

Training, Internal Mobility, Promotions, and Career Ladders

Organizations, Personnel, and Internal Labor Markets
Week 6

Sai Zhang

When a worker advances, what changed?

Central question

How do organizations build skills and reallocate talent, and what prevents productive internal career moves?

- A worker may become more productive without being promoted.
- A promotion may change tasks, employer beliefs, or access without increasing skills.
- A lateral move may lower current output while building future capability.
- Career opportunities depend on openings and other workers' moves.

Bridge: Week 3 supplies signals; Week 4 supplies rewards; Week 5 supplies managers and authority. Week 6 follows the worker's entire internal-career pipeline.

Learning goals: connect capability, access, and opportunity supply

- Separate skills, effort, assignment, information, certification, and measured output.
- Explain who pays for training and who captures its returns.
- Distinguish promotion as a reward from promotion as next-role allocation.
- Build eligibility, application, promotion, and exit denominators before estimating effects.

Core points

Training received, skills used, and returns captured are different objects. Individual advancement can coexist with displacement when slots are scarce.

Research deliverable: a career-transition panel design with two competing mechanisms, independent quality, and worker-welfare outcomes.

Start with worker, opportunity, and access ledgers

Ledger	Minimum records	What a successful-move panel misses
Worker	Person, position, job family, grade, manager, establishment, employer	Roles and organizational boundaries can change without a new title
Opportunity	Creation, posting, visibility, freeze, cancellation, filling	No opening differs from an unsuccessful candidate
Access	Eligibility, notice, nomination, application, offer, release, start	Non-applicants and blocked moves disappear from observed transitions

Evidence anchor: Baker–Gibbs–Holmström follows movements and pay in a firm’s personnel records. Its descriptive hierarchy is not a universal career ladder.

Baker, Gibbs, and Holmström (1994). Preserve announcement, effective, and recording dates; freeze a role crosswalk and retain unknown values.

A promotion funnel requires nested events and a common horizon

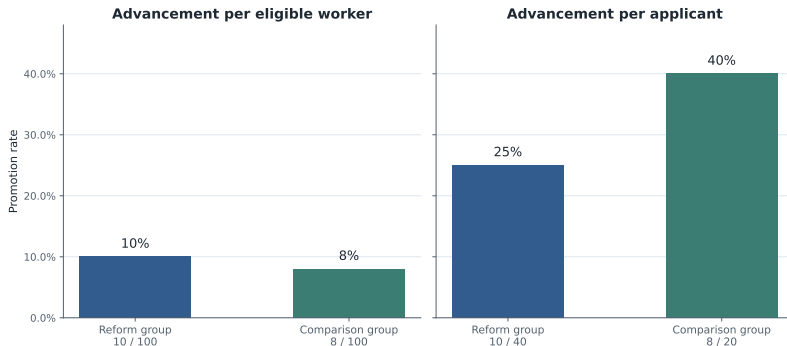
$$\Pr(P = 1 \mid E = 1) = \Pr(A = 1 \mid E = 1) \Pr(O = 1 \mid A = 1, E = 1) \Pr(P = 1 \mid O = 1, A = 1, E = 1).$$

- E : eligible; A : applied; O : received an offer; P : completed a promotion through this route.
- Use one baseline population and observation horizon; completed starts must be nested inside offers and applications.
- Direct appointments belong to a separate route. Offers, acceptance, origin release, and actual starts are distinct events.
- Conditional gate rates require positive denominators. A stage with no candidates has an undefined downstream rate.

Two populations

An early leaver remains in the baseline policy cohort but may leave a later conditional risk set.

Cohort advancement and applicant success can move in opposite directions



Original diagnostic: 100 eligible per group; 40 vs 20 apply; 10 vs 8 advance.

The applicant-conditioned comparison describes pools partly created by the reform.

SYNTHETIC_TEACHING_CONSTRUCTION_NOT_PUBLISHED_REPLICATION

Synthetic example: 100 eligible workers in each group; reform/comparison applications 40/20 and promotions 10/8.
Cohort advancement is 10%/8%; applicant success is 25%/40%. Applicant pools are partly created by the reform.

