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Thomas F. Remington

**Public-Private
Partnerships in VET:
Translating the German
Model of Dual Education**



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Around the world, governments, educators and businesses have expressed growing interest in German-style methods of vocational education (VET). In such countries, schools and firms share responsibility for providing technical and vocational education through apprenticeship training, a system often called "dual education." Dual education's appeal is two-fold. As an integral component of economic development, it serves to maintain a highly-skilled labor force meeting the needs of a technologically sophisticated industrial economy. As a mechanism for social integration, it has also proven to be an effective way to integrate young people into the workforce, keeping youth unemployment low. Dual education ensures a close fit between the demands of a dynamically changing economy and the skill profiles of those graduating from educational institutions. Little wonder that many countries have turned with renewed interest to the dual education system. However, actual implementation of the dual education outside the core Germanic countries in Europe has proven to be extremely challenging. While a number of national governments have devised grand planning documents calling for "upgrading VET," "firm-school cooperation," "practice-oriented vocational education" and "dualization," successful examples of institutional transfer are rare, at least at the national level. However, in some countries, local partnerships embracing elements of dual education have formed. This paper discusses some of the characteristic patterns of such partnerships and the pathways leading to their formation. The paper focuses particularly on the US case.

Key words: Vocational Education and Training (VET), Dual education, Public-Private Partnerships, USA.

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THE PROBLEM OF SKILL MISMATCHES

Ineffective VET systems result in significant mismatches between the demand for and supply of skill in a national or regional labor market. Scholars argue that one reason some countries remain trapped at the middle-income level of development is significant unevenness across sectors and regions in the quality of VET, with little diffusion of successful practices from one sector to another [Doner, Schneider, 2016]. As recognition of the importance of well-functioning systems of skill formation has risen, experts and policy-makers in many countries in international organizations have called for devoting more attention to upgrading the quality and effectiveness of vocational education and training (VET). In particular, policy-makers have urged closer cooperation between employers and schools (e.g. see [OECD, 2010]). They seek to adapt elements of the German and other continental systems where apprenticeships are the most common pathway leading from school to jobs. Dual education serves both economic and social purposes: it helps to ensure a continuous supply of qualified workers matching the employment demands of technologically advanced industrial economies. At the same time it helps to integrate society by easing the transition from school to employment. The youth unemployment rate in Germany in 2016, for example, at 7%, was less than half that of the EU average of 18.75% (<https://data.oecd.org/unemp/youth-unemployment-rate.htm>).

Dual education systems in the German-speaking countries rest on a series of partnerships operating at the macro-, meso- and micro-levels. At the macro-level, they are the outcomes of bargaining among business, labor, and government over the distribution of the costs and benefits of investment in training. At the meso-level of regions, industrial associations, and branch-based labor unions, they reflect the delegation of public functions to organizational actors such as industrial-trade and crafts business chambers that administer and supervise VET. At the micro-level of firms, schools, and individuals, dual education resolves a series of types of collective action dilemmas, particularly coordination among firms over professional standards and training obligations, and

those tying firms to state bodies such as education departments and schools. As the classical economic literature on human capital formation argues, firms are typically reluctant to devote resources to training beyond the immediate needs of the firm out of a reasonable fear that other firms can free-ride on their training efforts. Deeper co-investment by individual employees and firms in job-specific and industry-specific training may require some guarantee to both sides that the resources invested in training will yield a longer-term return; social insurance mechanisms protecting the value of such skill against the loss of employment income may help induce such joint investment [Estevez-Abe, Iversen, Soskice, 2001; Iversen, Soskice, 2001]. However, in many countries lacking the thick fabric of institutional complementarities characteristic of European-style coordinated market economies, alternative institutional mechanisms may help to motivate joint investment in sector-specific skill by market actors. Such alternative arrangements are more likely to be found in countries featuring regional and local economic competition. Large countries such as the United States, Russia and China thus furnish favorable conditions for such locally-based models to arise.

