Managers and the persistence of productivity

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NBER Organizational Economics, Fall 2026

How much does a better manager improve outcomes?

Similar firms differ in productivity, **managers are one reason why**

Productivity differences: Syverson (2011), Gibbons & Henderson (2012), and many more

Manager effects: Bertrand & Schoar (2003), Lazear et al. (2015), Fenizia (2022), and many more

Most estimates of manager effects use a static model

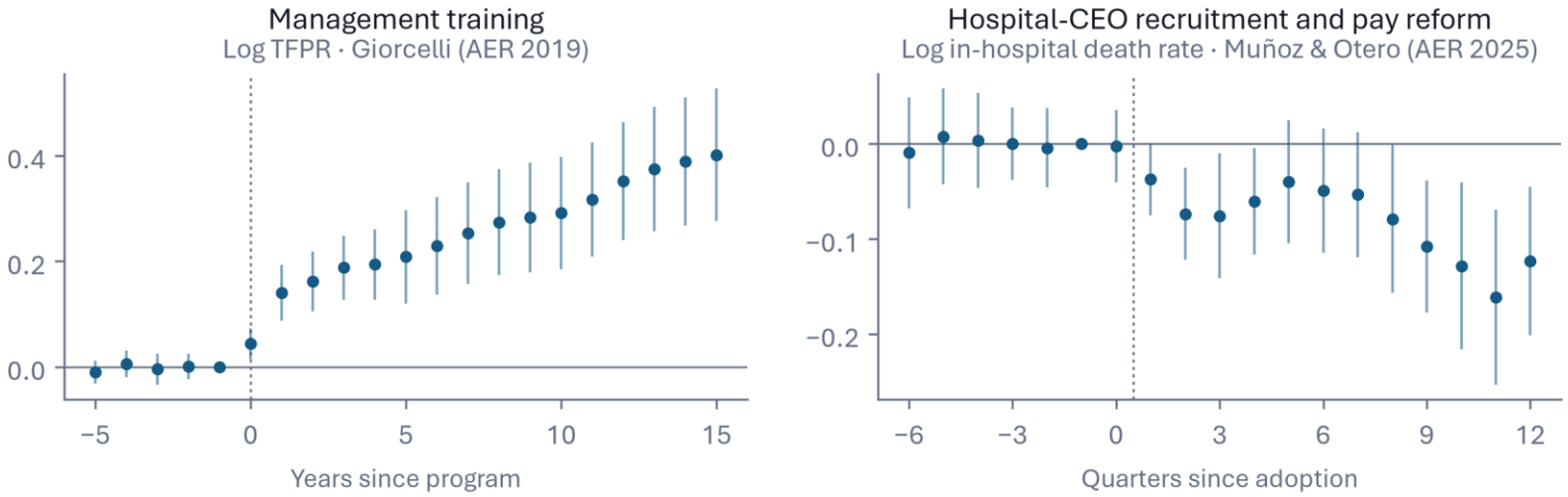
The whole effect arrives and leaves with the manager

But **much of what managers do outlasts them**

Hiring, practices, contracts, organizational capital

Bloom, Sadun & Van Reenen (2016), Dessein & Prat (2022), and many more

Papers often find that management effects are larger years later



Other papers with similar dynamic findings

Managers and CEOs: Coelli & Green (2012), Bandiera, Prat, Hansen & Sadun (2020), Walsh & Dotter (2020), Hoffman & Tadelis (2021), Acemoglu, He & le Maire (2022), Kala (2024), Minni, Nguyen, Sarsons & Srebot (2026), Nguyen (2026), and many more

Management interventions: Bloom et al. (2013, 2020), Bruhn, Karlan & Schoar (2018), McKenzie & Puerto (2021), Anderson & McKenzie (2022), Bianchi & Giorcelli (2022), Iacovone, McKenzie & Maloney (2026), and many more

This paper: recovering effect of managers when outcomes persist

Each manager influences a persistent outcome

Static estimate lies between the first-year and long-run effects

- *Understates the long-run effect, more so with high persistence or short tenures*