Training is a sequence of interventions and observations

Stage	Data needed	Distinction to retain
Offer or nomination	Eligible roster, assignment rule, manager	Opportunity versus participation
Enrollment / attendance	Starts, absences, withdrawal, time costs	Access versus actual exposure
Completion / certification	Requirements, test form, certificate date	Compliance versus mastery
Assessment / disclosure	Independent scores, recipients, release date	Capability versus employer information

A completion flag need not measure learning. Record whether supervisors observe the certificate and whether workers can use assistance during the assessment.

A common task helps compare capability, but can omit skills useful only in a different job. Assess leavers where feasible and report actual coverage.

Skills evolve; jobs determine which skills become productive

$$h_{i,t+1} = (I - \Delta)h_{it} + BT_{it} + L_{jit} + \eta_{it}, \quad q_{it} = a'_{jit} h_{it} + e_{it} + \epsilon_{it}.$$

- i, t : worker and time; h : skill vector; T : training inputs; j : job assignment.
- I : identity matrix; Δ : depreciation; B : training effectiveness; L_j : learning from job j ; η : skill innovation.
- a_j : job-specific skill weights; q : output; e : effort; ϵ : production noise.
- Employers' beliefs about h remain separate from the skill vector itself.

Original teaching organizer. Payroll and output alone do not jointly identify all terms. Gibbons–Waldman (1999, 2006) integrates human capital, learning, and assignment in richer models.

A higher recorded outcome does not uniquely identify learning

Invented intervention	Observation	Additional discriminating evidence
Change task assignment	Routine output 50 $\rightarrow$ 57; common skill test stays 50	Comparable-task and new-role performance
Disclose a certificate	Supervisor rating 3 $\rightarrow$ 4; common skill test stays 50	Blind assessment and supervisor responses
Improve capability	Better independent performance	Novel tasks, retained skills, test effort, tool availability

Measure task difficulty, technology, effort, and recording rules. Adding post-training tasks as controls can remove part of the program's total effect.

Original counterexamples, not estimated magnitudes. Skills, assignment, information, and measurement can change together.

Employer payment does not prove technological firm specificity

Model anchor	Economic mechanism	Measurement implication
Becker (1962)	Returns can be general or specific to a relationship	Measure productivity and outside use separately from the payer
Acemoglu–Pischke (1999)	Wage compression and frictions can support employer-financed general training	Wage and productivity returns can differ
Lazear (2009)	Generally useful skills receive different weights across firms	A skill bundle can be valuable in a particular combination

Training costs, portable skills, wage gains, and captured production value are different empirical objects.

Selected model excerpts. The contractual payer alone does not identify the technology or worker welfare.

Developmental assignments can lose output now and create value later

Full future capture: $-3 + 0.9(5) = 1.5$.

Half future capture: $-3 + 0.9(0.5)(5) = -0.75$.

- A lateral move costs three units now and creates five additional units next period.
- Discount factor is 0.9; skills, future production, and other costs are fixed.
- The unit bearing the early loss may not receive the later benefit.
- Record current output, later tasks, retention, wages, and whose preferences determine the move.

Original two-period illustration, not a full dynamic optimum. Baseline calculation has no exit or other costs; half capture is a separate private-return scenario.

Training finance requires a return ledger for both sides

$$\Pi_F = -C_F + \sum_{t=1}^2 \beta^t s_t (\Delta q_t - \Delta w_t).$$

- C_F : initial firm cost; β : discount factor; s_t : probability the worker remains available in period t .
- Δq_t : additional monetary production value; Δw_t : extra compensation.
- This is a private present-value calculation, not a causal estimator or social-welfare measure.
- Retention may respond to training and financing. The formula holds its path fixed for the exercise.

Original teaching accounting. Omitted: returns after exit, replacement costs, spillovers, taxes, worker time costs, risk, and outside opportunities.

The same production gain can finance pay and firm returns

$$C_F = 70, \quad \beta = 0.95, \quad s_t = 0.9^t, \quad \Delta q_t = 80, \quad \Delta w_t = 25 \quad (t = 1, 2).$$

Accounting object	Present value
Firm: $-70 + 55(0.855 + 0.855^2)$	17.231375
Extra pay while employed: $25(0.855 + 0.855^2)$	39.650625
Combined net production: $-70 + 80(0.855 + 0.855^2)$	56.882

- Firm return plus extra pay equals net production value by accounting.
- A high firm return does not establish worker gains; no wage change does not establish no worker benefit.