In the United States, experts and government officials have been calling for a major shift in public educational spending to more vocationally-oriented programs. This movement is driven by both economic and social problems. Economically, there is rising recognition of a mismatch between the available supply of skilled labor and the demand for it; socially, rising inequality has created greater barriers to social and geographic mobility. A 2011 report by the Harvard Graduate School of Education, entitled “Pathways to Prosperity,” emphasized that many of the new jobs that will be created in coming decades will require high levels of knowledge and skill, but that the existing system of education was failing to produce the numbers and types of graduates needed. Middle-skill jobs are disappearing, while jobs requiring postsecondary credentials were increasing. Meantime, the nearly half of young people who lack any usable postsecondary educational credentials is suffering declining wages and employment [Pathways to Prosperity..., 2011]. As the Harvard report observes, the share of teens and young adults hold-

ing jobs is at the lowest point since the end of the Great Depression of the 1930s, and a majority of young adults lack even an associate's degree [Pathways, 2011, p. 1–2; Holzer, 2015]. Although the great majority of young people express an aspiration to go to college, 40% failed to obtain a bachelor's degree within six years of matriculation. By the time they have reached the age of 27, only about 40% of young people have earned an associate's degree or higher. Another 10% or so have earned a certificate. Experts have called those remaining as “the forgotten half” [Halperin, 1988]. This population has seen declining starting wages and slowing wage growth, particularly for men [Guvenen et al., 2017].

The “pathways” movement has attracted some controversy because it explicitly rejects the ideal of “college for all.” However, the Harvard report points out that “27% of people with post-secondary licenses or certificates—credentials short of an associate's degree—earn more than the average bachelor's degree recipient.” [Pathways, 2011, p. 3] This suggests that the problem in the US is less one of a “skills shortage” than a “skills mismatch”—too many people with qualifications that are poorly suited to the job market or who have inadequate opportunity to obtain the right skills in the first place [Stern, 2015]. A report by the New York Federal Reserve Bank in 2014 found that 44% of young people with four-year college degrees were underemployed. They were either involuntarily employed part-time, or held full-time jobs that did not require a college degree. Another 9% were unemployed [Schwartz, 2016, p. 745]. Many experts, including the authors of Harvard Pathways project, have therefore been working active to promote “career-plus-college readiness pathways” programs throughout the country. Many believe the US should adopt apprenticeship programs, as in Germany and Switzerland [Hoffman, Schwartz, 2015; Newman, Winston, 2016]. Modified apprenticeship-type programs are springing up around the country, organized around partnerships between schools and employers. These initiatives are based on the premise that high schools should provide students both with postsecondary-level academic credits equipping them for college if they choose, and with real-world practical experience and training provided by firms [Schwartz, 2016]. Numerous experts have therefore urged employers, governments and schools to

work together cooperatively to upgrade training and match skill formation with the changing demands of the labor market. In nearly all cases, the advocates of career-plus-college pathways call for modification of school curricular programs, deeper involvement by employers in setting curricular and occupational standards and in providing workplace-based training, active support by local government, and the formation of a coordinating body to serve as intermediary among schools, employers and government. Before turning to some examples, however, it is worth reviewing the core elements of the German apprenticeship system.¹

DUAL EDUCATION IN THE GERMAN-SPEAKING WORLD²

Dual VET refers to the practice of dividing vocational education and training between school-based and workplace-based sites. In Germany, dual VET grew out of a long history of guild-based apprenticeships, class conflict and bargaining, industrial modernization during and after World War II, and multiple refinements in recent decades [Thelen, 2004]. The system is highly regulated. Under federal law, 70% of the time spent by trainees is devoted to practical training (both on the job

¹ Dual education is characteristic of a number of German-speaking countries and countries with a similar heritage of apprenticeship-based training, such as Austria, Switzerland, Denmark, and Netherlands, as well as Germany. Organizational details vary somewhat across countries. Rather than generalizing broadly, I will concentrate on the German system.

² This account is based on interviews with officials and experts in Germany at the Bundestinstitut für Berufsausbildung (BIBB), the Gesellschaft für Internationale Zusammenarbeit (GIZ), the and Volkswagen, as well as a conference on “Work-Based Learning as a Pathway to Competence-Based Education,” sponsored by BIBB and UNEVOC, Bonn, Germany, June 22–23, 2017. In addition, materials published by the German Office for International Cooperation in Vocational Education and Training (GOVET) provided useful basic statistical information.

and in dedicated training facilities) and 30% in school. The breakdown of the curriculum is also roughly 2/3 occupational (following a framework curriculum for VET), 1/3 general subjects.

