

# DISSERTATION PROPOSAL

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## “On the Structural Relationship Between Technology and Labor Markets”

Monday, December 2, 2019

4:30 pm

Tepper Quad 4243

The relationship between technological change and labor markets is widely studied in macroeconomics, and most often through the lens of demand: new technologies are seen to affect the relative productivities of different types of labor, or their shares in production, thereby creating movement in quantities and prices. But technology can also directly influence the nature of labor – its content and context – suggesting a more structural aspect of the technology-labor relationship. In my dissertation I study the relevance of this channel for aggregate labor outcomes, and its importance in explaining observed changes in labor market structure and the distribution of wages over the last 40 years.

I begin by considering the impact of technology on the allocation of labor across employers. A recent empirical literature indicates that rising wage inequality in the U.S. and Europe is driven, to a significant extent, by an increased tendency of high-income individuals to work for high-paying employers. I characterize this trend, utilizing a matched employee-employer dataset from Germany combined with a survey on operational performance and policies. I evaluate the hypothesis that changing employment patterns are driven by technological heterogeneity, with high-wage firms more intensive in their use of ‘skill-biased’ inputs such as information technology, outsourcing of labor, and organizational and informational capital.

In the second chapter I formalize this hypothesis, developing and estimating a model of labor markets with two-sided heterogeneity, wage differentials arising from search frictions, and an explicit linkage between firm technology and the workforce composition. The goal of this exercise is, first of all, to quantify the contribution of changing employment patterns to wage inequality, taking into account the behavioral responses of workers and firms. Second, through counterfactual experiments I hope to elucidate the relationship between cross-sectional technological heterogeneity and the distribution of wages, and any implications of this relationship for policies that promote or impede technological adoption by firms.

Finally, I consider the effect of technology on occupational content, in an environment where occupations are ‘complex’ and consist of bundles of tasks that must be performed. In this environment, the adoption of a labor-substituting technology can ultimately increase labor demand, if it allows for a better specialization of workers’ abilities to the requirements of the job. This approach reconciles competing notions of labor-substituting and labor-complementing technological change, and provides an explanation for why two technologies, or the same technology in two different occupations, can have divergent implications for employment. Using occupational survey microdata from Germany over the years 1979-2012, I show that the proposed mechanism can provide a coherent account of historical trends in PC adoption and occupational shares.