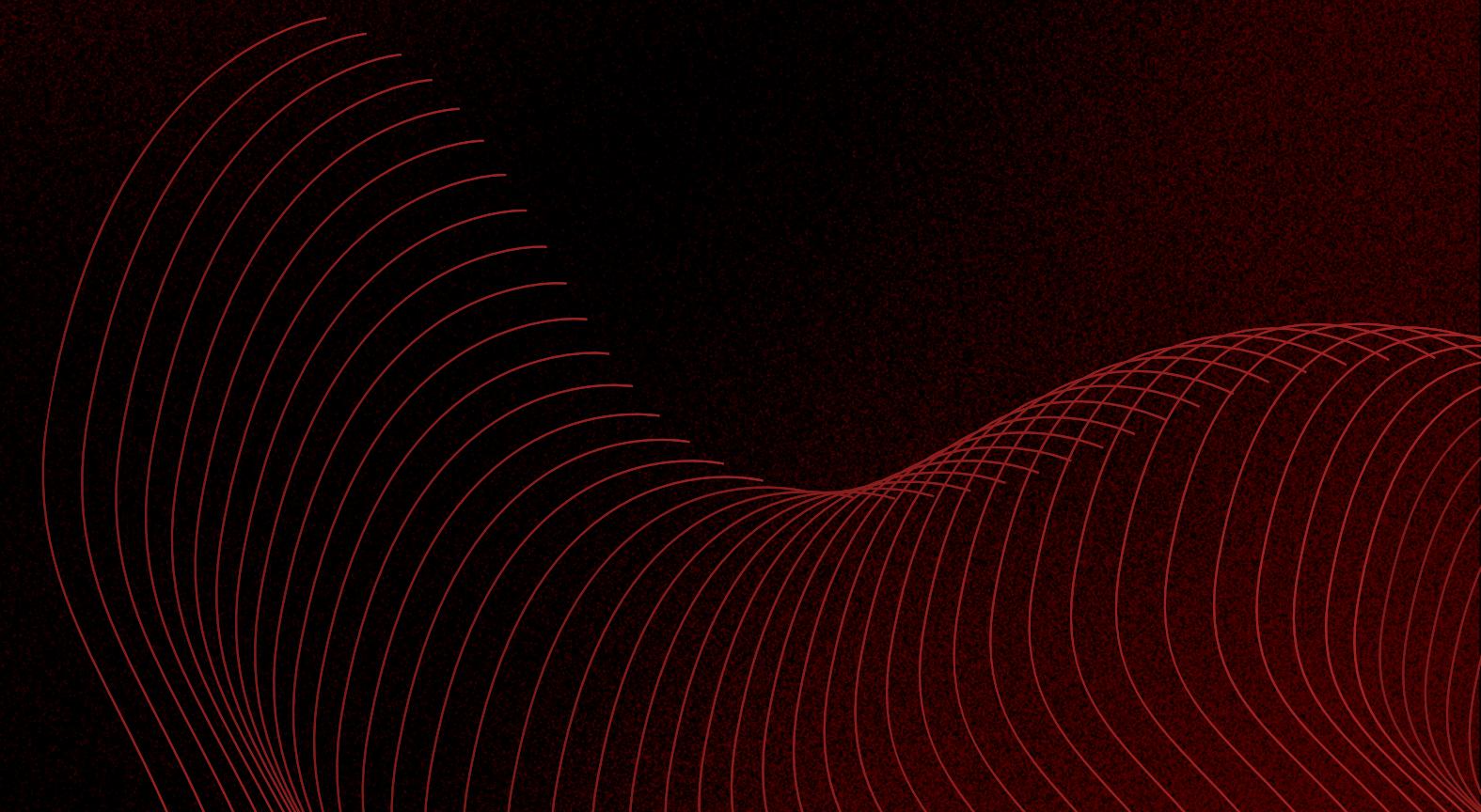
**2. Allocative efficiency**

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**3. Net entry**

# SUMMARY OF FINDINGS

Factors that affect aggregate productivity



# SUMMARY OF FINDINGS

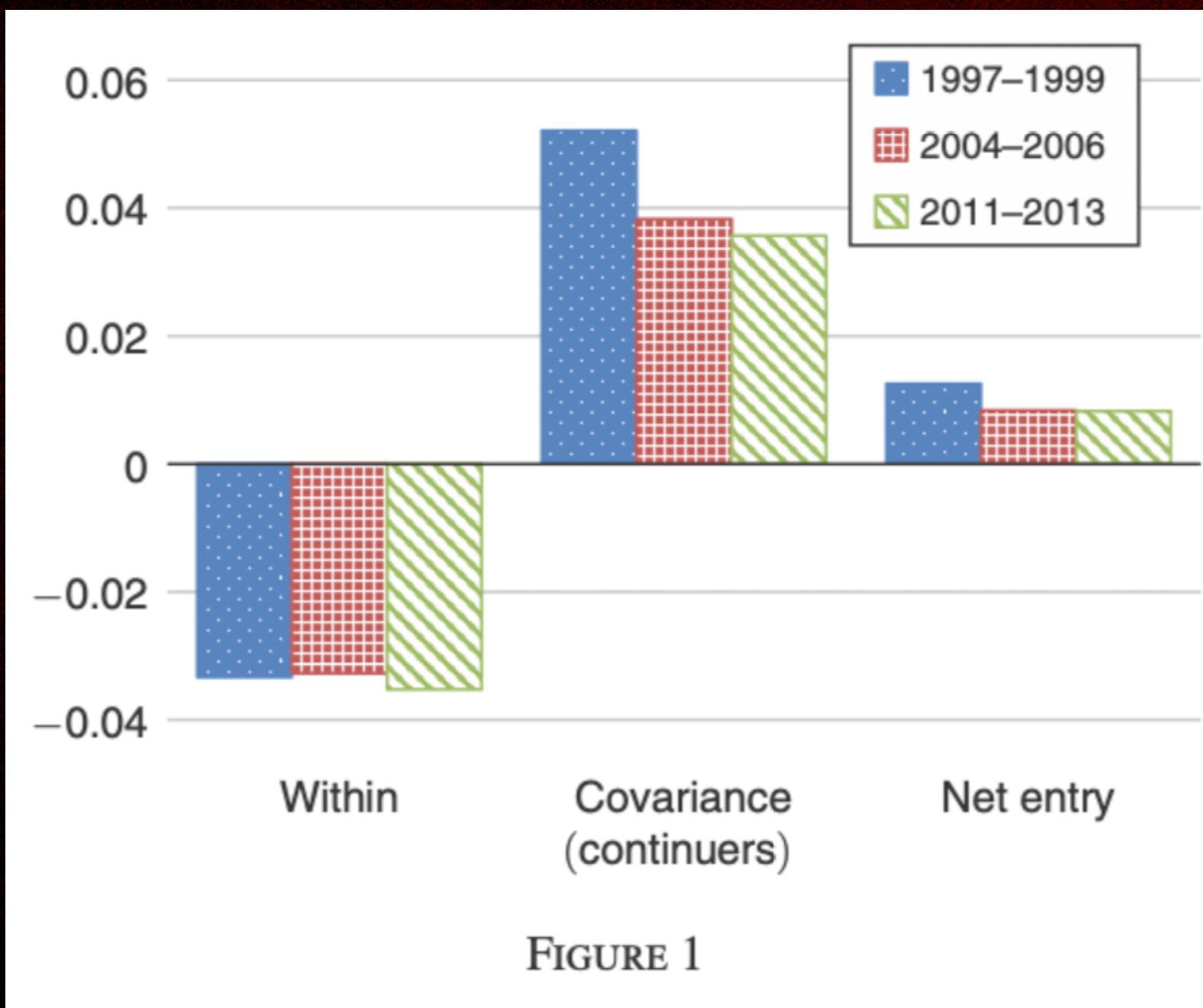