Two ways to recover the long-run effect – with applications

- *Effect at the end of an event study*
- *Estimate persistence from a model*

Findings from empirical applications

In two of three event studies, the **long-run estimate is 38–49% larger**

US CEOs: **long-run CEO effects 5–46% more dispersed** than static estimates

38–46% for sales and employment, which are more persistent than profitability

Static estimates also **rank CEOs differently**

Implies **static estimates understate the long-run value of good managers**

May help explain executive pay premiums and persistent performance differences

SEMINAR ROADMAP

1. Theory

2. Event studies

3. Persistence model

SECTION

Measuring the effect of managers

THEORY

Each manager adds to a persistent outcome

Static model $y_{t,p} = \theta_{m(t,p)} + \alpha_p + \gamma_t + \varepsilon_{t,p}$

With persistence $y_{t,p} = \Sigma_{k \geq 1} \delta_k y_{t-k,p} + \theta_{m(t,p)} + \alpha_p + \gamma_t + \varepsilon_{t,p}$

δ_k non-negative weight on the outcome k periods back

θ_m what manager m adds each period

Captures persistence in workforce, customers, capacity, routines, etc

$\delta_k = 0$ is the static model, where nothing carries over to the successor

THEORY

Static estimate vs long-run effect

One lag $y_{t,p} = \delta\, y_{t-1,p} + \theta_{m(t,p)} + \alpha_p + \gamma_t + \varepsilon_{t,p}$

Example: a manager one unit better than average serves two years, persistence δ = ½

Year	Plant's gain
1	1
2	1 + ½ = 1.5
Then an average successor	
3	**0** + ½ + ¼ = **0.75**

A static regression assumes one constant effect, so it averages this manager's years:

(1 + 1.5) / 2 = 1.25

It credits year 3 to the successor

Even an average successor looks good

THEORY

Static estimate vs long-run effect

One lag $y_{t,p} = \delta\, y_{t-1,p} + \theta_{m(t,p)} + \alpha_p + \gamma_t + \varepsilon_{t,p}$

Example: a manager one unit better than average serves two years, persistence δ = ½

Year	Plant's gain
1	1
2	1 + ½ = 1.5

Instead, equally good managers from then on

3	**1** + ½ + ¼ = **1.75**

A static regression assumes one constant effect, so it averages this manager's years:

(1 + 1.5) / 2 = 1.25

First-year effect: **1**

Long-run effect: **1 + ½ + ¼ + … = 2**

If the plant has one unit better managers forever

First-year effect 1 ≤ static estimate 1.25 ≤ long-run effect 2

THEORY

Static estimate lies between the first-year and long-run effects

$$y_{t,p} = \Sigma_{k\geq 1}\, \delta_k\, y_{t-k,p} + \theta_{m(t,p)} + \alpha_p + \gamma_t + \varepsilon_{t,p}$$

ψ_j how much of a contribution j years back is left today: $\psi_0 = 1$, $\psi_j = \Sigma_{1\leq k\leq j}\, \delta_k\, \psi_{j-k}$

r_j share of today's managers already in office j years earlier, below 1 because managers leave

With two-year stays, as in the example, $r_1 = ½$, then 0

PROPOSITION 1

For managers one unit better than average

First-year effect	ψ_0	$=$	1			
Static estimate	B_{static}	$=$	1	$+\ r_1\psi_1$	$+\ r_2\psi_2$	$+\ \ldots$
Long-run effect	B_{LR}	$=$	1	$+\ \psi_1$	$+\ \psi_2$	$+\ \ldots$

$1 \leq B_{static} \leq B_{LR}$ when $\delta_k \geq 0$ and each r_j is between 0 and 1

Assumptions: manager assigned at random within plant, today's manager unrelated to past shocks

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Long-run effects from event studies

End-of-window effect from a fused lasso

Event studies give one coefficient per period, but headline effect is one number

Usual number is a static estimate, which "averages" the coefficients

When effects build up, the smaller early ones pull the estimate down

Use fused lasso (Tibshirani et al., 2005) to group consecutive periods into blocks

