Are Good Managers Scarce? Evidence from the Hungarian Transition

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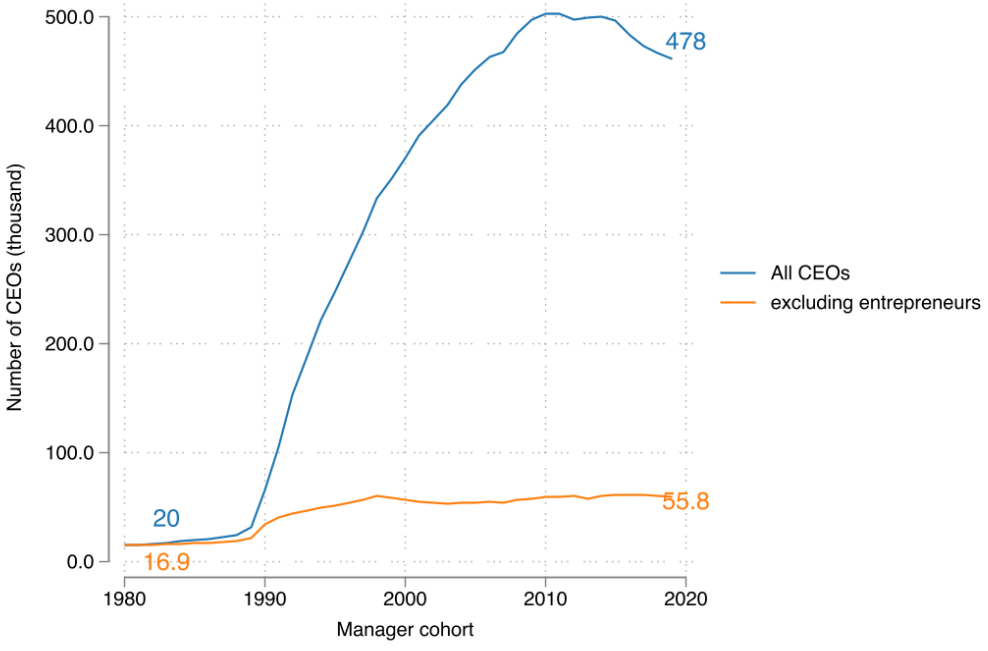
Introduction

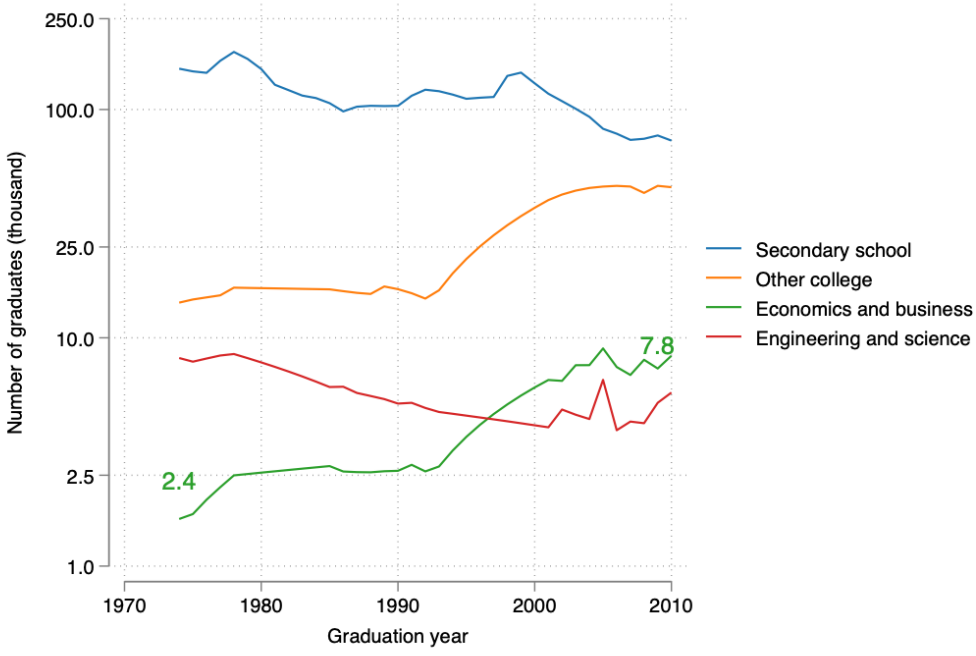
Hungary, 1980 (Fortepan / Szalay Zoltán)