Individuals enter dual VET programs from several paths. Some start after completing a lower secondary school degree (*Hauptschule* or *Realschule*), others after completing a higher secondary (*Gymnasium*) or a post-secondary degree program. A smaller number start careers after attending a technical school rather than a dual education program. Altogether, around half of those starting a career have gone through dual education. Of the workforce between the ages of 25 and 40, over half have received VET training in the dual education system, another 10% have other technical school degrees, around a quarter have higher educational degrees, and only 13% lack a specific occupational qualification. Although the number of apprenticeship contracts signed each year has been steadily declining for the last 15 years, the dual education system remains the principal way young people acquire occupational qualifications.

Only about 20% of firms offer apprenticeships. Most of these are small and medium-sized firms, few of which maintain their own dedicated training facilities. Only large firms such as Volkswagen, Siemens and Bosch can afford to run separate training academies and workshops. Most companies that do offer training contract out the work to specialized training companies such as inter-firm training centers, or use part-time trainers. Nonetheless, the scale of the national commitment to VET may be judged by the fact that some 16% of the total workforce in the country work as trainers on a full- or part-time basis. Moreover, dual education system serves a large number of sectors, not just manufacturing. Although 60% of apprentices work in manufacturing, over a quarter are in crafts production, and smaller numbers work in the free professions, agriculture, public services and other occupations. Dual VET is offered in 329 occupations. It is important to recognize that these are defined broadly. Particular attention is given to providing “competencies” rather than narrow skill profiles. Competencies are understood to refer to the ability to apply knowledge to a range of tasks rather than to be able to perform a single job-specific or industry-specific task.

Business chambers play a central role in the dual VET system. There are 80 such chambers in all, some organized by industry, others by craft. Chambers combine sectoral and regional principles of organization (for example, the Stuttgart industry-trade council represents the industries of Stuttgart, of which the automobile-manufacturing cluster is particularly important). Each chamber has a specialized council for overseeing skill development, and some skills councils oversee multiple professions. The combination of sectoral and regional organization within the chambers helps promote sharing of information and perspectives across industries. It also reinforces the concept that a profession need not be confined to a particular industry.

Chambers have both public-law and private-law status. Businesses are required by law to belong to chambers and in turn federal law assigns the chambers substantial responsibility for VET. The chambers, through their member dues, provide a little over half of the total financing of VET, with government providing the balance.³ Individuals do not pay for their own training. The chamber system has a number of implications: it ensures standardization of training methods and content, independent assessment of the qualifications of individuals during the course of and at the end of the training period, and provision of a pool of workers with industry-recognized qualifications. The chamber system helps ensure that the interests of small and medium-sized firms are not overshadowed by large enterprises. The costs and benefits of the dual education system are thus broadly shared by all firms in a given sector. Chambers have their own skills councils that set standards, oversee examinations and issue certifications that are recognized by the federal government. They also train and evaluate the trainers, monitor the training carried out by firms, register the training contracts with individual apprentices, and mediate disputes between trainees and companies. Critically, the chamber system overcomes any tendency for individual firms to shirk from providing training in the fear that other firms will poach their train-

³ The government's funding is split between direct support for schools—representing about 54% of the total—and oversight and administration of the system.

ees. All firms, large and small, benefit from the existence of a pool of skilled labor in their sector and region. Individual firms take advantage of the fact that they have the opportunity to observe the performance of individual trainees; 2/3 of trainees end up being hired by the company where they did their practical training. Chambers thus play a critical role as intermediaries among schools, individual employers, government, and individual apprentices.

