

The Prevalence of Apprenticeships in Germany and the United States

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The educational systems and labor markets of Germany and the United States take different approaches to preparing young people for the workforce. One feature of Germany's workforce development model that has been of interest to policymakers in the United States is the important role played by employer-financed apprenticeships. The United States instead relies mainly on comprehensive general education, with career training largely taking place in community colleges and other postsecondary institutions. Research has pointed to several factors that may foster apprenticeships in Germany to a greater extent than in the United States, including labor-market conditions, social norms, and other circumstances.

There are considerable differences in training options and educational outcomes for young people in the United States and Germany. Compared with the United States, a lower share of the German population has a college degree.¹ Yet the unemployment rate of young people in Germany is far lower than it is in the United States. For Germans age 24 and younger in the labor force, the unemployment rate in 2012 averaged 8.1 percent, half the 16.2 percent youth unemployment rate in the United States during the same period.² One factor that appears to smooth the transition from school to work for young people in Germany and some other European countries is the institution of apprenticeships—an educational path, commonly known as the “dual system,” that combines schooling with employer-funded workplace training.

Policymakers, economists, and commentators in the United States have long been interested in

the apprenticeship model as a means of reducing youth unemployment.³ It also is viewed by some as a means of addressing the need of employers, even in a time of relatively high unemployment, to find workers with the right skills. Apprenticeships remain far less common in the United States than in Germany, however. The prevalence of apprenticeships has been a puzzle to researchers because the incentives of employers to fund such training are not obvious.

This *Economic Brief* reviews research that, taken as a whole, suggests that the decision of employers to invest in apprenticeships may depend on specific labor market conditions, social norms, and other circumstances. It describes the institutional arrangements under which apprenticeships prevail in Germany and contrasts those with the arrangements under which young people transition to jobs in the United States. The comparison suggests that the prevalence of

apprenticeships in Germany relative to the United States may be associated with broader differences in institutional arrangements and social factors in the two countries.

Apprenticeships in German Vocational Education

Vocational training in Germany is one of two tracks available to students in secondary education. Setting aside some regional variations, the broad outline of the German system is that after four years of elementary education (that is, starting at around age 10), students interested in university education attend a *Gymnasium*; those interested in vocational training attend a *Hauptschule* or *Realschule*, with the latter at a more advanced academic level.⁴ In Germany, as in other European countries, the vocational pathway is predominant. Of all students completing general schooling each year, two-thirds enter the apprenticeship system.⁵ There is mixing of tracks; some *Realschule* graduates go on to a *Gymnasium*, while some *Gymnasium* graduates go on to apprenticeships.

Youth on the vocational track normally start their apprenticeships at around age 16, choosing from among programs leading to any of 350 nationally recognized occupational certificates. This training takes two to four years. The students spend one or two days per week at public vocational schools and three to four days per week working and training within firms. Employers pay apprentices a wage for their work. The Vocational Training Act of 1969 and subsequent legislation have established minimum requirements for the quality and curricula of employer-provided training. Employers' associations, trade unions, and government institutions develop the curricula.⁶ Participation by employers in the apprenticeship system is voluntary, yet a considerable number of German firms offer apprenticeships.⁷

At the end of apprenticeships, students must pass standardized examinations that cover both practical and theoretical knowledge. Students who pass receive a skilled worker's certificate. Between 50 percent and 60 percent of apprenticeships each year lead to regular employment at the sponsoring firms.⁸ For the other students, the certificates can serve as a valuable signal of their credentials.

The cost of apprenticeship training is shared. The classroom training is part of the public school system, so its cost is borne by taxpayers; the on-the-job training cost is incurred by the employers; and apprentices share part of the cost by accepting lower wages throughout the training. Nonetheless, the cost incurred by employers participating in the apprenticeship programs may be significant, especially in larger, more industrial firms.⁹

Reconciling German Apprenticeships with Economic Theory

Economic theory suggests that in perfectly competitive markets, employers would not pay for general training (that is, training in skills that are not specific to one firm) because it is less costly for them to hire skilled workers who have been trained elsewhere. Moreover, employers who sought to recoup their training costs by paying below-market wages to the workers after their training periods would lose those workers to rival firms. Indeed, evidence from Switzerland—which has an apprenticeship system similar to Germany's—indicates that firms are less willing to pay for general training in regions where rival firms are concentrated (that is, where there is industry agglomeration), corroborating the notion that concerns about poaching affect firms' training decisions.¹⁰