Hungary, 1990 (MTI)

Number of Executive Positions Increased



Business Degrees Became More Prominent



What Can We Learn From Hungary?

Use Hungarian post-socialist transition as a natural experiment to study the supply side of the market for managers.

Why Micro $\neq$ Macro

What we know

1. Management matters
2. Training works
3. Managers matter

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1. What policy interventions can improve management for an entire country?
2. How to quantify the macro effects of these policies?

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What we need

1. Endogenous supply: how to incentivize people to become managers?
2. Selection: who will become managers?
3. Competition: what are the GE feedbacks of interventions?

Setup and Data

Data

Manager Data 1985-2019

Universe of corporations (1m) and their CEOs (1.3m).

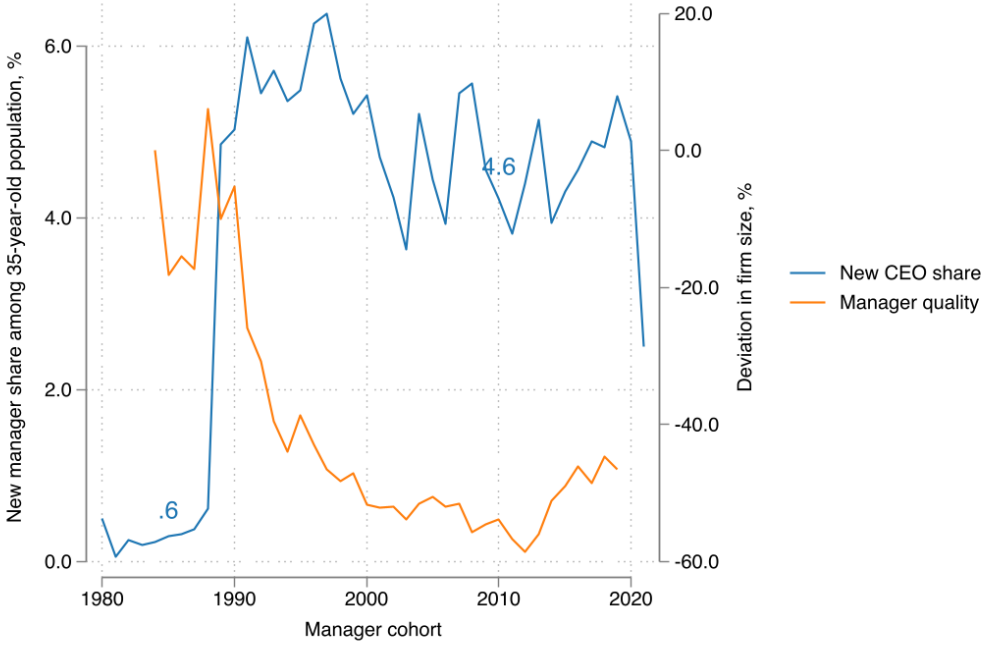
Firm Financials 1985-2019

Firm size (employment) as proxy for manager quality.

Manager Wages 2002-2017

(not yet used) Annual earnings of 50 percent of workers (including managers).

Quantity Up, Quality Down



Outline

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An Equilibrium Model of Managers

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1. Managers differ in innate skill
2. Returns to manager skill subject to corporate governance friction
3. Self-selection into management
4. Wages determined in equilibrium

Production Function

A manager with skill z can hire l workers to produce output

$$q = (Az)^{\nu} l^{1-\nu}.$$

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Aggregate GDP:

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with sum of manager skills

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Policy goal: Increase Z via either N (more managers) or $\bar{z}$ (better training).