The negotiated compromises among the stakeholders in dual VET distribute the costs and benefits of training across employers, employees and taxpayers. For example, the training allowances paid to apprentices are closely regulated. Trade unions want to protect their members and ensure that apprentices are not used to displace full-time workers. Companies want to recoup the cost of training. Under federal guidelines, therefore, companies set the training allowance in rough proportion to the value contributed by the apprentice to production each year. The interests of apprentices are protected through training contracts regulated by the chambers. Companies spend approximately 18,000 Euros per year on each apprentice. The total cost of VET is over 25,000 Euros per year, taking all employers and government expenditures together (about 13.4 billion Euros per year for slightly over a half million apprentices each year). Nationally, then, dual VET represents an enormous social investment. The Federal Institute for Vocational Training (Bundesinstitut für Berufsausbildung, or BIBB) acts as a kind of “VET parliament,” where all the major stakeholders are represented—the federal and Land governments, trade unions, and employer associations. BIBB develops policy recommendations reflecting the common interests of the stakeholders.

In short, dual education in Germany—as in the other countries where it is the predominant method for skill development—rests on a series of partnerships among governments at different levels, schools, firms and employer associations, and trade unions [Hoffman, 2011]. At the national level, a government body such as an education ministry oversees that education meets uniform quality standards. Government delegates to sectoral and regional business associations the responsibility for determining the qualifications required for occupations in their branches of

the economy, and business chambers—membership in which is mandatory for business enterprises—directly administer the determination of professional qualifications and assessment of competence. Trade unions and enterprise-level works councils represent the interests of trainees and employees. A strong culture of consensus seeking attenuates frictions and encourages cooperative solutions to conflicts of interest among the social partners. Complementary social institutions, such as generous social insurance and old-age income schemes, help to guarantee that the costly co-investment in VET by employers, workers, and taxpayers will pay off in the event of economic downturns.

Given the closely interlocking and historically co-evolved institutional complementarities that underpin the dual VET system in Germany and other similar countries, the question arises of how equivalent partnerships among firms, schools, and governments might form in countries lacking such a framework?

BUILDING PARTNERSHIPS BETWEEN EMPLOYERS AND SCHOOLS

As the literature on fiscal federalism has shown, regional decentralization can encourage local experimentation if economic and political leaders of regional units compete for investment resources or political advancement [Weingast, 1995]. In countries such as the United States, China and Russia, competitive pressures induce regional actors to devise new institutional arrangements to foster economic development by improving the match between VET and local labor markets. Where they are established, such arrangements can afford local solutions to the collective dilemmas outlined above. Even in countries where large-scale national programs to upgrade VET have fallen short of their goals, local partnerships among firms, schools, and governments may succeed.

Examination of such partnerships suggests that they vary along two dimensions—breadth or scope of participation, and depth of commitment on the part of the organizational partners. In “broad” arrange-

ments, multiple firms cooperate with government to align the common VET needs of a group of firms in the same industry with the VET provided by local educational institutions. Multi-firm cooperation in training helps to form a pool of skilled labor from which all firms, large and small, can recruit and allows firms to avoid competing for labor on wages. Broad partnerships can vary as to how costly is the investment made by individual firms and schools. Those that are both broad and deep are sometimes called “collectivist” or “solidaristic” [Swenson, 2002; Thelen, 2004; Busemeyer, Trampusch, 2012] because they commit multiple firms to contributing to practical training in cooperation with school-based training. This alleviates the problem of underprovision of training out of employers’ fear of poaching.

Depth refers to the costliness of the commitment made by firms and schools to cooperation in training. Deep commitments require both sides to make an investment of time, effort and material resources in matching their training efforts that may be recouped only over a long period of time. Firms may supply training equipment to schools, provide hands-on practical training at training centers or on the production floor, provide specialists for instruction at schools, collaborate with schools in revising curricular content and standards, evaluate the proficiency of graduates, and help meld occupational proficiency standards with the curricular requirements set by government education bodies. Deep investment by the schools is also required, as they revise their educational programs, retrain instructors, and place greater emphasis on practical training of students. For many schools, such collaboration with employers forces them to emphasize their role in economic development at the expense of their social responsibilities as schools of last resort for problem students and sources of retraining for laid-off workers.

Plotting these two dimensions against each other yields a two-by-two matrix of four ideal types (Fig. 1).

In the upper right quadrant are solidaristic European models of VET, as found in Germany, Austria, Switzerland, Denmark Norway, Netherlands, and other countries. Solidaristic systems with high commitment on the part of employers, schools, government and society, tend to arise in countries whose economies depend on high value-added ex-

ports. Historically, bargaining among centralized associations of employers and trade unions has played out at the national level. As Peter Katzenstein showed, in smaller northern European states that are highly dependent on global exports tend to build institutions to share the gains and costs of maintaining internationally competitive industries across business and labor [Katzenstein, 1985]. In such systems, intermediary organizations such as business chambers play a central role in coordinating the interests of individual firms, regional and national government agencies, schools, and labor.



