Worker Learning and Management

Managerial Investment in Portable Human Capital and Business Tax Policy

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Project Summary

Firms invest in workers not only through formal training expenditures, but also through managerial time devoted to worker development. A manager who delegates difficult tasks, provides feedback, and develops a subordinate's capabilities diverts time and attention from current production. The resulting human capital can be portable: workers may leave the firm and carry the acquired capability to a new employer. This creates an appropriability problem because the employer bearing the development cost may capture only part of the return.

This project studies that mechanism using German linked employer–employee data and a quantitative search model. Empirically, exposure to higher-quality managers predicts workers' later outcomes after they enter management. Workers exposed to stronger managers earn persistently more after becoming managers, including after moving to another establishment, but are less likely to transition into management in the short run. I interpret these patterns through a model in which managers allocate time between current production and worker development and workers accumulate portable managerial skill. Higher skill raises match output immediately, but the worker's wage responds only when an outside offer arrives: on-the-job search delivers both poaching offers from other managers and offers to become a manager, and the worker then either renegotiates in place or moves. How frequently those offers arrive therefore determines how much of the return the investing employer retains.

The portability mechanism motivates a business-tax question: how effective are tax incentives for employer-provided human-capital investment when the investing firm cannot fully appropriate the return? The planned policy extension introduces a targeted tax credit or subsidy that lowers the effective cost of employer-provided development. The model can then quantify how labor-market mobility affects the investment response and how the gains are divided among workers, incumbent firms, and future employers. Because part of the relevant input is managerial time that never appears as a recorded expenditure, it also quantifies how much of that margin an instrument written on documented outlays can reach. This connects employer-provided human-capital investment to questions of business-tax incidence and labor-market frictions.

1 Empirical Evidence on Portable Managerial Skill

Data. The empirical analysis uses the German Linked Employer-Employee Data (LIAB, longitudinal model), which link establishment records to administrative employment biographies and allow workers to be followed across establishments and occupations. Starting from establishments observed

*Korea Development Institute. This summary draws on my paper of the same title, begun during my Ph.D. at Washington University in St. Louis, which reports the full empirical analysis and the quantitative model.

continuously between 2009 and 2016, I take all individuals employed there at least once during 2008–2017 and merge their complete employment histories; the resulting sample contains 1,465 establishments with at least one manager as of 2008. Managers are identified from four-digit KldB-2010 occupation codes, classifying as managerial the subcode within each three-digit occupation group that is explicitly labeled "managers/supervisors." Manager quality is measured as standardized AKM person fixed effects averaged over a strictly pre-outcome exposure window, and each non-managerial worker is assigned exposure to the highest-quality manager in the relevant team-quarter. Specifications additionally control for worker, firm, and peer quality measured before the exposure window, as well as occupation, industry, region, tenure, and demographic characteristics.

Fact 1. prior manager quality predicts wages after workers become managers. I follow workers around their first worker-to-manager transition, focusing on workers who simultaneously change establishments and enter management. A one-standard-deviation increase in prior manager quality is associated with approximately 4–7 percent higher wages after managerial entry, with the relationship remaining positive for several years. The pattern is similar in specifications absorbing worker-by-destination-establishment fixed effects, which remove time-invariant wage premia specific to the destination match. The persistence of the association after workers change firms is therefore consistent with a component of managerial capability that is accumulated under prior managers and carried across employers.

Fact 2. stronger managers are associated with slower immediate managerial transitions. Among workers who change employers, a one-standard-deviation increase in prior manager quality is associated with a managerial-transition hazard ratio of approximately 0.78 at mean worker quality, or about a 22 percent lower near-term transition hazard. The same negative average relationship appears when internal and external managerial transitions are considered together. In contrast, prior manager quality has little relationship with ordinary worker-to-worker external moves, suggesting that the pattern is specific to entry into management rather than a general reduction in mobility.

Taken together, these results point to a dynamic role for managers. Exposure to a stronger manager is associated with slower immediate advancement but higher earnings once the worker later enters management, including after moving to another employer. I interpret this joint pattern as consistent with workers accumulating portable managerial capability while remaining in the current match, so that the value of staying reflects not only current wages but also the option to continue building skill realizable in future managerial jobs. These are associations rather than causal estimates. One alternative is that managers simply hold on to capable subordinates. Retention by itself, however, would not generate both patterns: it postpones advancement without raising managerial wages at a later employer. Delay combined with a portable premium is what a development channel predicts.