Corporate Governance Friction

Operating surplus,

$$\Pi(z) = q(z) - wl(z) = z\pi(w)$$

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Owners cannot commit to sharing more than a fraction of surplus.

Manager wage is

$$\omega(z) \leq \phi\Pi(z) = \phi z\pi(w)$$

with $\phi < 1$.

Underprovision of manager skills.

Career Choice and Skill Supply

Manager if $\omega(z) > w$,

$$z > z_{\min}(Z).$$

Supply of manager skills is Pareto

$$\Pr(z > z_{\min}) = z_{\min}^{-\theta} z_0^{\theta}$$

$$\mathsf{E}(z) := z_* = \frac{\theta}{\theta - 1} z_0$$

Labor Market Clearing

$$N + L_p = L$$

$$n := \frac{N}{L}$$

Aggregate GDP

$$\frac{Y}{L} = (Az_*)^{\nu} n^{\nu(1-1/\theta)} (1-n)^{1-\nu}$$

Increasing n

1. adds to stock of manager skills
2. dampened by selection (average manager is worse)
3. reduces production employment

Equilibrium and First Best

First best

$$\frac{n^*}{1-n^*} = \frac{\nu(1-1/\theta)}{1-\nu}$$

Equilibrium

$$\frac{n}{1-n} = \phi\frac{\nu(1-1/\theta)}{1-\nu} < \frac{n^*}{1-n^*}$$

Too few managers.

What Can Policy Do?

1. Reduce corporate governance frictions.
2. Subsidize managers.
3. Provide management training.

Managers and Entrepreneurs

Managers and Entrepreneurs

Suppose an α share of population has "entrepreneurial spirit":

1. can start own firm
2. capture full rent from running it

Others work for other entrepreneurs, either as manager or as worker.

Aggregate GDP

$$\frac{Y}{L} = \left(\frac{\theta}{\theta - 1}\right)^{\nu} (Az_0)^{\nu} \left[\alpha n_1^{1-1/\theta} + (1-\alpha) n_0^{1-1/\theta}\right]^{\nu} (1-n)^{1-\nu}$$

Additional misallocation

$$n_0 < n^* < n_1$$

Too few managers, too many entrepreneurs. Uniform pro-manager policy may be harmful.

Transition Dynamics

Transition Dynamics

Continuous time.

1. Birth: $l = \delta L$ individuals born in each instant.
2. Retirement: Active life ends with Poisson arrival δ.
3. Career choice: at birth and with Poisson arrival λ ("Calvo fairy")

Average career spell

$$1/(\lambda + \delta)$$

$\rightarrow$ sluggish, forward-looking adjustment

Dynamic System

Ordinary differential equations:

$$v'(t) = (\rho + \lambda + \delta)v(t) - \nu \left[\frac{L - N(t)}{Z(t)}\right]^{1-\nu}$$

$$J'(t) = (\rho + \lambda + \delta)J(t) - (1 - \nu) \left[\frac{L - N(t)}{Z(t)}\right]^{-\nu}$$

$$N'(t) = (\lambda + \delta)Lz_0^{\theta}\phi^{\theta}v(t)^{\theta}J(t)^{-\theta} - (\lambda + \delta)N(t)$$

$$Z'(t) = \frac{\theta}{\theta - 1}(\lambda + \delta)Lz_0^{\theta}\phi^{\theta-1}v(t)^{\theta-1}J(t)^{1-\theta} - (\lambda + \delta)Z(t)$$

