Skill Mismatch Over The Technology Lifecycle

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Abstract

Firms increasingly invest in new technologies to boost productivity, yet little is known about how well workers' skills align with the requirements of evolving production systems. We propose a new theoretical framework and empirical methodology—leveraging large language models (LLM's) with matched data from worker resumes and firm job postings—to analyze how skill mismatch varies across firms that utilize different information technologies (IT). We document three sets of findings. First, skill mismatch exhibits a U-shaped pattern as IT evolves: mismatch is high when new technologies are deployed, declines over time as firms and workers adjust, and rises again as technologies become obsolete. Second, mismatch is substantial not only for technical skills, but also for complementary non-technical skills such as managerial ability. Third, skill mismatch helps explain firm investment in intangible assets, which in turn helps reconcile the gap between IT adoption and measured productivity. These patterns are consistent with theories of technological change in which skill adjustment lags drive heterogeneity in firm-level productivity. Our results highlight the central role of skill mismatch between firms and workers in the diffusion of new technologies.

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