This dynamic channel is what the business-tax extension requires, and the two facts map onto the objects it needs. A framework in which managers affect only contemporaneous output and pay would miss both the delay between the cost of development and its return and the possibility that the return accrues outside the investing employer. Fact 1 measures the size of the portable return, since the post-transition wage gain is realized after the worker has left and entered management. Fact 2 measures how long the incumbent holds the worker beforehand, since the managerial-transition hazard governs expected retention. That prior manager quality is unrelated to ordinary worker-to-worker moves indicates that it shifts the managerial margin specifically rather than generic turnover, so the arrival rate of managerial offers is the relevant mobility dial in the tax counterfactual. Together the two facts discipline the share of the return that the investing employer captures.

2 Model: Managerial Time as Human-Capital Investment

I develop a search-and-matching model with heterogeneous workers and managers, endogenous skill accumulation, and on-the-job search. Individuals can be unemployed, employed as workers, or employed as managers. A productive match contains a worker with skill x, a manager with skill y, and firm productivity z.

The central decision is how a manager allocates time between current production and worker development. Let g denote the share of managerial time devoted to development. Flow output is

$$f(g, x, y, z) = z \left[((1-g)y)^{\theta} x^{1-\theta} \right]^{\rho}.$$

A higher g leaves less managerial time available for current production, so development has an immediate opportunity cost even when it does not appear as a separately recorded training expenditure. At the same time, developmental effort raises the worker's future managerial capability:

$$x' = x + g\eta\Phi(y - x).$$

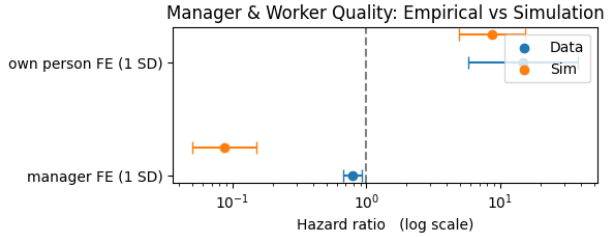
Learning depends on the manager-worker skill gap. When the manager is substantially more capable than the worker, there is greater scope for skill development; as the worker approaches the manager's capability, the incremental gain declines.

The match therefore faces an intertemporal allocation problem. Managerial time devoted to production raises output today; managerial time devoted to worker development sacrifices current output but raises future worker skill. Worker mobility determines who captures the return. Employed workers search on the job and face two distinct outside opportunities: poaching offers that move them to another team as workers, and offers to enter management. Only the second realizes accumulated managerial skill in the role for which it was built. Wages are set by sequential auction, so a worker's pay rises only when an outside offer arrives and is either matched by the incumbent or accepted. The arrival rate of offers therefore determines how long the match retains the output gain from accumulated skill before that gain is competed away.

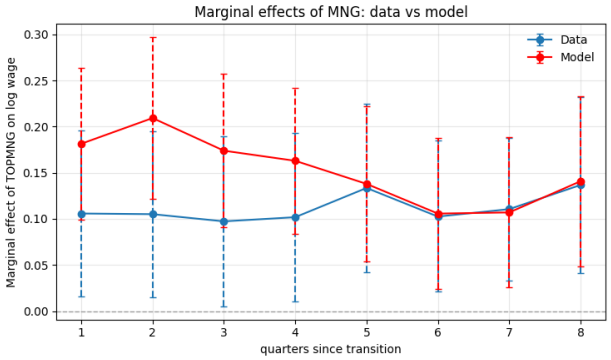
The model is calibrated to labor-market flows, worker-to-manager transition rates, managerial wage shares, and the empirical effects of prior manager quality on post-transition wages and managerial-transition hazards. Figure 1 summarizes the two model moments most directly tied to the empirical motivation. The calibrated model reproduces the lower near-term managerial-transition hazard associated with stronger prior managers and the positive post-transition wage gradient with respect to prior manager quality. The transition hazard disciplines the value of remaining in the current match, while post-transition wages discipline the portable skill accumulated before the worker enters management.

3 Business-Tax Extension: Subsidizing Employer-Provided Development

Portability creates a wedge between the private return to worker development and its total value. The incumbent bears the full opportunity cost of managerial time but captures the return only while the worker stays; once the worker leaves, the remaining value appears as productivity at another employer, as a stronger outside option, or as compensation after the worker becomes a manager. How large that wedge is depends on search frictions, which is why the search structure is essential to the



(a) Managerial-transition hazard



(b) Post-transition managerial wage

Figure 1: Model fit to the two headline empirical moments.

exercise rather than a device for matching transition rates.