Jump variables

value of a managerial position v, wage present-value J

Slowly moving state variables

number of managers N, total skill of managers Z

Dynamic Stability

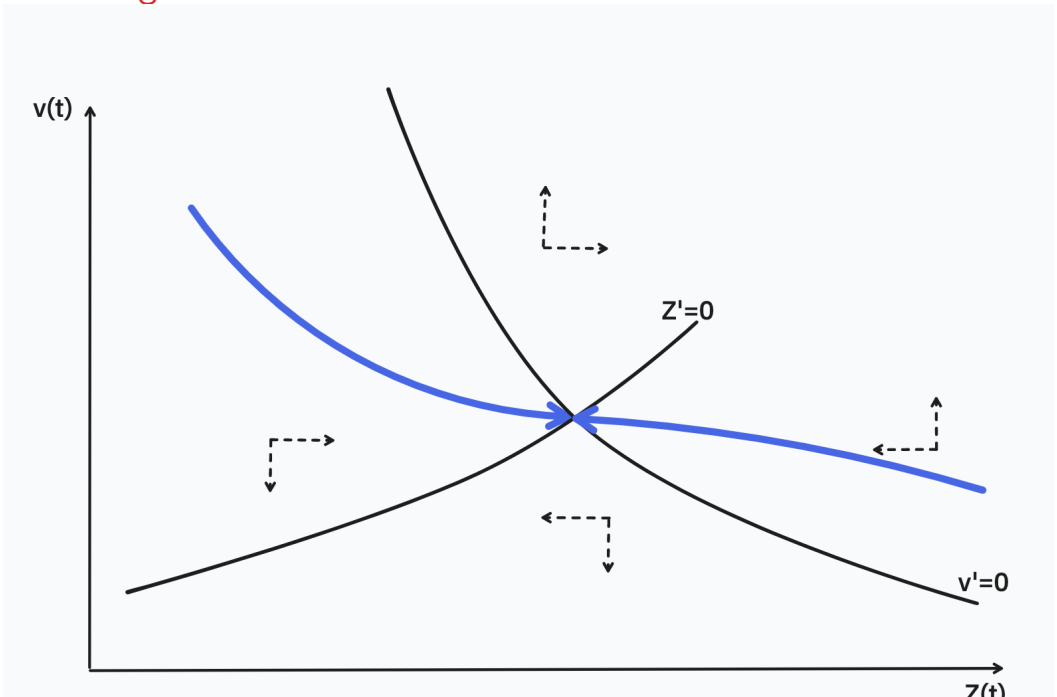
System is saddle-path stable.

$\rightarrow$ During transition, manager value overshoots.

$\rightarrow$ "Gold rush" of business training, manager entry

$\rightarrow$ dynamic inefficiency: managers entering during gold rush are less skilled

Overshooting



Taking the Model to the Data

Goal

Calibrate model to match two steady states:

1. communism (-1989)
2. capitalism (2005-2010)

changing only corporate governance parameters, ϕ and α.

Calibration

Table 1: Calibrating parameter values

Parameter	Target moment	Target value
ν	Steady-state ratio of managers to workers	0.18
α	Share of entrepreneurs	0.88
ϕ_{new}	Correlation of manager wages with firm size	...
ϕ_{old}	Manager share under communism	0.007
$1/\theta$	Elasticity of firm size wrt cohort selectivity	0.15
$\lambda + \delta$	Average CEO career length	14 years

Policy Counterfactuals

1. **Transition**: Increase ϕ_{old} to ϕ_{new} suddenly.
2. **Manager subsidy**: Subsidize ω to increase GDP by 5 percent.
3. **Curriculum reform**: Increase z_0 to increase GDP by 5 percent.

Study

- transition path (GDP, wage, entry)
- firm-size distribution
- inequality between managers

Conclusion

Conclusion

- Tractable, quantifiable model of manager demand and supply.
- Novel data for Hungary, 1985-2019.
- Use transition as macro shock to identify macro model.