Synthetic parameters and fixed retention. Combined net production is not welfare; no paper's estimated return is reproduced here.

Training contracts connect financing to mobility

- **Setting:** Hoffman–Burks, employer-sponsored general training in trucking.
- **Variation:** training-contract and quit-response evidence, combined with a structural analysis.
- **Targets:** retention responses and model-based returns to financing arrangements.
- **Limitation:** empirical quit responses and simulated returns or welfare require different arguments.
- Track costs, compensation, exits, and subsequent opportunities rather than studying only completers who stay.

Hoffman and Burks (2017), selected NBER working-paper version. Its historical contract setting supplies a research question, not current guidance on legal enforceability.

Administrative training records reveal timing but not random nomination

- **Setting:** Bartel, company training and career records.
- **Variation:** observed training participation in a personnel panel.
- **Targets:** wage growth and job-performance measures following training.
- **Limitation:** nomination may reflect anticipated promotion, falling performance, or supervisor budgets.

Design translation

Put nomination, attendance, assessment, role change, and pay on one timeline. Worker effects remove stable differences, not time-varying reasons for training.

Bartel (1995). These are questions for a new application, not allegations that the paper ignored them.

Randomized access can affect trainees and their coworkers

- **Setting:** de Grip–Sauermann, workplace training with individual productivity records.
- **Variation:** training field experiment linked to workers and coworkers.
- **Targets:** trainees' productivity and effects on untreated coworkers.
- **Limitation:** an untreated coworker may be exposed through shared work.

Define the exposure

Record team membership, treatment saturation, and interaction opportunities. The direct effect of an offer differs from the overall effect of introducing a program.

de Grip and Sauermann (2012), Economic Journal. Independent quality distinguishes faster service from better service;
Week 7 develops the peer mechanisms.

Soft-skills training changes distinct outcomes, not one universal return

- **Setting:** garment workers in India; on-the-job soft-skills training.
- **Variation:** randomized access to the training program.
- **Targets:** productivity, promotion, pay, retention, and collaborative production.

Published 2023 outcomes	Interpretation boundary
Productivity and promotion gains	Effects of the program bundle; not a unique skill mechanism
No wage or retention effects reported	Distinct outcomes; do not infer exact equivalence or zero worker benefit

Limitation: communication, confidence, effort, skills, and assignments can respond together; spillovers complicate exposure.

Adhvaryu, Kala, and Nyshadham (2023), JPE, required reading. Use this publication; do not import older The Skills to Pay the Bills magnitudes.

An offer effect differs from receipt and completion comparisons

$$\text{ITT} = \mathbb{E}[Y \mid Z = 1] - \mathbb{E}[Y \mid Z = 0], \quad Z = \text{randomized offer.}$$

- Account for assignment strata and the intended baseline population.
- Report enrollment or completion first stages alongside assessment, output, and career outcomes.
- A receipt IV also needs relevance, exclusion, monotonicity, and suitable interference assumptions.
- Offers can signal support or alter advancement access without receipt. Exclusion is substantive.
- Comparing completers with non-completers conditions on choices and survival affected by treatment.

Methods applied to training access. The synthetic lab identifies an offer effect on universally assessed skills; its competitive career outcomes need another interpretation.

Separate training access from information disclosure in a new design

Proposed variation	Target and records	Remaining ambiguity
Training-access lottery	Effect on common and novel-task assessments	Effort, attendance, and tool use also matter
Independent disclosure lottery	Effect of releasing assessment results to supervisors	Disclosure can change mentoring, effort, and tasks
Follow later assignments	Portability and career responses	Movement and outcome observation are selected

Prespecify assignment, cells, follow-up, and common weights. The effect of disclosure is an information-policy effect, not automatically pure belief updating.

Proposed extension, not a treatment claimed for Adhvaryu et al. (2023). Adding post-treatment tasks to a regression does not by itself identify mediation.

Rewarding current performance can conflict with next-role allocation

Worker	Frontline output	Manager contribution
A	12	13
B	10	18

Promote A: $13 + 10 = 23$, promote B: $18 + 12 = 30$.

- Incremental manager-versus-frontline values are 1 for A and 8 for B.
- Current-output ranking chooses A; static productive assignment chooses B.
- Skills, effort incentives, wages, and willingness to accept are held fixed.