Fig. 1. Models of VET

In the bottom left quadrant of the matrix are “liberal” systems where there is low cooperation between employers and schools and little coordination among firms over the content and methods of VET. To a considerable extent, regions in Russia, China and the US fall into this quadrant. Local and regional governments, acting through community colleges or technical high schools and colleges, are the principal suppliers of VET. For the most part, firms meet their skill needs by hiring from the market or providing in-house training. Consequently, in the US, Russia and China, governments seeking a deeper joint investment in VET on

the part of schools and employers must find functional equivalents for the elements that make dual education work in Germany. VET systems tend to be located in the bottom left quadrant, where there is little coordination across firms and only limited joint investment by firms and schools. Few schools provide systematic internship opportunities, and apprenticeships are the exception rather than the rule. Currently in the US, only around 400,000 people are participating in registered apprenticeships, out of a workforce of 160.2 million people [Helmer, Conway, 2014, p. 325].

In some regions of the US, Russia, and China, we observe consortial partnerships (i.e. the top left quadrant). Organizational partners—firms and schools—make relatively modest joint investments of time, effort, and material resources into training practices serving the needs of a set of employers. Groups of firms representing a particular industry located in a given region agree on the standards required for certification and licensing in their industry, and may offer internships or other forms of workplace-based learning. Coordination occurs through the formation of an organization such as a sectoral council which then works with a group of local VET institutions at the secondary and tertiary level to ensure that the VET curriculum matches the needs of industry for entry-level and mid-skill jobs. In Western Massachusetts, for example, small firms in the nanotechnology and biotechnology fields have formed “the Massachusetts Advanced Manufacturing Collaborative,” which, among other things, works to align the curriculum of VET institutions with the needs of member firms as well as to create a pilot apprenticeship program [Jackson, 2015].

Another type of consortium arrangement is found in Greenville County, South Carolina. Here, starting in the 1950s and 1960s, in response to the long-term decline of the agriculture and textile industries, local business and government officials began looking for ways to attract foreign investment in high-skill, high-wage industries. Recognizing that tax incentives alone would be inadequate to induce foreign direct investment in manufacturing, civic and business leaders at the local and state level agreed to invest heavily in postsecondary technical education. Greenville Technical College became the motor of the county’s economic de-

velopment strategy. Overseen by a county-appointed board on which the county school district superintendent, the county Workforce and Investment Board, and major individual firms are represented, the Technical College works closely with firms to develop curricula tailored to their needs. But rather than simply provide customized training services to particular firms, the college converts new technical courses into industry-oriented curricula that can serve multiple firms in the same industry. The county and state work closely together, so that successful practices at the local level can be scaled up to the state level, while state-level programs (such as state subsidies to firms that offer apprenticeships) can be adopted locally. The county and state also tap federal workforce development and career-and-technical education funding. The Greenville example is more successful than many, but shares some common characteristics to consortial arrangements found in the US South: trade unions are simply not part of the partnership; the local community college is the core of the cooperation among business, government, and education; multiple firms cooperate with government for the benefit for economic development in the region; and an intense shared perception of competition with other counties helps fuel cooperation across the local, state and federal levels.⁴ A county area development commission is empowered to link business and education as well as to work with prospective foreign investors to ensure that their skill needs will be met.

Another common partnership arrangement found in the US, Russia, and China is the “parental” model (the bottom right quadrant of the figure). Here a single big firm acts as the anchor. If such a firm dominates the local labor market, poaching of skilled workers by other firms recedes as a threat. Usually with the encouragement of local government, local education authorities work with the firm to ensure that the education and training provide not only firm-specific skills, but also more generic skills and knowledge that are transferable to other firms in the industry. In the case of parental relationships, the school depends heavily on its parent firm for material support, such as training equipment,

⁴ This summary is based on my own research and a set of interviews in December 2016 with policy-makers and experts in Greenville.

maintenance of facilities, stipends to instructors, practical instruction, and employment of their graduates. Note that parental arrangements are found in Germany as well, as when smaller partner firms rely on a larger “lead” firm (*Leitbetrieb*) to meet training needs for the industry in a given region. The parent firm thus ensures that the classroom instruction at the school complements the workplace-based learning at the firm.