FIGURE 1

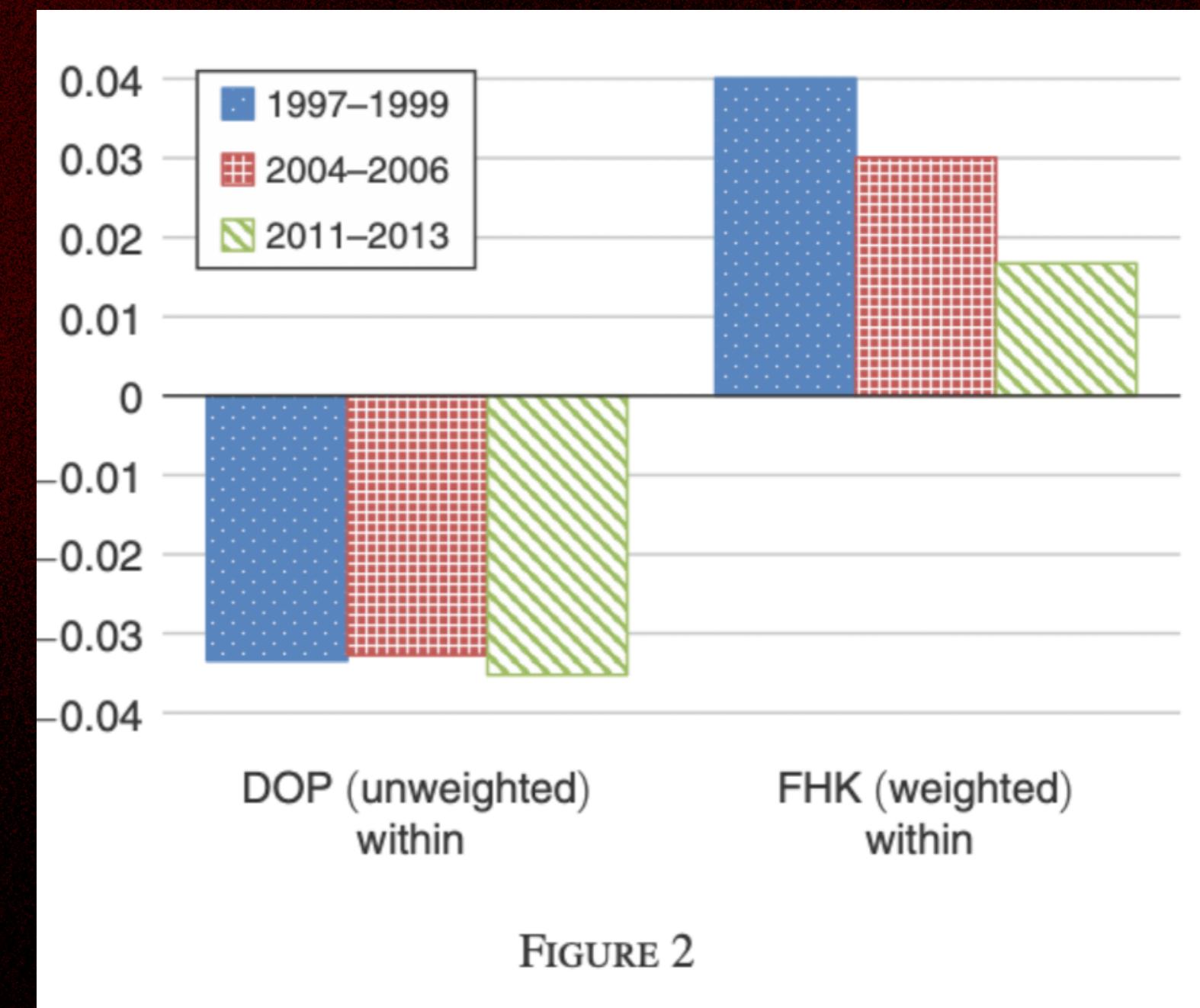


FIGURE 2

Source: Author Calculations From RE-LBD

# PLAN OF ACTION

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Policy Measures

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Research Initiatives

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In-depth Analysis

## Policy Measures

- Reduce barriers for new businesses.
- Encourage a culture of innovation.
- Facilitate the efficient movement of labor and capital.