Original two-worker illustration. A promotion promise can motivate current effort; the seven-unit static gap is not an estimated universal cost of the Peter Principle.

The Peter Principle paper links current sales to later managerial outcomes

- **Setting:** sales personnel and subsequent managerial performance in the published sample of **131 firms**.
- **Variation:** current performance, realized promotion decisions, and later team outcomes.
- **Target:** compare predictors of being promoted with predictors of next-role performance.
- **Limitation:** promotions include acceptance; promotion offers are not observed.
- Future manager performance is observed for selected promoted workers, not every candidate's potential managerial contribution.

Benson, Li, and Shue (2019), QJE, required reading. The 214-firm count belongs to an earlier working paper. The paper also uses an instrumental-variable comparison, discussed next.

The leave-out promotion-rate instrument targets marginal promotions

- **Instrument:** the firm's promotion rate in that month, excluding the focal worker and teammates.
- **Comparison:** candidates whose realized promotion changes with promotion intensity; a local margin under the IV assumptions.
- **Outcome construction:** managerial value added accounts for common firm-time conditions.
- **Identification:** exclusion and relevant local-effect assumptions remain necessary. Promotion intensity can reflect other organizational conditions.

Leave-out is a construction rule

Removing a mechanical link does not make an instrument exogenous. The study goes beyond raw promoted-worker correlations without randomizing all appointments.

Benson–Li–Shue (2019). This instrument and the accepted-promotion outcome must be interpreted within the paper's actual institutional setting.

Rejected candidates' next-role performance is usually missing

Evidence object	What it can reveal	What remains missing
Later subordinate sales	Performance in an assigned managerial role	Team resources, reassignment, and joint production
Promoted-worker prediction	Predictors among observed managers	Unobserved role outcomes for non-promoted candidates
Trial role / assessment center	Capability under a common opportunity	Stakes, duration, and transport to permanent appointments

Assess alternative promotion rules using next-role measures independent of current-role rankings. Include any lost incentive value of changing the rule.

Benson–Li–Shue (2019) motivates the question. Trial assignments are proposed evidence, not a claim about the paper's treatments.

The application database starts after several career gates

Gate	Needed record	Competing explanation for no application
Visibility	Eligible workers and who saw each opening	No information rather than no interest
Disclosure	Confidentiality rules and notification dates	Applying may reveal dissatisfaction
Endorsement	Manager approval and nomination requirements	Anticipated rejection or retaliation
Release	Requested, approved, rejected, delayed release	A successful candidate cannot move

Retain eligible non-applicants and cancelled openings. Distinguish low demand for a move from barriers before the recorded application.

Haegele (2026) motivates observing internal access. An internal labor market remains a search and information system even when workers already know the employer.

Talent hoarding makes announcement timing part of identification

- **Setting:** Haegele, personnel and survey evidence on internal mobility and managers.
- **Variation:** quasi-random variation in exposure to hoarding within the institutional design.
- **Target:** internal applications and access to career opportunities.
- **Limitation:** applications can respond before an actual manager rotation. Manager identity is not universally randomized.

Construct the chronology

Manager announcement → vacancy information → application → actual rotation → release and start: verify the actual ordering in each setting.

Haegele (2026), published AER, required reading. Earlier accessible manuscript supplies qualitative timing detail; no version-specific numerical estimates are mixed here.

A productive move can be privately costly to the origin manager

$$\text{Firm net gain} = 8 - 3 - 1 = 4.$$

Invented effect of the move	Value
Destination output	+8
Origin output	-3
Moving cost	-1
Origin manager's local payoff without credit	-3

- A transfer credit of 4 changes that local payoff to +1.
- Credit may change gaming, replacement, and future cooperation; workers also have preferences.

Original local-incentive arithmetic motivated by talent hoarding. It does not establish an optimal transfer-credit policy or a welfare gain.

Information, confidentiality, and release are different interventions

Proposed intervention	Immediate target	What must still be measured
Random vacancy notification	Information delivery and application	Feasible slots and candidate composition
Confidential application rule	Disclosure risk and willingness to apply	Endorsement, release, acceptance
Changed manager release rule	Ability to execute an approved move	Origin disruption, destination quality, worker preferences

Use the eligible worker–opening population and the actual assignment unit. An application increase is not itself more jobs or a production gain.

Proposed designs. Anticipated reassignment and future openings can change applications before the recorded move.