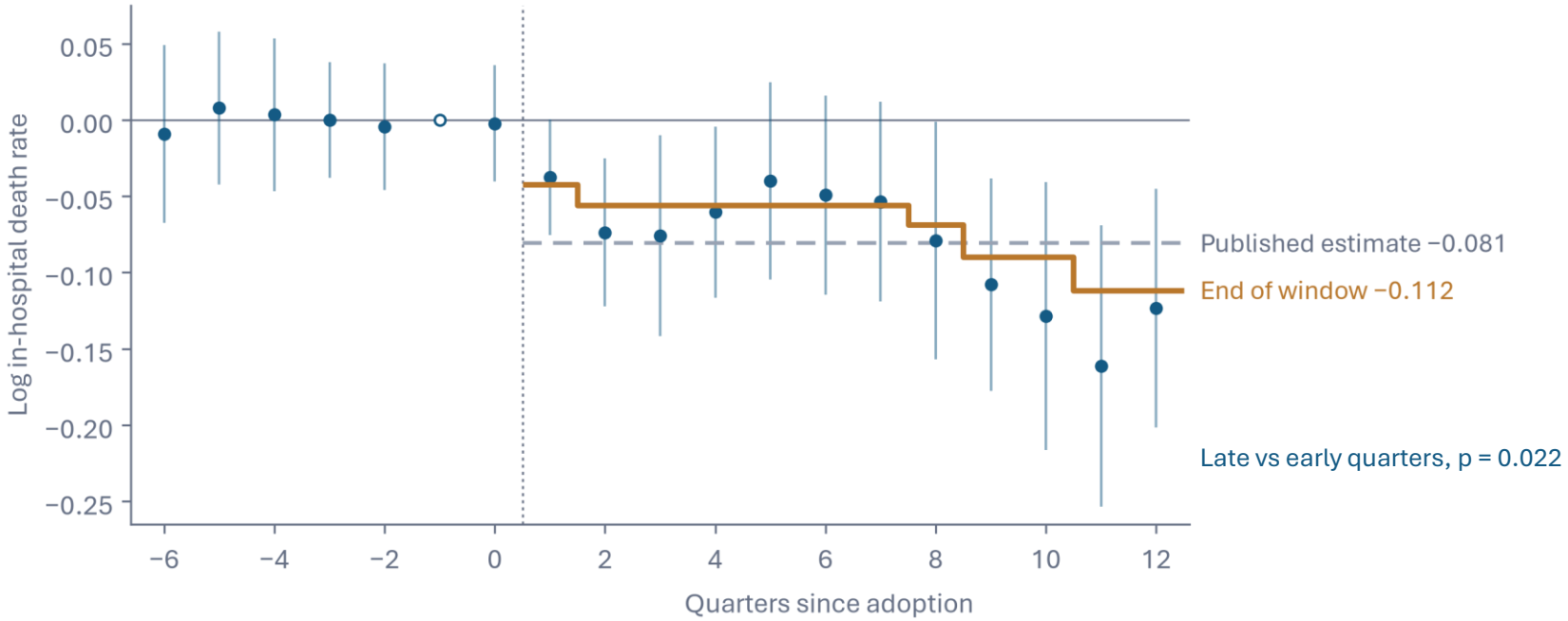
Provides a rigorous method to group periods (as opposed to eyeballing it)