The planned policy exercise studies a targeted business-tax incentive for employer-provided development. Define the output cost of development relative to devoting all managerial time to current production as

$$C(g, x, y, z) = f(0, x, y, z) - f(g, x, y, z).$$

Tax authorities do not observe g: a credit attaches to qualifying expenditure—documented outlays on external courses, certified programs, or the payroll of designated trainers—while much of worker development takes the form of managerial time that generates no such record. Let $\kappa \in [0, 1]$ denote the share of the development cost that is eligible and τ the effective rate at which eligible cost is subsidized, so that the private cost becomes

$$(1 - \tau\kappa)\, C(g, x, y, z).$$

Writing the instrument as an effective rate keeps the mapping to statute explicit: a credit at statutory rate c implies $\tau = c$, whereas an enhanced deduction of d implies $\tau = t\, d$ at corporate rate t, and neither is worth its face value to a firm without current taxable income. The case $\kappa = 1$ is the benchmark in which the instrument reaches the entire margin, and tracing the response across κ measures how much of that margin an instrument written on qualifying expenditure can actually reach. The boundary problem is familiar from the R&D credit, whose base is defined by qualified research expenses; here the unqualified portion is managerial time.

Proposed tax exercise. Let $\mathcal{F}$ summarize the friction environment—in particular the arrival rates of outside worker and managerial offers generated by on-the-job search. The private development choice satisfies

$$(1 - \tau\kappa) MC^{\text{dev}}(g; x, y, z) = MB^{\text{private}}(g; x, y, z; \mathcal{F}),$$

where MC^{dev} is the current output cost of an additional unit of managerial time devoted to development and MB^{private} is the continuation benefit captured by the current employment relationship. For each (τ, κ) I will resolve the equilibrium development policy and measure the average investment response

$$\Delta g(\tau, \kappa; \mathcal{F}) = \mathbb{E}[g^*_{\tau\kappa}(x, y, z; \mathcal{F}) - g^*_0(x, y, z; \mathcal{F})]\,,$$

then repeat the same counterfactual under alternative mobility environments that change the arrival rate of managerial offers. This asks whether the same statutory incentive produces a different development response when workers can more or less readily carry acquired skill away from the

investing employer.

The framework also organizes the portion of the return that the incumbent does not capture. Write $MB^{\text{total}} = MB^{\text{private}} + MB^{\text{portable}}$, where MB^{portable} is the value realized in later employment relationships, and let

$$A(\mathcal{F}) = \frac{MB^{\text{private}}}{MB^{\text{total}}}$$

denote the incumbent's appropriation share. Search frictions affect $A(\mathcal{F})$ through retention, outside offers, wage renegotiation, and subsequent matching, so tracking $A(\mathcal{F})$ alongside $\Delta g(\tau, \kappa; \mathcal{F})$ separates how much a subsidy raises investment from how much of the induced investment the subsidized firm retains. A low appropriation share is not by itself evidence of underinvestment: whether the uncaptured portion is an efficiency loss or a transfer to workers and later employers depends on how far the match can shift the cost of development onto the worker, a question this project poses but does not settle.

Finally, I will decompose the incidence of the policy into changes in worker compensation and career outcomes, incumbent match value, and output realized in later matches. No monotonic effect of lower search frictions on the subsidy response is assumed, since greater mobility simultaneously changes retention, bargaining, and the allocation of workers across matches; the quantitative model determines how these forces interact. The exercise reduces to a small set of counterfactual outcomes—the change in average development intensity, the incumbent appropriation share, worker gains, and output.

4 Contribution and Relation to the Literature

The project connects three literatures. First, work on employer-provided training shows how labor-market frictions can allow firms to capture part of the return to investments in transferable worker skills, sustaining firm-financed general training [1]. Here, a key investment input is managerial time rather than an observed training expenditure, and the empirical evidence links that input to later outcomes after workers move across firms.

Second, the project contributes to the economics of management and workplace learning. Managers can affect not only contemporaneous productivity and wages, but also the future supply and quality of managers by developing workers who subsequently enter management. This complements work on workplace learning [2].

Third, the project connects employer human-capital investment to business-tax incentives and incidence. Existing work shows that tax policy can materially alter firm investment [4] and that the incidence of business taxation can extend to workers rather than remaining with firm owners [3]. Human-capital investment has a distinctive feature: the asset can leave the firm. The framework introduces a portability margin through which a policy formally subsidizing the current employer can generate gains that ultimately accrue to workers and to other employers.

The current paper establishes the empirical portability margin and develops the quantitative mechanism. The planned tax extension will use that framework to study when targeted business-tax incentives change employer investment in worker development and how labor-market frictions shape the distribution of the resulting gains.

References

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