Internal movers and external hires may fill different needs

- **Setting:** Bidwell, personnel records distinguishing internal moves from external entry.
- **Variation:** hiring route and subsequent careers in comparable jobs.
- **Targets:** compensation, performance, and exits by entry route.
- **Limitation:** external recruitment may respond to unavailable internal skills or unusual vacancies; route is not randomly assigned.

Define the opening as well as the worker

Filling the same position differently is distinct from creating different positions. Classify lateral moves by tasks, authority, pay, and location, not grade alone.

Bidwell (2011), Administrative Science Quarterly. Conditioning on the filled role can improve comparability without removing private information behind recruitment.

Internal talent markets can optimize different objectives

- **Setting:** Cowgill–Davis–Montagnes–Perkowski, internal talent-market evidence and an assignment model.
- **Variation:** firm-led and preference-based assignment comparisons.
- **Targets:** firm-preferred quality, workers' rankings, use of expertise, and developmental matches.
- **Limitation:** a feasible assignment simulation does not independently identify learning under assignments never observed.
- Collect preferences before outcomes; current production, skill growth, and worker utility need separate measures.

Cowgill et al. (2025), *Management Science* 71(3):2508–2526; online 2024. Modeled assignment outcomes are not randomized skill effects or a social-welfare ranking.

Task similarity helps study portability without observing every skill

- **Setting:** Gathmann–Schönberg, task measures linked to worker mobility and wage histories.
- **Variation:** movement across jobs with different task requirements.
- **Target:** transferability of human capital across occupations.
- **Limitation:** occupational requirements are not individual skill tests; work can differ within the same code.

Implement a task-distance measure

Freeze the taxonomy and crosswalk. Validate old/new tasks inside the firm; compare performance on later tasks not used to select the original move.

Gathmann and Schönberg (2010). A change of employer need not erase all accumulated human capital; a stable title need not preserve the task bundle.

Retirement delays can restrict younger colleagues' opportunities

- **Setting:** Italian firms exposed to an unexpected pension reform.
- **Variation:** retirement delays and heterogeneous exposure across firms.
- **Target:** spillovers to younger colleagues' careers when advancement opportunities are limited.
- **Limitation:** workforce age may proxy for demand, technology, or planning; reconstruct predetermined exposure and the retirement rule.

Model a network of positions

Retirement → upper vacancy → promotion → lower vacancy. A hiring freeze, cancelled position, or external hire can stop the succession chain.

Bianchi, Bovini, Li, Paradisi, and Powell (2023), REStud. Avoid automatic controls for post-reform staffing mechanisms; the findings are not a universal retirement-policy recommendation.

One fixed slot creates a winner and a displaced candidate

Candidate	Observed in new role: old rule	New rule	Change
A	1	0	-1
B	0	1	+1
Total promoted	1	1	0

- Unchanged promotion counts do not imply unchanged output, fairness, or welfare.
- Individual advancement can displace a competitor; own-treatment-only potential outcomes are inappropriate for the contest.
- Observation changes in both directions. Equal aggregate selection does not establish individual monotonicity.

Original two-candidate example. It motivates contest-level targets and the later caution about Lee (2009) selection bounds.

Potential ratings and access to managers are distinct career gates

	Benson–Li–Shue	Cullen–Perez-Truglia
Setting	Personnel performance and potential ratings	Personnel/survey records and manager–employee contact
Variation	Assessments linked to promotion decisions	Manager transitions and interaction patterns
Target	Forecasts of future performance as a promotion gate	Contact and career progression
Limitation	Future outcomes are selected by promotion; ratings are not latent ability	Information, endorsement, learning, and preference require separate evidence

Benson–Li–Shue (2026), “Potential” and the Gender Promotion Gap, AER 116(2):375–417. Cullen–Perez-Truglia (2023), The Old Boys’ Club, AER. Both are published papers.

Persistent career gains can come from skills or durable assignments

- **Setting:** Minni, multinational personnel and worker–job allocation records.
- **Variation:** manager rotations and an ex ante promotion-speed proxy in the published 2026 study.
- **Targets:** worker allocation, subsequent roles, and persistent productivity or career changes.
- **Limitation:** lasting effects can reflect skills, task assignments, networks, or selection; persistence alone is not a teaching effect.