End-of-window effect = level of the last block

Understates the long-run effect if the effect is still growing

EVENT STUDIES

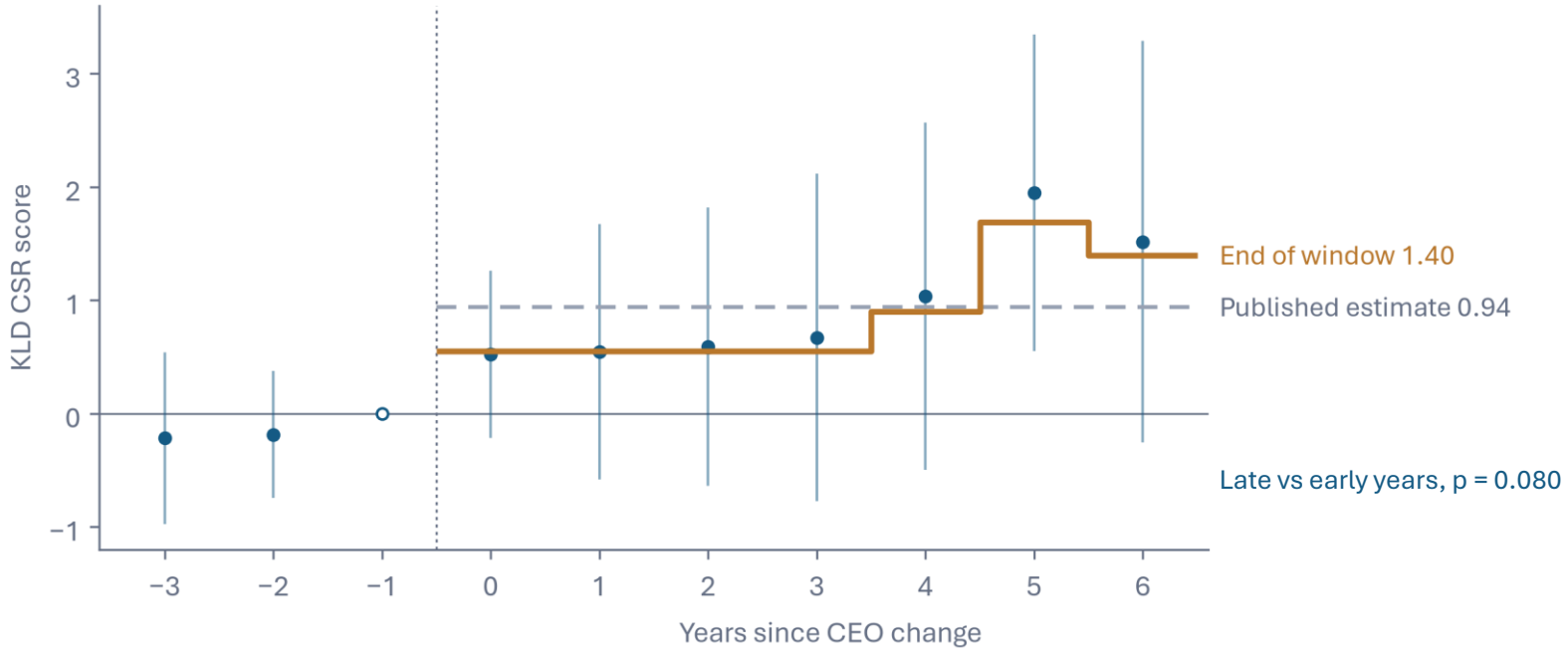
Hospital CEOs in Chile: 38% larger than static



Muñoz & Otero (AER 2025), data shared by Cristóbal Otero. Quarters since a hospital first appoints a CEO through competitive selection, 95% CIs