## Research Initiatives

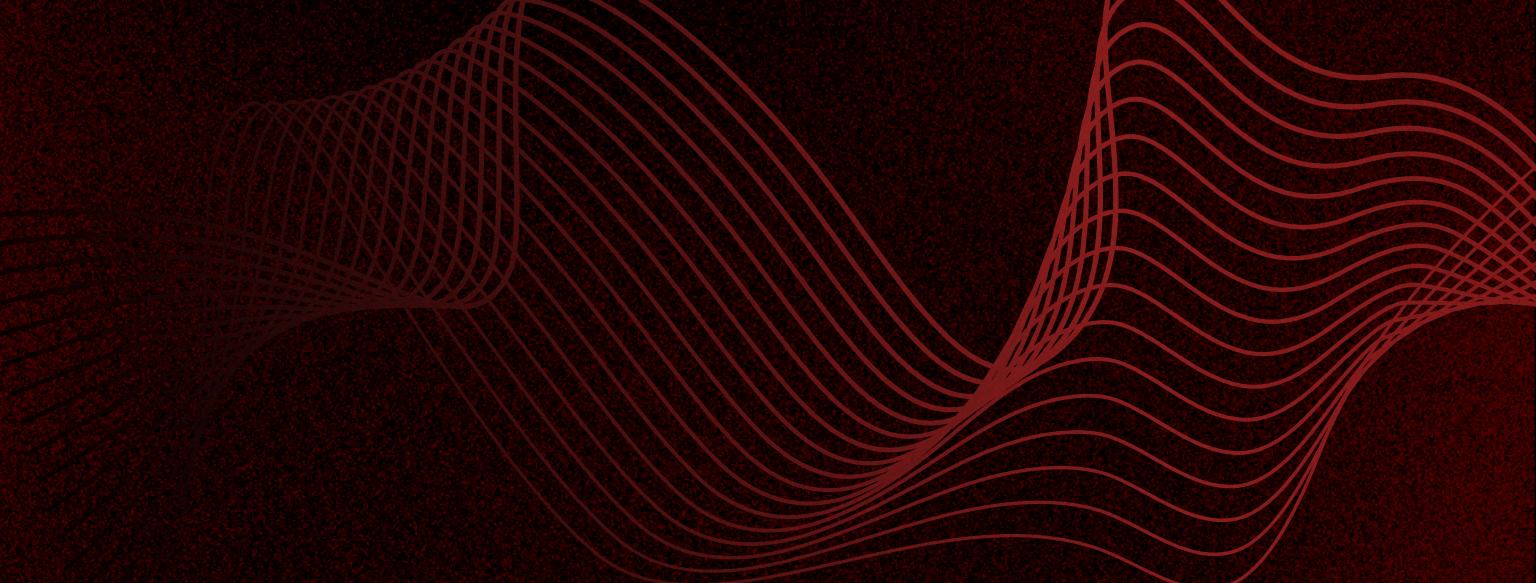
- Conduct further research to understand underlying causes.
- Develop targeted interventions based on research outcomes.

## In-depth Analysis

- Analyze declines in dynamism and efficiency, guiding targeted interventions and policy adjustments.
- Utilize comprehensive firm-level data for a meticulous examination of economic trends across sectors and time.

# CONCLUSION

- Decker et al. link declining dynamism to reduced productivity, urging a reevaluation and emphasizing allocative efficiency's crucial role.
- Allocative efficiency decline, identified by Decker et al., is a key driver of productivity slowdown, emphasizing the critical role of efficient resource allocation.
- The study highlights inefficient technological allocation as the cause of declining productivity, emphasizing the need for efficient resource allocation strategies.
- Decker et al. advocate a comprehensive strategy: reduce barriers, foster innovation, optimize labor and capital movement, and encourage further research for a dynamic economy.



# THANK YOU