



Occupational specificity: A new measurement based on training curricula and its effect on labor market outcomes



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ARTICLE INFO

Jel Classification:

I20
J24
J62

Keywords:

Human capital specificity
Occupational mobility
Vocational education and training

ABSTRACT

This paper proposes a new measurement for the specificity of occupations based on a content analysis of training curricula that we link to labor market demands. We apply Lazear's (2009) skill weights approach and test predictions on labor market outcomes derived from his theory. We find clear evidence of a trade-off between earning higher returns with more specific training and higher occupational mobility with less specific training. Our measure improves the micro-foundation of human capital specificity and provides an evidence-based approach to evaluate the specificity of training curricula.

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1. Introduction

According to traditional human capital theory, investments in specific human capital are considered to be riskier than investments in general human capital, but specific investments are also considered to generate higher returns (Heijke and Borghans, 1998). On the one hand, they are considered riskier because they limit individuals' ability to adapt to technological change, a view based on the assumption that individuals with specific human capital will find adapting to and operating new technologies, machinery and services more difficult. This lower adaptability might cause wage losses or unemployment (Hanushek et al., 2017; Krueger and Kumar, 2004). On the other hand, investments in specific human capital are viewed as generating higher returns, because they are more closely tied to actual job requirements, thereby leading to higher productivity (Gervais et al., 2008; Wasmer, 2006). Thus, workers who have to decide whether to invest into more or less specific human capital face a trade-off between a higher return in a given job and a higher risk if they are forced to (or want to) change their current job. Similarly, educational policy makers have to decide how to design educational curricula: more or less specific to provide workers with different choices. In this paper, we investigate the returns and risks of investments in human capital by providing a new specificity measure.

We develop a measure for the specificity of a worker's human capital investment based on the skill¹ bundles as specified in occupational train-

ing curricula. Previous research typically makes a simple dichotomy of definitions and assumes that academic (college and university) education provides general skills and that vocational education provides specific skills, and compares the labor market returns of academic and vocational education (Hanushek et al., 2017; Korpi and Mertens, 2003; Malamud and Pop-Eleches, 2010). Several more recent studies indirectly measure specificity based on the wage differentials of occupational changers (e.g., Coenen et al., 2014) or based on the relative distribution of workers across occupations (Shaw, 1987; Vogtenhubler, 2014). Few studies explicitly analyze the specificity of human capital investments based on subject choices within study programs (e.g. Silos and Smith, 2015; Tchuente, 2016), but no study so far has analyzed differences in the educational content on the level of single skills when measuring specificity.

Our measure relies on the identification of the bundle of single skills learned during an education program. Theoretically, this approach draws on Lazear's (2009) "skill-weights approach," which assumes that all single skills are general but that the combinations and weighting of these single skills, i.e., their uses, in different jobs make skill bundles more or less specific. Comparing the bundle and weights of single skills given by the curriculum of a training program with the required skills and weights in the overall labor market provides us with a specificity measure for this training program.

Our approach is related to and extends the approach of Geel et al. (2011) and Rinawi et al. (2014), who calculate occupational skill bundles and specificity measures using survey data, and data from occu-

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¹ In line with the literature using a task-based approach, we define skills as "a worker's endowment of capabilities for performing various tasks" (cf. Acemoglu and Autor, 2011). This definition includes practical skills as well as theoretical and practical knowledge.

personal counseling services, respectively. While they use data on the occurrence of skills in occupations, our approach is to directly gather skills from occupational curricula and to additionally generate weights for these skills and incorporate these weights into our specificity measure. To test the validity of our specificity measure and its relevance for labor market outcomes and educational policy making, we draw on Lazear's skill weights approach to derive and test hypotheses on the expected labor market outcomes of graduates of more or less specific training programs. In particular, we investigate the longer-term labor market outcomes of these graduates, i.e., their probability of changing occupations, their unemployment durations and their expected incomes, both, in their original occupation and after occupational changes.

For our empirical analysis, we use Swiss vocational education and training (VET) curricula not only because they provide detailed data on the single skills and weights that individuals acquire during their training (as verified by state-mandated examinations), but also because these VET occupations cover more than two thirds of the Swiss labor market. This wide coverage allows us to calculate reliable specificity measures by comparing an occupation's skill weights with those on the overall labor market. If a particular occupation requires skills and weights that are used only in a small number of jobs in the overall labor market, the occupation is defined as specific. However, if a particular occupation requires skills and weights that are used in a large number of jobs, it is defined as general.

Our results show that graduates of occupations with specific skill bundles have a smaller probability of occupational changes and search longer for a new job when unemployed, so that they are less mobile than graduates of general occupations. Yet, our results also show that graduates of more specific occupations earn higher wages as long as they stay in the occupation for which they were trained (the "training occupation"). Thus, we find clear evidence for a trade-off between earning higher returns in more specific occupations and benefitting from a higher occupational mobility in less specific occupations. The economic significance of these results is large, indicating that the specificity of an occupation as measured by our new indicator could be informative for educational and labor market policy.