EVENT STUDIES

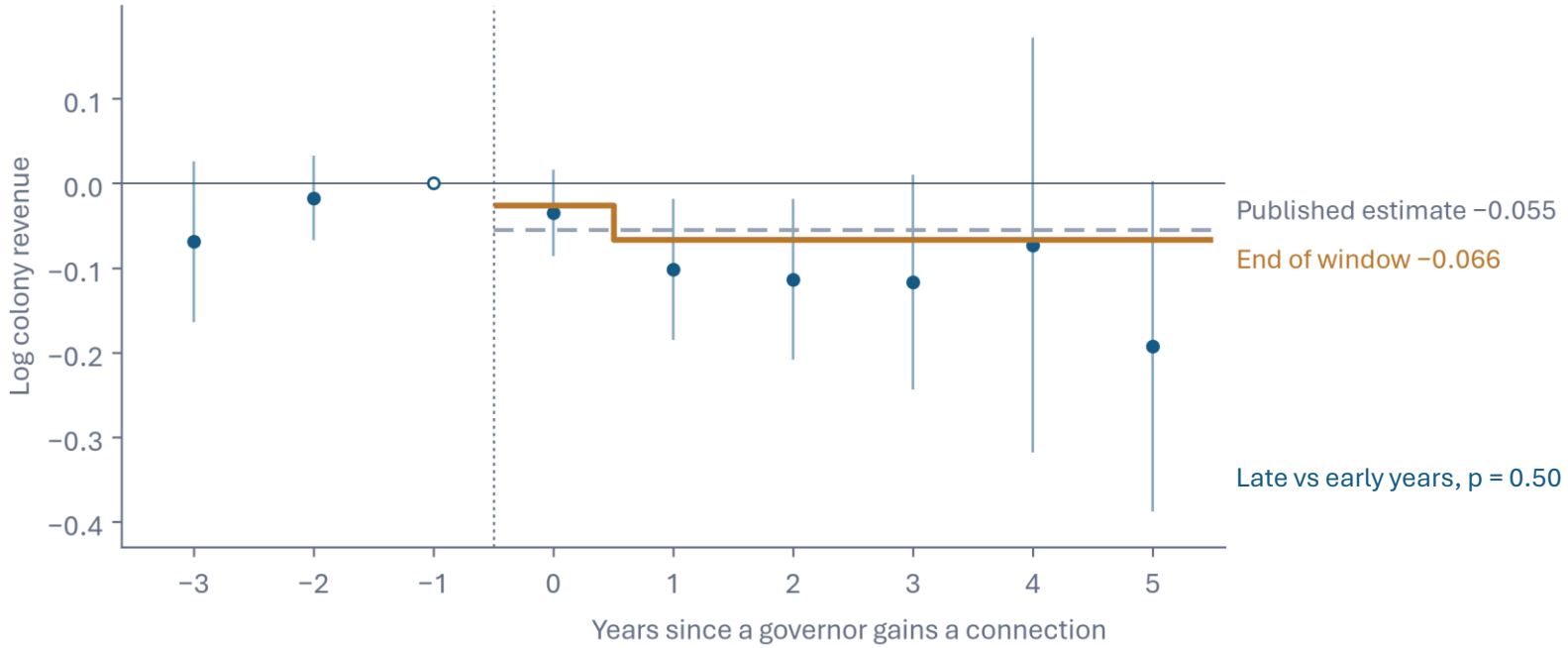
CEO daughters and CSR: 49% larger than static



Cronqvist & Yu (JFE 2017), data shared by the authors. Incoming CEO with a daughter vs without, 153 CEO changes at 110 firms, KLD score of corporate social responsibility (CSR), strengths minus concerns, 95% CIs

EVENT STUDIES

British colonial governors: comparable to static



Xu (AER 2018). 109 changes in a governor's connection to the Secretary of State during a posting, before 1930 (a lost connection counts as a negative gain). 95% CIs

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Estimating persistence from a model

A parsimonious model of persistence

Model $y_{t,p} = \delta\, y_{t-1,p} + \theta_{m(t,p)} + \alpha_p + \gamma_t + \varepsilon_{t,p}$

Long-run effect of manager m: $\theta_m / (1 - \delta)$

Instrument y_{t-2} for y_{t-1}, on years with the same manager at t−1 and t

Valid if y_{t-2} and manager identity do not predict the shock at time t

Estimators **Levels** with manager, firm, year and industry × year effects

Few years per manager bias δ down (Nickell), so levels is conservative

Forward orthogonal deviations (FOD)