Appendix

Literature

- **Large-scale management interventions**: Italy (Giorcelli 2019); US WW II (Bianchi & Giorcelli 2022); US business-school expansion (Giorcelli 2023)
- **Large-scale education interventions**: Italy (Bianchi & Giorcelli 2020), Colombia (Ferreyra et al 2023), Vietnam (Vu 2023)
- **Selection of talent**: Denmark (Akcigit, Pearce & Prato 2020)
- **Calibrated models with skill supply + selection**: Guner et al 2008; Bhattacharya et al 2013; Gomes & Kuehn 2017; Esfahani 2019; Akcigit, Alp & Peters 2021; Engbom et al 2024

Education and Career Choice

Education and Career Choice

1. Choose school i
2. Draw innate manager skill z
3. Get trained in school: $z \to \lambda_i z$
4. Choose whether manager or worker

We solve the model backwards.

Distribution of Manager Skills

We assume that z is distributed Pareto, depending on schooling

$$1 - F_i(x) = \Pr(z > x | \text{school} = i) = \left(\frac{x}{\lambda_i z_0} \right)^{-\theta}$$

for $\theta > 1$ (so that the distribution has a finite mean).

Career Choice After Graduation

Potential managers choose to enter if net value exceeds the opportunity cost,

$$\phi v(t) z > J(t)$$

Selection on manager skill,

$$z > z_{\min}(t) := \frac{J(t)}{\phi v(t)}.$$

Entry cutoff $z_{\min}$ independent of school i.

Expected Career When Entering School

Schools affect

1. the probability of becoming a manager
2. expected skills and wages

Probability of becoming a manager

$$\pi_i(t) = z_{\min}(t)^{-\theta}(\lambda_i z_0)^{\theta}$$

Average manager skills

$$\tilde{z}(t) = \frac{\theta}{\theta - 1} z_{\min}(t)$$

Manager Value

Bellman equation for manager value:

$$\rho V(t,z) = \omega[z, Z(t)] - \delta V(t,z) + V_t(t,z)$$

Guess solution:

$$V(t,z) = v(t)z$$

If this is the case, the Bellman can be rewritten as

$$\rho v(t) = \nu p \left[\frac{L^p(t)}{Z(t)}\right]^{1-\nu} - \delta v(t) + v'(t)$$

Expected labor income from a degree

$$E_i(t) = \pi_i(t)\phi v(t)\tilde{z}(t) + [1 - \pi_i(t)]J(t) =$$
$$J(t)\left[1 + (\lambda_i z_0)^\theta \phi^\theta v(t)^\theta J(t)^{-\theta}/(\theta - 1)\right]$$

Probability of choosing school i

$$x_i = \frac{e^{\alpha_i}\left[1 + (\lambda_i z_0)^\theta \phi^\theta v(t)^\theta J(t)^{-\theta}/(\theta - 1)\right]^{1/\gamma}}{\sum_j e^{\alpha_j}\left[1 + (\lambda_j z_0)^\theta \phi^\theta v(t)^\theta J(t)^{-\theta}/(\theta - 1)\right]^{1/\gamma}}.$$

$1/\gamma$: elasticity of school choice

α_i: attractiveness of school i

Aggregate skill level

$$\Lambda(t) = \left[\sum_i x_i \lambda_i^\theta \right]^{1/\theta}$$

Demographics

Manager and Worker Demographics

Workers and managers die at a constant rate δ.

The stock of population:

$$L := \int_{-\infty}^{t} e^{\delta(s-t)} l ds = l/\delta.$$

The mass of active managers:

$$N(t) := \int_{-\infty}^{t} e^{\delta(s-t)} n(s) ds.$$

The stock of workers:

$$L^p(t) := L - N(t)$$

Competition Between Firms

Potential new managers have a time invariant skill distribution $F(z)$.

Only the best become managers: a time varying truncation of F.

The distribution of skill among the stock of managers, denoted by $G(t, z)$, is a mixture of these truncated distributions.