Extend the Week 5 outcome panel

Follow later jobs and independent skills. Test performance where the candidate mechanisms predict different gains.

Minni (2026), QJE; published panel covers 11 years. Retain the specific lateral-rotation design rather than treating all manager changes as random.

AI-assisted performance and portable learning require different tests

- **Setting:** Brynjolfsson–Li–Raymond, workplace generative-AI access and performance records.
- **Variation:** rollout of a work-assistance tool.
- **Targets:** productivity, experience heterogeneity, and evidence relevant to learning.
- **Limitation:** simultaneous assistance, retained skill, and later advancement remain distinct outcomes.

A sharper career extension

Assess novel tasks and performance without assistance; justify any withdrawal or outage comparison. Link retained skill to applications, new assignments, and promotions.

Brynjolfsson, Li, and Raymond (2025), QJE. The published paper already studies evidence relevant to learning; these are sharper transfer and career tests, not a claim of an empty literature.

Research opportunities begin with mechanisms that can disagree

Proposed project	Competing explanations	Discriminating record
Training and disclosure	Skill versus certification	Blind novel-task test and disclosure timing
Confidential applications	Latent demand versus unavailable slots	Non-applicants, opening counts, release and starts
Developmental rotations	Learning versus immediate fit	Current loss and later independent tasks
Succession chains	New opportunities versus displacement	Position network, winners, losers, and exits
Tool-assisted learning	Portable capability versus assistance	Unassisted retention and career follow-up

Proposed designs; assignment and observation must be justified separately. Hoffman–Stanton (2025) provides the broader personnel-economics map.

Define states and clocks before drawing an event-study graph

Analysis unit	Clock or state	Practical rule
Worker-month	Baseline eligibility, grade, training, exit	Preserve the baseline cohort after exit
Worker-opening	Visibility, application, offer, release	Preserve eligible non-applicants and cancelled openings
Position-month	Vacancy, freeze, filled status	Track slot supply independently of candidates
Job spell	Effective start, leave, re-entry	Prespecify simultaneous moves and rehire rules

An eventual-completer or eventual-promotee cohort conditions on the future. It can create a period in which members must remain observable to qualify.

Methods Box. Unknown eligibility is not zero eligibility. Announcement, application, offer, and actual start are different time origins.

Competing risks preserve the baseline career probability

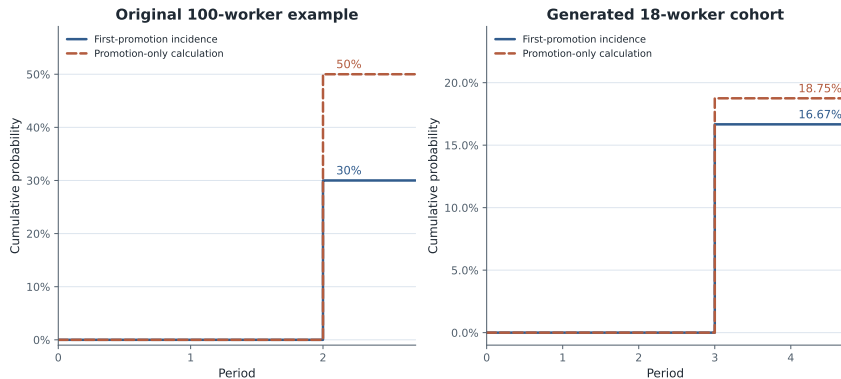
$$\lambda_P(t) = \Pr(P_t = 1 \mid R_t = 1), \quad \lambda_X(t) = \Pr(X_t = 1 \mid R_t = 1),$$

$$S(t) = \prod_{s=1}^t [1 - \lambda_P(s) - \lambda_X(s)], \quad F_P(t) = \sum_{s=1}^t S(s-1) \lambda_P(s).$$

- R_t : no prior first promotion or competing exit just before period t ; P_t, X_t : mutually exclusive first-event indicators.
- $S(0) = 1$; $S(t)$: probability of remaining event-free; $F_P(t)$: first-promotion cumulative incidence.
- Define within-period order, observation, and censoring; hazards require a nonempty risk set.
- Later grades, lateral moves, leave, and re-entry require a richer multi-state model.

Andersen–Keiding (2002). Correct transition accounting does not identify the causal effect of training or promotion; treatment can change who remains at risk.