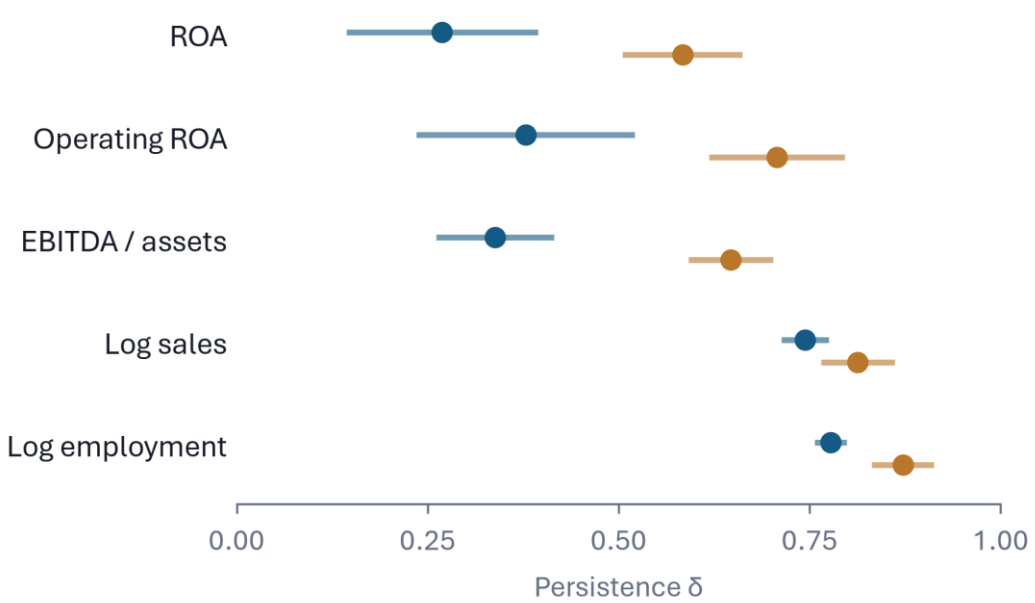
Deviations from the average of the spell's later years

No Nickell bias

Low bias in simulations across a range of conditions

US CEOS

Firm scale is highly persistent, profitability less so



Levels

Sales, employment 0.74–0.78

Profitability 0.27–0.38

FOD

Higher for every outcome

Same ordering

ExecuComp–Compustat 1992–2025, y_{t-1} instrumented by y_{t-2}, industry × year effects. 95% CIs clustered by firm

US CEOS

Long-run CEO effects on firm scale: 38–46% more dispersed

$$M = B_{LR} / B_{static} = (1 + \delta + \delta^2 + \ldots) / (1 + r_1\delta + r_2\delta^2 + \ldots)$$

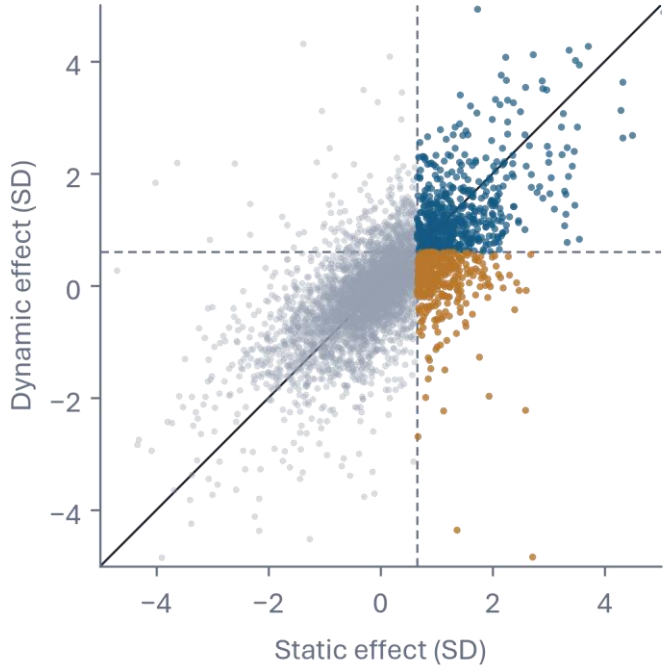
Proposition 1 with one lag ($\psi_j = \delta^j$), share r_j from the CEO tenures we observe

	Persistence δ, levels	M at levels δ	M at FOD δ
Profitability (3 measures)	0.27–0.38	1.05–1.08	1.18–1.31
Log sales	0.74	**1.38**	1.57
Log employment	0.78	**1.46**	1.89

ExecuComp–Compustat 1992–2025

US CEOS

Static and dynamic effects rank a firm's CEOs differently



Static: Bertrand–Schoar effect, all CEOs

Picks up the predecessor's legacy

An average CEO after a great one is overrated

Dynamic: CEO effect on $y_t - \delta y_{t-1}$, over $1 - \delta$

At the FOD δ

Rank correlation 0.66

About 40% of the static top fifth (orange) are not in the dynamic top fifth

Log sales. CEOs with 2+ years at firms with 2+ CEOs, relative to the firm's CEO mean, shrunk for noise. Blue dots are in the top fifth on both, dashed lines mark the top fifth

