02/02/2024

DECLINING DYNAMISM, ALLOCATIVE EFFICIENCY, AND THE PRODUCTIVITY SLOWDOWN

Ryan A. Decker, John Haltiwanger, Ron S. Jarmin, and Javier Miranda (2017)

AGENDA

Introduction	3
Methodology	6
Summary of Findings	13
Plan of Action	15
Conclusion	17

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 φ_{it}:

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

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:

$$\Delta\phi = \sum_{i\in S}[s_{i2}(\varphi_{i2} - \bar{\phi}) - s_{i1}(\varphi_{i1} - \bar{\phi})] + \sum_{i\in E} s_{i2}(\varphi_{i2} - \bar{\phi}) - \sum_{i\in X} s_{i1}(\varphi_{i1} - \bar{\phi})$$

$$= \underbrace{\sum_{i\in S} \bar{s}_i(\varphi_{i2} - \varphi_{i1})}_{1} + \underbrace{\sum_{i\in S}(s_{i2} - s_{i1})(\bar{\varphi}_i - \bar{\phi})}_{2} + \underbrace{\sum_{i\in E} s_{i2}(\varphi_{i2} - \bar{\phi})}_{3} - \underbrace{\sum_{i\in X} s_{i1}(\varphi_{i1} - \bar{\phi})}_{4}$$

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 ϕ_1 instead of the time average $\bar{\phi}$ as a reference productivity level. Their decomposition is then given by:

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

$$= \sum_{i\in S} s_{i1}(\varphi_{i2}-\varphi_{i1}) + \sum_{i\in S}(s_{i2}-s_{i1})(\varphi_{i1}-\phi_1) + \sum_{i\in S}(s_{i2}-s_{i1})(\varphi_{i2}-\varphi_{i1})$$

$$+ \sum_{i\in E} s_{i2}(\varphi_{i2}-\phi_1) - \sum_{i\in X} s_{i1}(\varphi_{i1}-\phi_1)$$

* * *

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 ϕ_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):

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

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:

$$\Delta\phi = (\phi_{S2} - \phi_{S1}) + s_{E2}(\phi_{E2} - \phi_{S2}) + s_{X1}(\phi_{S1} - \phi_{X1})$$
$$= \Delta\bar{\varphi}_S + \Delta cov_S + s_{E2}(\phi_{E2} - \phi_{S2}) + s_{X1}(\phi_{S1} - \phi_{X1})$$
$$\Rightarrow$$
$$\Delta P_i = \Delta\bar{p}_{i,C} + \Delta cov_C(\theta_f, p_f) + \theta_{E2}(P_{E2} - P_{C2}) + \theta_{X1}(P_{C1} - P_{X1})$$