Dynamics

Dynamics

Bellman equation of manager wages

$$v'(t) = (\rho + \delta)v(t) - \nu \left[\frac{L^p(t)}{Z(t)}\right]^{1-\nu}$$

The set of managers will be a slowly moving state variable.

$$N'(t) = n(t) - \delta N(t)$$

The change in the overall skill of managers is

$$Z'(t) = n(t)\tilde{z}(t) - \delta Z(t)$$

The change in the discounted PV of worker wages is

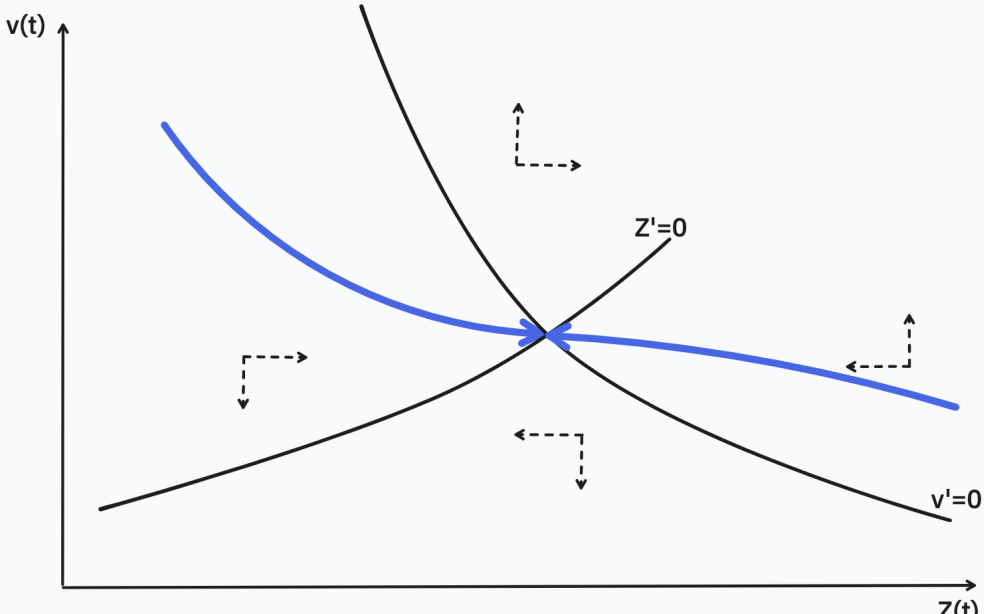
$$J'(t) = (\rho + \delta)J(t) - w(t)$$

Dynamic Equilibrium

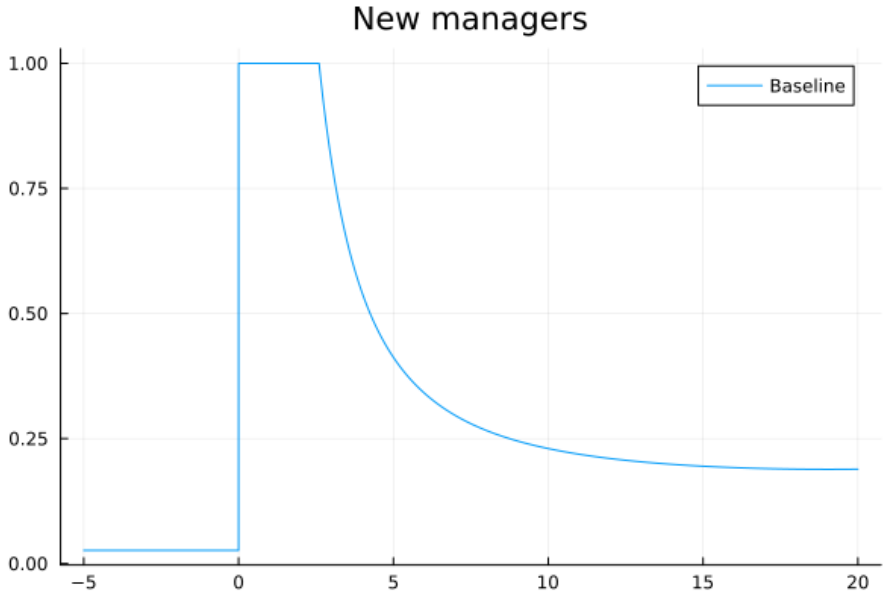
Ordinary differential equations in Z and N (state) and v and J (co-state):