Conclusion

Static models understate long-run effect of managers

When outcomes are persistent, a manager's effect persists beyond her tenure

In applications, long-run effect exceeds the static estimate

By 38–49% for Chile hospital CEOs and CSR, by 38–46% (firm scale) for US CEOs

Judging managers or reforms by their first years understates the gains

This may help explain large compensation premiums for executives

Appendix

APPENDIX

Who manages matters more for persistent outcomes

Valuing leaders: static estimates understate the long-run value of better managers

Under Prop. 1's conditions, a better CEO adds, summed over all later years, B_{LR}/B_{static} times what the static estimate implies (undiscounted)

Evaluating reforms: short windows understate the gains from better management

Evaluations over one to three years see part of the build-up

Evaluating managers: early results mix in the predecessor's legacy

Longer windows, or results net of the inherited path, separate the two

Open: which decisions last, and can managers speed up the build-up?

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End-of-window effects and published estimates

	End of window	Published	End of window ÷ published	Mean coefficient ÷ published	Bootstrap 95%
Hospitals, quarters 1–12	−0.112	−0.081	1.38	1.02	[−0.190, −0.043]
CSR, daughter vs none	1.40	0.94	1.49	1.04	[−0.02, 2.92]
CSR, within children bins	1.25	0.94	1.33	1.59	[0.20, 3.90]
Colonial, before 1930	−0.066	−0.055	1.21	1.92	[−0.362, 0.005]

Level of the last fused-lasso block, λ by Mallows's C_p. Mean coefficient is the average of our post-event coefficients. Published: Muñoz & Otero Table 1, Cronqvist & Yu Table 11, Xu Table 5

Late coefficients minus early ones, p = 0.022 (hospitals), 0.080 and 0.053 (CSR), 0.50 (colonial)

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Related literature

1. Manager effects estimated with fixed effects

   Bertrand & Schoar (2003), Lazear, Shaw & Stanton (2015), Fenizia (2022), Minni (2026), Muñoz & Otero (2025)

   This paper: what these estimates measure when outcomes persist

2. Biases in manager effects

   Limited mobility: Andrews et al. (2008), Kline, Saggio & Sølvsten (2020), short tenures: Koren et al. (2025), replicability: Jarosiewicz & Ross (2023)

   This paper: a separate gap, between the static estimate and the long-run effect

3. Durable management and persistent performance differences

   Syverson (2011), Gibbons & Henderson (2012), Bloom, Sadun & Van Reenen (2016), Bandiera et al. (2020), Dessein & Prat (2022), Cai, Prat & Yu (2026)

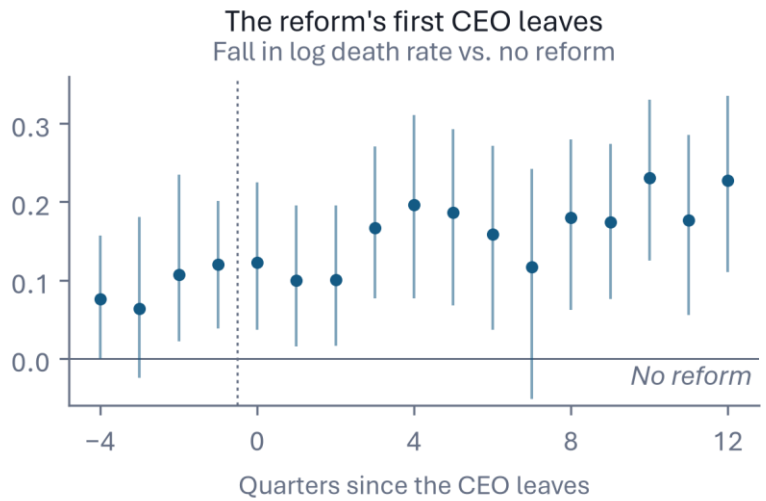
   This paper: a parsimonious framework that helps explain these findings