Thus, to account for the prevalence of German apprenticeship programs, the economic literature has pointed to various labor market imperfections. Central to the argument is that firms have to be able to pay workers a wage that is lower than their marginal product to recover the costs of training. (In other words, the firms earn labor market "rents.") In addition, the wage structure has to be compressed—the gap between wages and marginal product needs to be higher for more-skilled workers—so that firms prefer high-skilled workers and have an incentive to increase worker skills through training.¹¹ Research has suggested that asymmetric information, the influence of unions and work councils, and a high cost to employees of mobility between firms are labor market imperfections that possibly contribute in Germany to labor market rents for firms and a compressed wage structure. But a unified explanation for the prevalence of apprenticeships within countries remains elusive.¹²

Asymmetric information and high firing costs. For the employer, apprenticeships can yield detailed information about workers' on-the-job skills—information that would not be evident from their academic performance alone. Apprenticeships can help employers identify the most productive workers while paying them less than prevailing wages—and they enable employers to act on that information by extending regular job offers only to those workers—but the net economic benefit of doing so depends on other costs of running the program. Information about employees' performance becomes particularly important if employers face high firing costs for regular workers. In the German context, high firing costs may have been a factor historically in the growth of the dual system, but this motivation may have declined as reforms have made it easier to bring new workers in under fixed-term contracts, minimizing the cost of firing within what is effectively a probationary period.¹³

In addition to asymmetric information about employee quality, participants in the labor market also have asymmetric information about employer quality. There is reportedly a perception among skilled blue-collar workers in Germany that apprenticeship programs are an indicator of a high-quality employer, and such programs may therefore aid in recruiting both apprentice and nonapprentice employees.¹⁴

Unions and work councils. The presence of strong unions may increase the return on apprenticeships. Unions with strong bargaining power are believed to foster compressed wage scales to the benefit of less-skilled workers.¹⁵ In addition, work councils, which are elected in each plant by employees and usually have unofficial ties to the union, may influence wage agreements in a manner that leads to higher pay for internally trained workers.¹⁶ It is noteworthy, however, that apprenticeships are also in use in nonunionized industrial establishments, for example, in the United States. (See below.)

Mobility. Young people in Germany change jobs relatively infrequently. Several reasons may account for the low worker mobility, such as search costs to find a new employer, which may exceed the benefits if the variability in wages across employers is low.¹⁷ In addition,

if a job switch entails moving to another locale, the worker may find such a prospect unappealing, thus leading to an implicit mobility cost in addition to whatever direct moving costs are not covered by the prospective new employer. Whatever the reason for the lack of churn in the German labor market, the resulting “stickiness” of the worker's initial job match increases the employer's expected return on an investment in apprenticeship. The employer can invest in apprenticeships with less concern that the trained workers may be poached.¹⁸ As noted, however, up to half of all apprentices find jobs outside their sponsoring firm, which suggests that some firms choose to offer apprenticeships despite a nontrivial risk that their trained workers will leave.

Beyond these and other labor market imperfections, there is some evidence—although not quantified—that decisions of German employers to invest in apprenticeships are influenced by views of duty. Some German executives reportedly perceive a norm in favor of such training, and that to meet these “social expectations,” companies may be willing to sponsor apprenticeships “even though they could increase their own profits by eliminating their apprenticeship programs and hiring apprentices trained elsewhere.”¹⁹ Research has shown that even if two countries have the same degree of asymmetric information and wage compression, different levels of commitment to training may result in different outcomes.²⁰

Training Patterns for Young Workers in the United States

Apprenticeships along the lines of the dual system are uncommon in the United States and are concentrated in the construction trades. The principal federal program coordinating apprenticeships, the Department of Labor's Registered Apprenticeship program, reports that only 44,348 workers graduated from the U.S. apprenticeship system in fiscal 2013; the United Services Military Apprenticeship Program, geared for active-duty service members, graduated another 8,194.²¹ In its peak year of the 2000s, fiscal 2004, the Registered Apprenticeship program had a still-modest 63,037 graduates. (These figures do not include jobs that are referred to as apprenticeships but do not follow the dual-system model.) One

pocket of growth in U.S. apprenticeships has been in subsidiaries of European-owned industrial firms with plants, typically nonunionized, in North and South Carolina;²² this model has not spread broadly to U.S. firms, however.

In contrast to Germany, labor markets in the United States are more competitive. Unions represent only a small fraction of the workforce and have a more limited ability to influence wages. Flexible wages, low firing costs, and relatively high worker mobility may result in lower incentives for U.S. firms to invest in worker training through apprenticeships.