Our paper makes three scientific and one practical contribution. Our first and most important contribution is that we develop a new measure of occupational specificity that directly links the content of a training curriculum to the labor market specificity of that training. The measure is based on Lazear's skill weights approach and links the bundles of single skills in a given curriculum with the bundles of skills existing in the labor market. Thus, we directly connect the content of training curricula with its specificity on the labor market. By applying Lazear's framework and linking the content of training curricula to the demand in the respective labor market we provide a direct, curriculum-based measure of specificity and contribute to the empirical micro-foundation of the specificity of human capital. In contrast, previous literature has mainly used indirect measures of human capital specificity, such as measures based on worker mobility or tenure. These measures, while very helpful with respect to many empirical questions in labor economics, do not help to draw direct conclusions on the relation between the content of training curricula, their labor market specificity, and the respective labor market outcomes for graduates.

Second, we show that there is substantial variation in the occupational specificity of VET programs and that this makes a difference for the labor market outcomes of graduates. Using our measure, we find that training curricula for some occupations are rather general, whereas others are very specific, and that some types of occupations, which have been assumed to be very specific in the past (for example occupations with small numbers of graduates) can actually be quite general.

Third, our occupational specificity measure provides empirical support for Lazear's skill weights approach because it shows a direct link between the specificity of skill bundles and the labor market outcomes of individuals that invested in this type of human capital. Thus, we provide first-hand evidence that supports Lazear's theory by directly link-

ing the bundles of single skills prescribed in training curricula to labor market outcomes of the respective graduates. We apply the measure to test three hypotheses derived from Lazear's skill weights approach. The skill weights approach predicts that workers with specific training earn a specificity premium if they stay in their training occupation, change occupations less often, and have longer unemployment durations. All three predictions are borne out in the data.

Fourth, as a practical contribution, we provide a specificity measure based on curricula content that is shown to be closely related to real world labor market outcomes. Our specificity measure thus provides an evidence-based tool to evaluate the specificity of occupational training programs. It can help practitioners to develop or revise training curricula, and we briefly discuss under which conditions the measure might help curriculum developers to evaluate the potential outcomes of introducing new or of changing existing training curricula. In particular, our approach allows to measure the specificity of newly developed or revised training curricula before they are even implemented (which is not possible with specificity measures used in previous literature because they rely on historical labor market data). Thus, our measure provides an empirical method that contributes to the development of policy tools to evaluate expected outcomes of introducing new or revising existing training curricula. In this context, one important empirical insight of our analyses is that, when designing new training programs, policy makers have to be aware of a trade-off between higher returns of more specific trainings as long as graduates stay in their occupation versus higher risks of more specific trainings in case graduates need to or want to change their occupation.

The rest of the paper proceeds as follows. [Section 2](#) introduces Lazear's (2009) skill weights approach. [Section 3](#) gives a brief overview of the regulatory aspects of the Swiss VET system. [Section 4](#) explains the empirical construction of our measure for occupational specificity. [Section 5](#) presents our data and dependent variables for measuring labor market outcomes. [Section 6](#) explains our estimation strategy and [Section 7](#) shows our empirical results. [Section 8](#) concludes.

2. Theoretical background: the specificity of occupations

Lazear (2009) presents a theoretical approach that provides an ideal framework for our analysis. His skill weights approach determines human capital specificity at the level of single skills. Lazear's basic assumption is that all single skills are general and transferable across jobs, i.e., firms or occupations, but that each job requires different skills with different weights attached to them. This difference in skill weights across jobs makes a worker's skill bundle more or less specific. The approach assumes no a priori distinction between general and specific human capital. Instead, the key element of the approach is the labor market demand for single skills and specificity only result from differences in skills weights in one job compared to the skill weights that are required in the overall labor market.

To obtain a measure for the specificity of an occupation's skill bundle, we have to consider the skill bundle in an occupation in comparison to the skill bundles in the overall labor market, i.e. in all other available occupations. An occupation is defined as "specific" if the skill weights of that occupation are very different from the skills weights in all other occupations. If the skill weights in an occupation are similar to those in many other occupations, then we define such an occupation as less specific, or "more general." Occupational specificity thus depends on the distribution of occupations in the overall labor market.

Using Lazear's model of specificity allows us to derive three implications for workers' labor market flexibility and wages, implications that also provide us with a test for the validity and accuracy of our specificity measure. First, Lazear's model has implications for the level of wages in more or less specific occupations. While less specific skill bundles facilitate the transfer to occupations outside the individual's occupational domain, a higher degree of specificity implies a higher fit of the training to the required skills in an occupation. This higher fit increases produc-

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