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Learning, in a static model, would leave with the manager





Adhvaryu et al. re-plotted from the working paper; reform hospitals estimated from Muñoz & Otero's data; 95% CIs

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APPENDIX

Managers or management

01

Persistence in the outcome

$$y_t = \Sigma_k \delta_k y_{t-k} + \theta_{m(t)} + \dots$$

A manager's contribution carries forward through the plant's capacity, workforce and routines

Paper's estimates of δ assume this form

02

Lasting manager effects

$$y_t = \theta_{m(t)} + \Sigma_j c_j \theta_{m(t-j)} + \dots$$

Past managers' practices and decisions keep affecting the outcome

Under both, the static estimate lies between the first-year and long-run effects

The outcome's path after a change of manager can look the same under both

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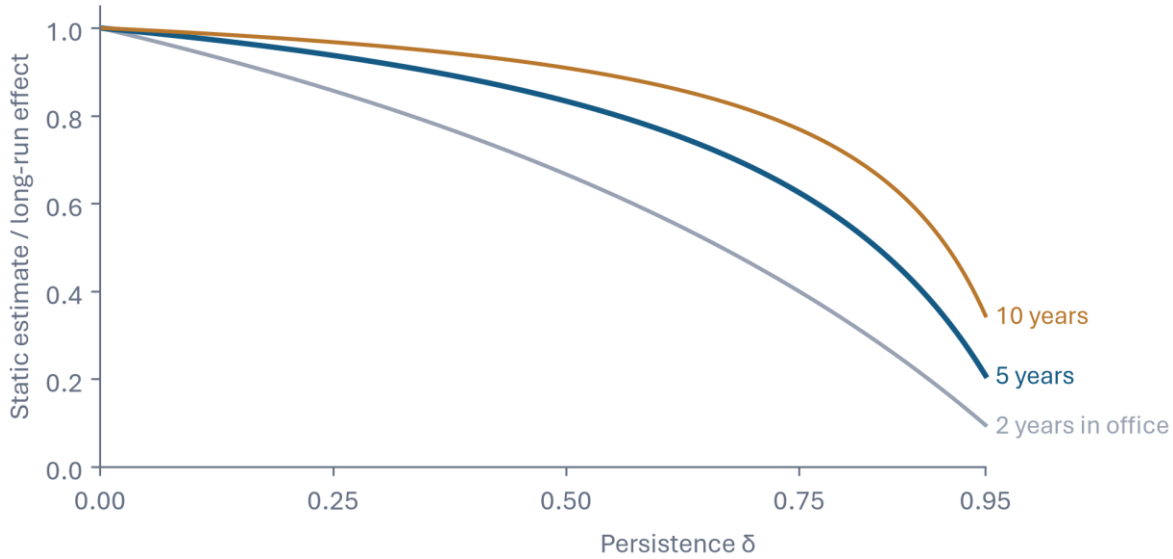
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APPENDIX

Persistent outcomes and short tenures widen the gap

$$B_{static} / B_{LR} = (1 - \delta) / (1 - \delta + \delta/\mu)$$

AR(1), constant yearly exit rate, random assignment; μ: mean years in office; illustrative



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APPENDIX

Identification of persistence in levels

Sample: years with the same CEO at t−1 and t

y = residual on firm, year and current-CEO indicators, on these years*

Persistence: $\delta = E[\, y^*_{t-2}\, y^*_{t}\,] \,/\, E[\, y^*_{t-2}\, y^*_{t-1}\,]$

Needs y_{t-2} to predict last year's outcome after the fixed effects (first-stage F)

Assumption: y_{t-2} and who manages do not predict this year's shock

Allows shocks correlated across adjacent years, and replacement after bad years through t−2

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APPENDIX

Short CEO spells bias the levels estimate toward zero

With CEO effects in levels, the time dimension is the spell

A CEO's spell at a firm covers 5.5 years of the panel on average

Removing the CEO effect subtracts the spell's average

It includes later outcomes that contain the current shock, so δ is biased down

FOD subtracts only the average of later years

The untransformed instrument stays valid if spells do not end because of performance

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