The educational systems in the two countries differ, as well. Vocational “tracks” are not popular in U.S. high schools.²³ Rather, the U.S. system predominantly focuses on comprehensive general education. One argument for this type of education is that it better enables workers to learn even in later stages of their careers, whereas specific skills are more prone

to depreciation and less adaptable to technological changes.²⁴ In U.S. high schools, students can acquire vocational skills through career and technical courses, which are generally taught without significant involvement by employers.

Most vocational training in the United States is offered at the postsecondary level, where students can obtain credentials in a variety of fields through community colleges and other organizations. (See Table 1.) Over 4 million Americans received vocational certificates in 2012 from community colleges alone. Many recipients are adults rather than recent high school graduates.

One aspect of the German model that may prove helpful in fostering demand for apprenticeships in the United States is that of nationally transferable certifications. One reason why workers in Germany are willing to share the cost of training by accepting lower wages during the period of apprenticeship is

Table 1: Characteristics of U.S. Education Certificates, 2012 (Numbers in Thousands)

Type of School or Organization That Provided Certificate Program	Number	Percent
Trade, vocational, technical, or business school	6,051	32.2
University or college other than community college	5,269	28.0
Community college	4,072	21.7
Business or company	872	4.6
Professional organization	848	4.5
Federal, state, or local government	688	3.7
Trade union	207	1.1
Military	155	0.8
Nonprofit organization	76	0.4
Other	566	3.0

Top Five Fields of Study	Number	Percent
Education	2,335	12.3
Nursing	1,978	10.4
Health professions, except nursing	1,681	8.8
Mechanic and repair technologies	1,022	5.4
Computer and information sciences	1,019	5.4

Source: Ewert, Stephanie, and Robert Kominski, “Measuring Alternative Educational Credentials: 2012,” U.S. Census Bureau, 2014.

that there is a nationally recognized skill-certification process upon completion of the program.²⁵ Such a transferable certification process may be of value in the United States to the extent that the more varied U.S. certification system may make it more difficult for employers to assess the value of particular certificates. Still, some economists suggest that within the context of the U.S. labor market, training that is primarily worker-financed may be more appropriate. They recommend that occupation-specific training for young people be expanded through community colleges with input from local employers.²⁶

Comparison of Labor Market Outcomes

Compared with their German counterparts, young people in the United States encounter higher unemployment rates, much higher job turnover, and longer job searches. From age 15 through 24, young men and women in the United States hold an average of 8.6 and 7.6 jobs, respectively, compared with 2.9 and 2.2 jobs in Germany.²⁷ While the high rate of churning in the United States may introduce volatility into the labor market for youth, some argue that this process is productivity-enhancing because it allows workers ultimately to find better-matched jobs.²⁸ Even though American young people receive less formal training within this process than their German counterparts, on average they realize similar or larger wage gains, especially later in life.²⁹ In addition, comparison of lifetime earning profiles of German apprentices and U.S. high school graduates shows that while German apprentices earn more initially, their U.S. peers enjoy faster wage growth from age 21 through 30, and their wages exceed those of their German counterparts after the age of 40.³⁰ To be sure, numerous other differences in the economies of the two countries make it difficult to draw firm conclusions about the effects of the two training systems on long-term outcomes.

Conclusion

The German labor market for youth is characterized by a dual system in which students acquire career-specific skills through employer-financed apprenticeships as part of their secondary education. Research suggests that the willingness of employers to invest in such training may be a consequence of both labor

market imperfections and social norms in Germany, though a unified explanation for the prevalence of apprenticeships still eludes researchers. In contrast, the education system in the United States relies mainly on comprehensive general education at the secondary level, with most career-specific training taking place in community colleges and other post-secondary institutions. ■

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Endnotes

¹ According to the Organisation for Economic Co-operation and Development (OECD), in 2011, 28 percent of the German population age 25 through 64 had completed tertiary education, compared with 42 percent in the United States. In the 25 through 34 age group, 28 percent of Germans and 43 percent of Americans had completed tertiary education. See *Education at a Glance 2013*, Table A1.3a, Paris: OECD Publishing, 2013.

² "Youth Unemployment Rate," *Employment and Labour Markets: Key Tables from OECD*, 2013.

³ For example, see Lerman, Robert I., "Expanding Apprenticeship: A Way to Enhance Skills and Careers," Urban Institute, October 2010; and Downs, Peter, "Can't Find Skilled Workers? Start an Apprentice Program," *Wall Street Journal*, January 17, 2014, p. A13.