The United States has parental-type partnerships in a number of regions. A notable example is the P-TECH partnership between IBM, the New York City Education Department, and the City University of New York, to provide knowledge and practical training for mid-skill jobs in fields such as IT.⁵ Designed as a six-year program (grades 9–14), each student participating graduates with both a high school diploma and an associate (i.e. 2-year postsecondary) degree in a technical field such as computers or engineering. Students also have workplace-based learning experiences such as internships offered by partner firms. The success of the initial P-TECH program in Brooklyn, New York, where IBM was the lead firm, has persuaded the state to replicate it throughout New York State.

Such parental relationships also develop when European manufacturing firms locate plants in the United States. For example, large German firms such as Volkswagen typically seek to replicate the German system of dual education as much as possible when they invest in production facilities outside Europe. As in Germany, VW’s model of training is to complement classroom instruction at the technical college with on-the-job training at training centers located at or near the production facility and “learning stations” and master-instructor supervision on the production floor. These arrangements are quite similar wherever Volkswagen operates assembly plants outside Germany. In the US, where Volkswagen has established a large assembly plant in Chattanooga, Tennessee, the firm has a close and deep partnership with the Chattanooga Community College. In Russia, Volkswagen built an assembly plant in Kaluga oblast’, where it works with the Kaluga automotive industry training center. In China, where Volkswagen has nearly

⁵ <<http://www.jff.org/initiatives/pathways-prosperity-network/new-york>>.

30 production facilities, it establishes partnerships with local technical colleges. In other countries where Volkswagen has built manufacturing plants, if there is not an adequate technical college available, the company either forms a training facility in collaboration with other automobile manufacturers or does its training in-house. In every case, Volkswagen seeks an educational partner with which to collaborate in dual VET as a condition of investment. In all cases, support from the regional governor is a critical condition of success.⁶

THE TRADE-OFF BETWEEN BROADENING AND DEEPENING COOPERATION

Examination of local partnerships fostering dual education and close firm-school cooperation suggests that they tend to be *either* broad *or* deep; outside the German-speaking countries of Europe it is rare to find both. True solidaristic arrangements appear to be institutionally difficult to achieve. This is perhaps because when a large firm dominates a local economy, it may calculate that the benefit of supplying public goods, in the form of training beyond what the firm can itself consume, considerably outweighs the costs. In such cases, the firm itself may take the initiative in proposing new forms of deep cooperation with local VET institutions, with government serving as guarantor. Because it dominates the local labor market, concerns that other firms will poach labor from it are minor compared with the benefit of ensuring a steady supply of trained workers, recruited from among the most able of those it has trained. When a single firm is lacking, however, and no one firm is willing to pay a disproportionate share of the cost of supplying a pool of skilled labor to the industry, government in cooperation with a regional association or chamber of commerce is likely to persuade multiple firms in the industry (for example, hospitality, IT, or health care) each to contribute a modest share of its resources to a collective effort to align schooling with the

⁶ Based on interviews with Volkswagen representatives, government officials, and experts in Chattanooga, Kaluga, Changchun, Beijing, and Wolfsburg.

skill needs of the industry. If the regional economy consists of multiple smaller firms, however, government is more likely to work through the schools to create multiple career-oriented educational tracks. In the US, a number of states have modified their laws on academic standards for secondary school-leavers to acknowledge the possibility of “multiple pathways” to graduation. This rule change encourages school boards to create “career academies” and similar institutions, often in partnership with local two-year and four-year postsecondary schools and universities. In Central Ohio, 15 school districts formed a consortium with Columbus State Community College to create integrated educational tracks in fields such as advanced manufacturing, health care, IT, and logistics.⁷ A new state curriculum in Miami-Dade County emphasized “career readiness.” In turn, a national educational policy organization helped create career academies in four fields (engineering, finance, hospitality and tourism, and IT) spanning 24 schools.⁸ A new law in Maine permitting alternative pathways to demonstrating proficiency in state-mandated educational standards has allowed the formation of a new charter school emphasizing maritime professions (marine science, marine transportation, marine engineering and marine management) [McCrea, 2016].