$$
\begin{aligned}
v'(t) &= (\rho+\delta)v(t) - \nu\left[\frac{L-N(t)}{Z(t)}\right]^{1-\nu} \\
Z'(t) &= \frac{\theta}{\theta-1}\delta L[\Lambda(t)z_0]^{\theta}\phi^{\theta-1}[v(t)/J(t)]^{\theta-1} - \delta Z(t) \\
N'(t) &= \delta L[\Lambda(t)z_0]^{\theta}\phi^{\theta}[v(t)/J(t)]^{\theta} - \delta N(t) \\
J'(t) &= (\rho+\delta)J(t) - (1-\nu)\left[\frac{L-N(t)}{Z(t)}\right]^{-\nu}
\end{aligned}
$$

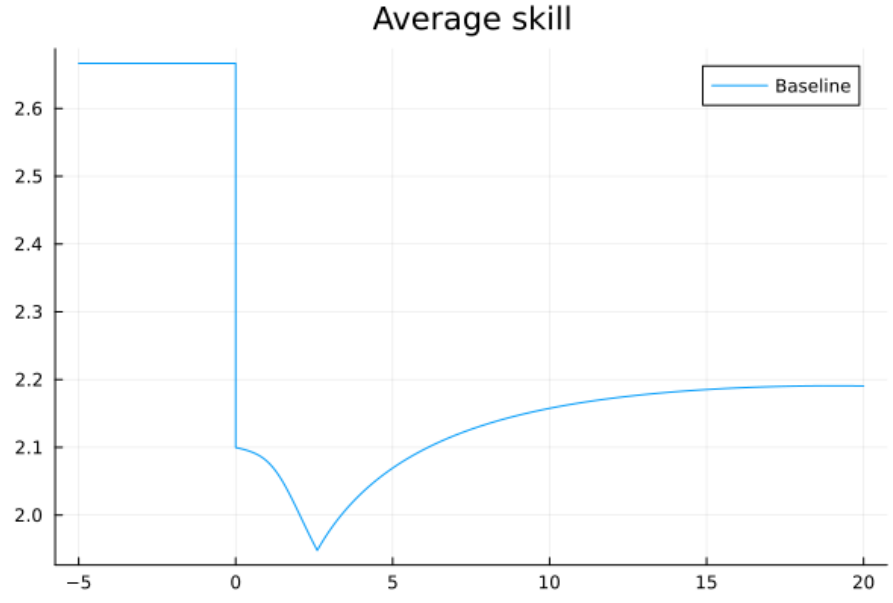
Transitional Dynamics



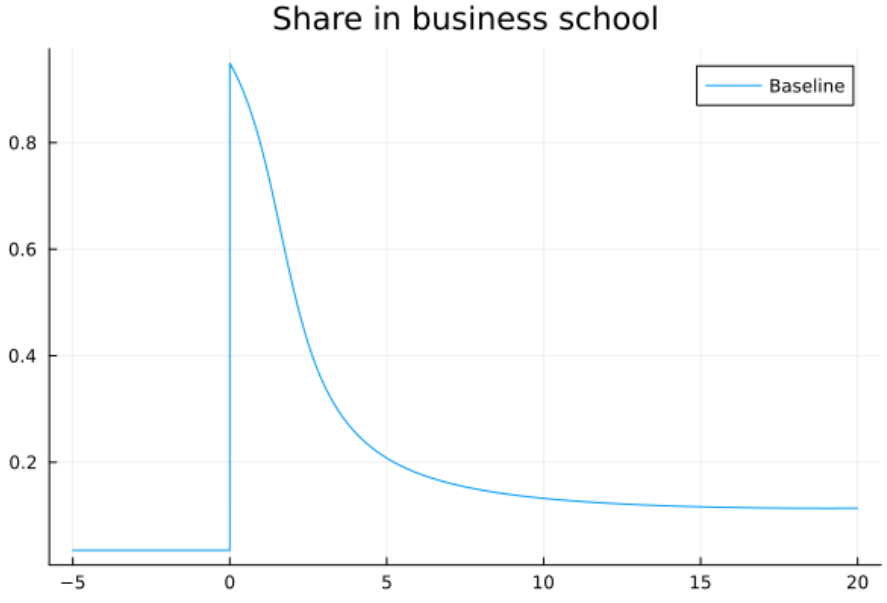
Transition: Manager entry increases suddenly



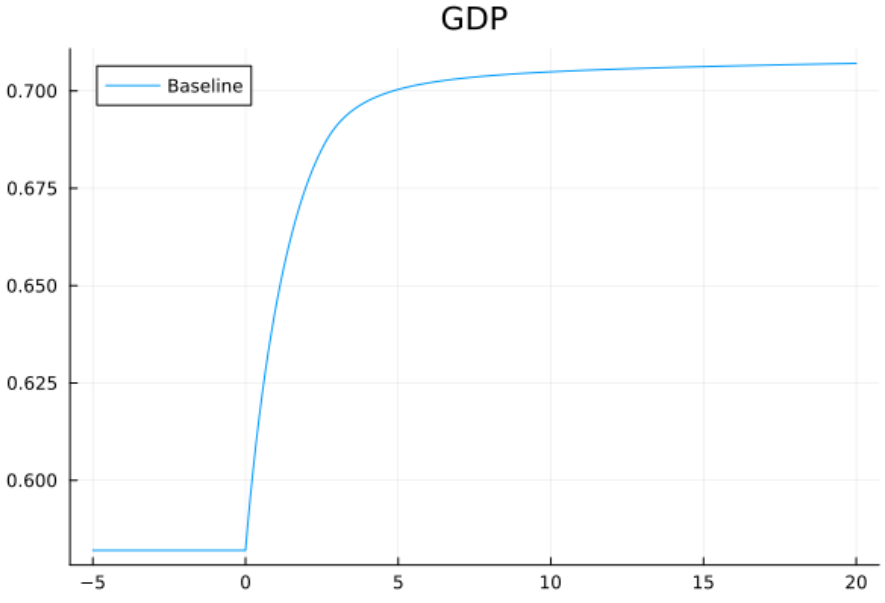
Transition: Entrant skill drops sharply



Transition: Business schools become more popular



Transition: GDP converges to a higher steady state



Measuring Manager Quality

Measuring Manager Quality

Log employment of firm i in year t in industry s, with a mananager having entered in cohort c is

$$\ln L_{icst} = \beta_1 \text{manager\_age}_{ict} + \beta_2 \text{firm\_age}_{ict} + \mu_c + \xi_{st} + \epsilon_{ict}.$$

Quality: μ_c

Degree of Selection

$$\ln \pi_{ic} = \theta \ln \lambda_i - \theta \mu_c + \varepsilon_{ic}.$$

Selectivity: θ

Manager Selection by Degree

VARIABLES	(1) ln_pi
(firstnm) firm_size	-6.872***
	(1.982)
(firstnm) degree = 1, economics	4.032***
	(0.368)
(firstnm) degree = 2, engineering	3.676***
	(0.492)
(firstnm) degree = 3, other	2.041***
	(0.455)
Constant	-14.92***
	(2.106)
Observations	87
R^2	0.553

Robust standard errors in parentheses

Hazard of Manager Exit by Cohort