METHODOLOGY

Table 1 Productivity Contributions of Surviving, Entering and Exiting Firms

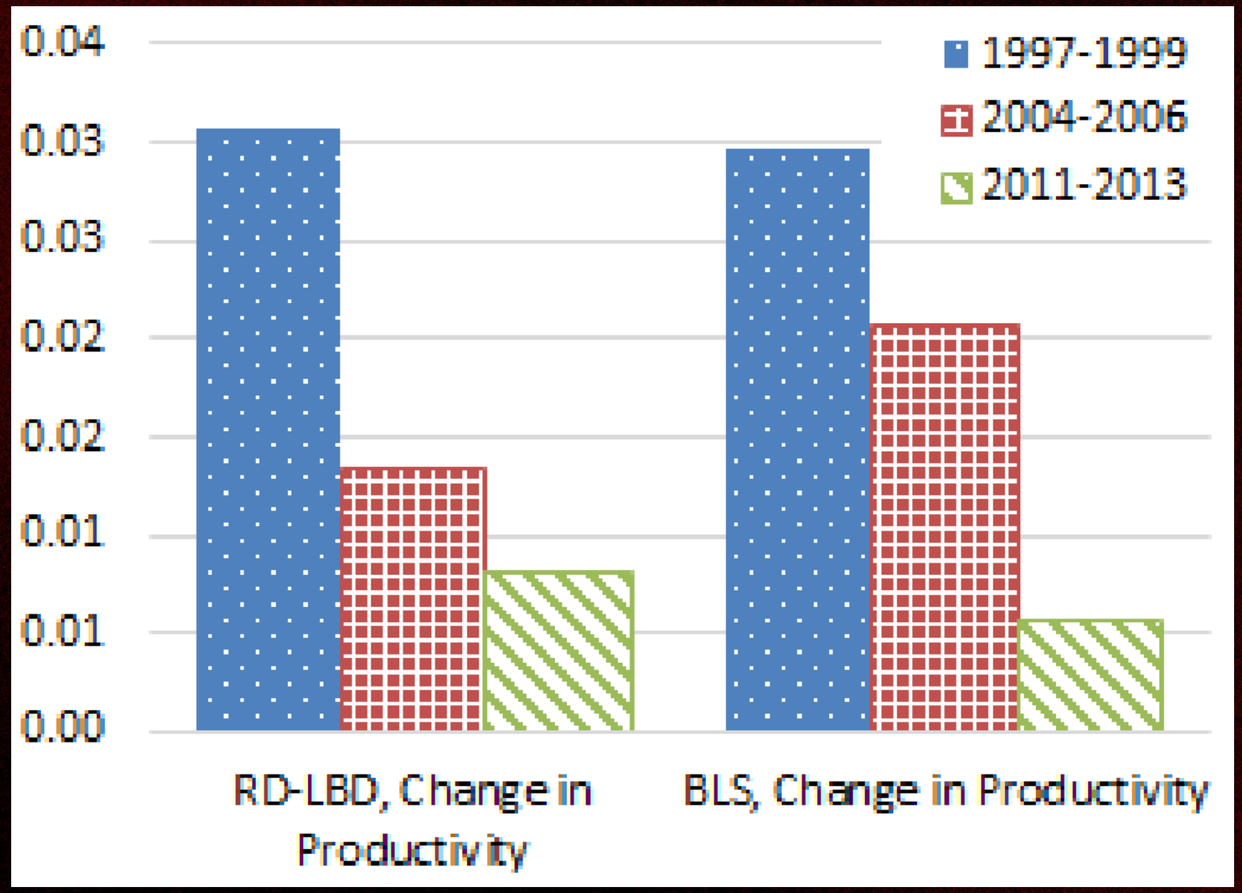
Group	GR	FHK	DOPD
Surviving firms	$\tilde{s}_{S2}(\phi_{S2} - \bar{\phi}) - \tilde{s}_{S1}(\phi_{S1} - \bar{\phi})$	$\tilde{s}_{S2}(\phi_{S2} - \phi_1) - \tilde{s}_{S1}(\phi_{S1} - \phi_1)$	$\phi_{S2} - \phi_{S1}$
Entering firms	$s_{E2}(\phi_{E2} - \bar{\phi})$	$s_{E2}(\phi_{E2} - \phi_1)$	$s_{E2}(\phi_{E2}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

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

Difference in weighted FHK ad unweighted DOPD ⇒ 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