Censoring competing exits answers a different promotion question



Exits are competing events. Promotion-only calculation = $1 - \text{Kaplan-Meier survival censoring exits}$.

Separate invented cohorts; no ordinary loss to follow-up. Neither curve makes assignment causal.

SYNTHETIC_TEACHING_CONSTRUCTION_NOT_PUBLISHED_REPLICATION

Left: 100 workers, 40 exit then 30 promote: 30% versus 50%. Right: 18 workers, two exit then three promote: 16.67% versus 18.75%. Separate synthetic cohorts; neither contrast establishes causality.

A career event date is not a random treatment date

- Promotions may follow prior task changes; applications may anticipate announcements or vacancies.
- An event study of promotees describes selected careers without an additional comparison and identification argument.
- Group-time ATT methods can fit genuine staggered, absorbing access under defensible parallel trends and anticipation assumptions.
- Repeated courses, multiple grades, rotations, and recurrent moves require explicitly defined treatment histories.
- Fix windows, comparison cohorts, exclusions, and weights; restricting to future nonmovers can create selection.

Callaway–Sant’Anna (2021); Roth (2022). A nonsignificant pretrend does not establish parallel untreated outcomes.

Robust aggregation cannot make endogenous timing exogenous.

Selection bounds need a defensible observation model

- **Data problem:** next-role performance is observed only for candidates actually promoted.
- **Possible approach:** Lee bounds under suitable treatment assignment and monotone outcome observation.
- **Target:** effects for an always-observed population under the stated assumptions.
- **Implementation:** show baseline selection rates, justify one-direction selection, and trim the relevant observed outcome distribution.
- **Limitation:** fixed-slot reforms can add B and remove A. Equal overall selection or attrition does not establish monotonicity or comparability.

Lee (2009), Review of Economic Studies. Common assessments or temporary trial roles offer different evidence; each has its own selection and external-validity limits.

Public resources do not supply a firm's full opportunity ledger

Resource	Useful object	Access or measurement limit
NLSY79 / NLSY97	Training histories, timing, completion	Changing universes and self-reported categories; incomplete internal risk sets
O*NET	Occupational tasks and skill descriptors	Freeze release and crosswalk; not individual skill assessments
LEHD public products	Workforce and job-flow aggregates	No confidential worker-level internal applications
Paper archive pointers	Potential code, documentation, or data route	Inspect actual files, license, protocol, and target before claiming replication

Official resource documentation recorded in the source ledger. Original archive bytes are not used for the guaranteed synthetic lab. Request roster and opportunity records before every possible outcome file.

A minimum reporting panel makes the empirical target reviewable

Report	Implementation	Limit to the claim
Access and transitions	Eligible counts, slots, offers, completion, applications, starts, exits	Gate rates use different populations
Production and quality	Common tasks, new-role output, errors, resources	Recorded output can change without skills
Incidence and welfare	Pay, hours, costs, risk, mobility, preferences	Retention or wages alone are not welfare
Uncertainty	Preserve assignment strata and dependence; declare inference unit	Payroll rows do not add independent assignments

Cameron–Miller (2015). Label causal effects, mechanism evidence, and descriptive diagnostics separately. A small exact lottery test addresses its sharp null, not arbitrary weak-null inference.

Research Lab: three department lotteries assign training access

- **Mode A:** original offline synthetic design reconstruction, motivated by randomized training access.
- Eighteen baseline-eligible workers; three departments of six; exactly three offers per department.
- Six months, $-1, 0, 1, 2, 3, 4$: 108 worker-month observations.
- Potential assessments and behavioral draws precede assignment; assignment uses a separate random-number stream.
- All workers, including leavers, receive an independent endline assessment: an artificial teaching guarantee.

The sample, assignment scheme, career rules, and effects are invented. They do not reproduce Adhvaryu et al. (2023), Haegele (2026), or Benson–Li–Shue (2019).

The assessment estimand uses every baseline worker

$$\Delta Y_i = Y_{i,4} - Y_{i,0}, \quad \hat{\tau} = \frac{1}{3} \sum_{d=1}^3 (\overline{\Delta Y}_{d,Z=1} - \overline{\Delta Y}_{d,Z=0}).$$

- i : worker; d : department; Z : offer; Y : independent assessment.
- Equal department sizes make equal weights the baseline-worker population weights.
- Target: the finite-population offer effect on assessment change; the skill endpoint has no interference by construction.
- Report the completion first stage. Receipt is not randomized, and completion-conditioned contrasts are descriptive.
- Stratified Neyman variance estimates an upper bound in expectation; a normal interval is not exact with 18 workers.