⁴ For more details, see Soskice, David, "Reconciling Markets and Institutions: The German Apprenticeship System" in *Training and the Private Sector: International Comparisons*, edited by Lisa M. Lynch, Chicago: University of Chicago Press, 1994, pp. 25–60.

⁵ See Biavaschi, Costanza, et al., "Youth Unemployment and Vocational Training," IZA Discussion Paper No. 6890, 2012, p. 33.

⁶ Biavaschi et al., 2012

⁷ Among the firms registered with the Chamber of Crafts or Chamber of Commerce, roughly half are authorized to participate in the dual system, and around half of those actually do so, according to Biavaschi, et al., 2012.

⁸ Biavaschi et al., 2012

⁹ Soskice, 1994

¹⁰ Muehlemann, Samuel, and Stefan C. Wolter, "Firm-Sponsored Training and Poaching Externalities in Regional Labor Markets," *Regional Science and Urban Economics*, November 2011, vol. 41, no. 6, pp. 560–570.

¹¹ Acemoglu, Daron, and Jörn-Steffen Pischke, "Beyond Becker: Training in Imperfect Labour Markets," *Economic Journal*, February 1999, vol. 109, no. 453, pp. F112–F142.

¹² See Wolter, Stefan C., and Paul Ryan, "Apprenticeship" in *Handbook of the Economics of Education*, edited by Eric A. Hanushek et al., vol. 3, Amsterdam: Elsevier, 2011, p. 530.

¹³ Harhoff, Dietmar, and Thomas J. Kane, "Is the German Apprenticeship System a Panacea for the U.S. Labor Market?" *Journal of Population Economics*, June 1997, vol. 10, no. 2, pp. 171–196.

¹⁴ Wolter and Ryan, 2011

¹⁵ Acemoglu and Pischke, 1999

¹⁶ Soskice, 1994

¹⁷ See Wolter and Ryan, 2011; and Winkelmann, Rainer, "How Young Workers Get Their Training: A Survey of Germany versus the United States," *Journal of Population Economics*, June 1997, vol. 10, no. 2, pp. 159–170.

¹⁸ Harhoff and Kane, 1997

¹⁹ Harhoff and Kane, 1997

²⁰ See Dustmann, Christian, and Uta Schönberg, "What Makes Firm-Based Vocational Training Schemes Successful? The Role of Commitment," *American Economic Journal: Applied Economics*, April 2012, vol. 4, no. 2, pp. 36–61.

²¹ See Employment and Training Administration, U.S. Department of Labor, "Registered Apprenticeship National Results."

²² See Jacobs, Rose, "Germany Exports Its Apprenticeship Model," *Financial Times*, January 24, 2014; and Schwartz, Nelson D., "Where Factory Apprenticeship Is Latest Model from Germany," *New York Times*, November 30, 2013.

²³ See Kuczera, Malgorzata, and Simon Field, *A Skills beyond School Review of the United States*, Paris: OECD Publishing, 2013.

²⁴ See Krueger, Dirk, and Krishna B. Kumar, "Skill-Specific Rather than General Education: A Reason for U.S.-Europe Growth Differences?" *Journal of Economic Growth*, June 2004, vol. 9, no. 2, pp. 167–207.

²⁵ See Acemoglu, Daron and Jörn-Steffen Pischke, "Certification of Training and Training Outcomes," *European Economic Review*, 2000, vol. 44, no. 4–6, pp. 917–927.

²⁶ See Lynch, Lisa M., "The Economics of Youth Training in the United States," *Economic Journal*, September 1993, vol. 103, no. 420, pp. 1292–1302; and Acemoglu, Daron, and Jörn-Steffen Pischke, "Why Do Firms Train? Theory and Evidence," *Quarterly Journal of Economics*, February 1998, vol. 113, no. 1, pp. 79–119.

²⁷ These estimates are based on studies tracking work experience of youth between 1979–88 in the United States and 1974–84 in Germany as shown in Ryan, Paul, "The School-to-Work Transition: A Cross-National Perspective," *Journal of Economic Literature*, March 2001, vol. 39, no. 1, pp. 34–92.

²⁸ See Heckman, James J., "Is Job Training Oversold?" *Public Interest*, Spring 1994, no. 115, pp. 91–115.

²⁹ See Topel, Robert H., and Michael P. Ward, "Job Mobility and the Careers of Young Men," *Quarterly Journal of Economics*, May 1992, vol. 107, no. 2, pp. 439–479.

³⁰ Harhoff and Kane, 1997

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