2. Allocative efficiency

3. Net entry

SUMMARY OF FINDINGS

Factors that affect aggregate productivity

SUMMARY OF FINDINGS

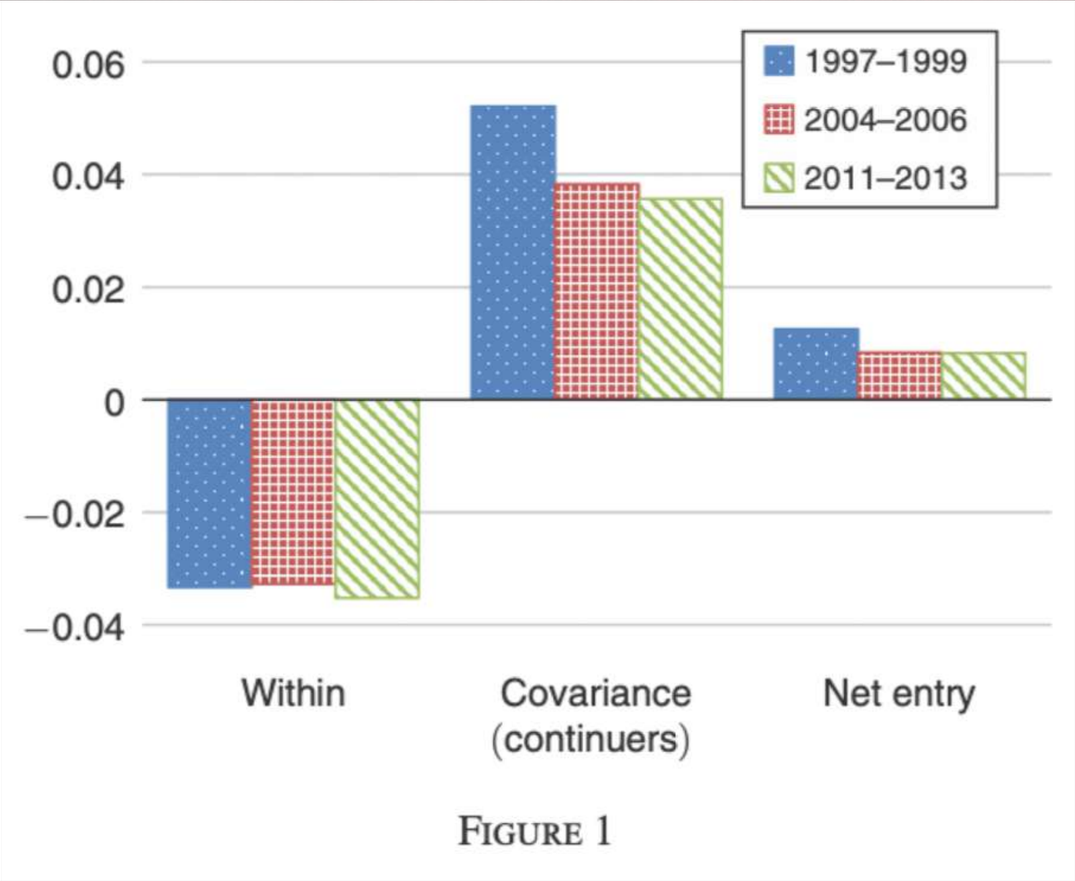


FIGURE 1

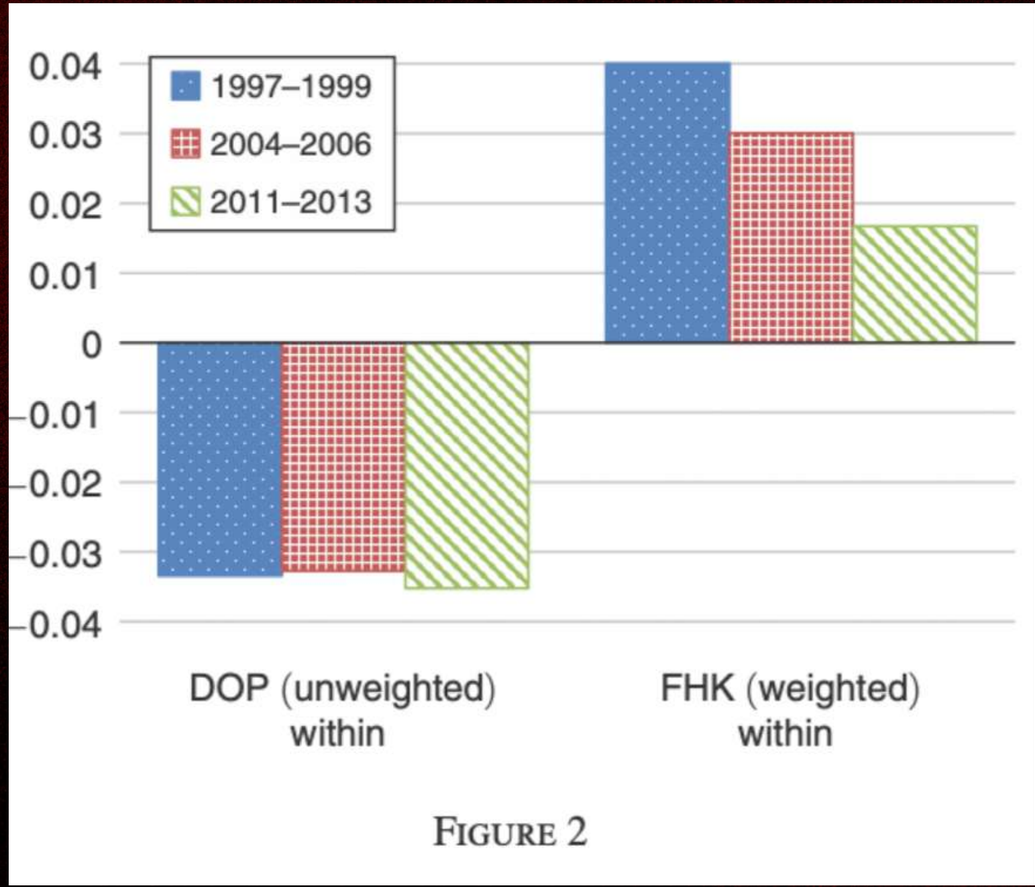


FIGURE 2

Source: Author Calculations From RE-LBD

PLAN OF ACTION

Policy Measures

Research Initiatives

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