Synthetic design assumptions. Universal assessment isolates the skill exercise; routine workplace output is missing after exit and changes with roles.

Exact-null enumeration and instructor truth answer different questions

$$\#\{\text{permitted assignments}\} = \binom{6}{3}^3 = 8,000.$$

Enumeration	What remains fixed?	Interpretation
Fisher sharp-null test	Observed assessment changes; reassign three offers within every department	Two-sided fraction at least as extreme, including ties
Instructor truth check	Both potential outcomes; recompute observations under each assignment	Mean estimator equals known finite-population offer ATE

The first tests no offer effect for every worker. The second uses counterfactual truth unavailable to an empirical analyst.

Exhaustive enumeration, not Monte Carlo. Do not permute across departments or shuffle worker-month rows. The sharp-null distribution is not an exact weak-null confidence interval.

The lab's promotion module deliberately introduces competition

Month	Event	Observation rule
1	Training offers; openings announced	One opening per department
2	Possible completion; possible exit	Completion precedes end-of-month exit
3	Applications, then selection	One promotion per department; candidates compete
4	Independent assessment; possible exit	Assessment includes leavers; routine output does not

First promotion and exit are absorbing in this toy module. Preserve baseline membership; report cohort advancement, applicant-conditioned success, and total slots separately.

Three filled slots imply endline promotion incidence $3/18$. Offer-group career summaries describe realized allocation with competition, not an ordinary individual no-interference promotion ATE.

Reproduce, diagnose, and keep the provenance explicit

Task	Output or check	Interpretation discipline
Reproduce assignment	Assessment ITT, first stage, 8,000 null assignments	Synthetic offer effect
Diagnose careers	Denominators, competing exits, slots, role versus skill	No causal completer or individual slot contrast
Diagnose accounting	Finance, development, comparative advantage, hoarding	Fixed assumptions; not welfare estimates
Verify workflow	35 starter assertions; two identical default runs; seed 88771; overwrite refusal	No significance requirement; truth stays instructor-only

Python standard-library path, no original microdata required. Optional original-data replication needs a separate archive/license/design audit; a publisher link is not an executed replication.

Three required readings organize the full career pipeline

Required reading	Preparation for discussion
Adhvaryu–Kala–Nyshadham (2023)	Diagram access, receipt, productivity, promotion, wages, and retention; distinguish bundle and mechanisms
Benson–Li–Shue (2019)	Compare current-job criteria with next-role outcomes; explain missing offers and the local IV comparison
Haegele (2026)	Reconstruct eligibility, vacancy visibility, announcement, application, release, and the supported counterfactual

Use theory excerpts for one mechanism and one observable implication. Rotate other empirical papers by training, opportunity supply, and career gates.

The 26 scholarly works and four official resources support projects and presentations; they are not 30 compulsory weekly readings.

Transfer: write a career-transition design with explicit denominators

Two-page proposal plus a denominator table

Define the baseline population, organizational boundary, opportunity set, treatment or exposure, comparison, and two mechanisms with different predictions.

- Give training, notice, application, offer, release, start, and exit dates.
- Separate cohort outcomes from conditional gate rates; count openings, displaced candidates, and spillovers.
- Include independent task/quality measures and worker costs, preferences, or well-being.
- State actual data access, assignment and inference units, one diagnostic, and one conclusion the design cannot support.

Discussion: a reform raises applications but not promotions. Specify an efficiency story and a redistribution story, then name the record that separates them.

Career development connects to teams through shared opportunities

- Training, information, assignment, and opportunity supply can each change a career.
- Promotion rules reward current work while assigning workers to different future tasks.
- Follow the whole baseline cohort and the openings available to it; conditional success rates tell only one part of the story.
- Productivity, pay, retention, independent quality, and welfare need separate interpretation.

Bridge to Week 7

Workers learn, coordinate, compete, and exert pressure together. Move from an individual's opportunity path to team production, information flows, and peer exposure.

Carry forward the assignment unit, exposure map, and displaced-worker accounting. Week 8 develops external options; Week 9 develops broader organizational change.