A parental firm receives a number of benefits, notwithstanding the fact that it cannot consume all the benefit of the skill it provides through training. It acquires principal influence in determining the academic program and acquiring specific information about each student that trains at the firm. This affords it an advantage in selecting and recruiting the best. Moreover, such firms strongly benefit by reducing adaptation time, i.e. the period during which a newly hired employee acclimates to the production process and work culture of the firm. These benefits lower the cost to the firm of losing employees to rivals. Particularly when the government uses its funding and administrative powers to induce one or more VET institution to invest jointly with the dominant firm in training programs where classroom instruction is complemented by on-the-job

⁷ <<http://www.jff.org/initiatives/pathways-prosperity-network/ohio>>.

⁸ <<http://dcte.dadeschools.net/community.html>>.

practical training, such programs satisfy the needs of the firm while allowing the accumulation of skill on the part of workers who may subsequently depart for jobs elsewhere. The public good here is a by-product of the partnership between the government, the school, and the firm.

However, when multiple firms in multiple sectors compete in the same region for labor, fears of poaching and the small size of firms inhibits deepening of cooperation and favors broad but shallow partnerships. (For smaller firms, training costs represent a much higher share of production costs.) In that case, it is institutionally less costly for government to forge ties across educational institutions than across firms. In that case we are likely to see movement vertically along the left axis. Government may encourage sectoral clusters to develop common standards for professional qualifications, and then align educational programs to meet those standards through career-oriented educational pathways. Firms' coordination on occupational standards requires less commitment of time, effort and resources than would direct participation in instruction and training, while government can advertise the region's pool of mid- and high-skill labor in fields that it considers important for future economic development.

The issue of government's involvement in forging agreements to deepen or broaden employer-school linkages raises one final question. Under what circumstances do governments intervene to form employer-school partnerships? Three factors stand out, which can be summarized as competition, crisis, and capacity. When they converge, government actors are much more likely to initiate firm-school partnerships. There are many examples from our three countries.

In Tennessee, the mayor of Chattanooga, with strong support of local chamber of commerce (acting as quasi-official arm of government for local economic development), and support from state government, provided material and organizational assistance to Volkswagen as inducements for it to build a production facility in Chattanooga, Tennessee. After helping to bring VW to the area, Chattanooga Mayor Bob Corker then ran for Senate on the strength of his success in promoting economic development in Chattanooga. He continued to help Chattanooga through as senator sitting on Senate Foreign Services Committee.

Conclusions

The competitive environment for political leaders and business enterprises is a crucial element in explaining the formation of school-firm partnerships. Both in democratic and autocratic political systems, regional leaders compete to preserve their positions or advance their careers. Firms compete for market share. (Even monopolistic firms in the military sector work in a competitive environment insofar as the government demands that they compete with technology and quality of rival nations.) Politicians and firms compete using strategies that proved successful in the past until an exogenous shock pushes them to reform by adopting a new strategy. The exogenous shock is often an economic crisis. Chattanooga for example faced an economic crisis in 1980s as the failure or departure of its manufacturing base resulted in a critical confluence of high unemployment and high pollution. Greenville faced a long-term deepening crisis as the industries on which its economy depended, textiles and agriculture, declined, and in both cases, politicians built successful political careers on their achievements in promoting economic development in their localities.

The third critical element is capacity. By this I mean both the administrative capacity of a regional or local government to establish and maintain partnership agreements with firms and schools, as well as a common understanding of the importance of the partnerships on the part of business, government, and educational leaders. Such cohesion is more likely to emerge when business, government and educational elites have cooperated in the past on other projects, such that they can draw on a well of mutual trust and a set of cooperative practices. In all the cases reviewed here, political leaders responded to opportunities presented by economic crisis, in an environment where they had to compete to attain and keep their offices, and where they could call upon administrative competence and social capital formed by past experience.

CONCLUSIONS

For both firms and schools, joint investment in new types of VET is institutionally costly. Schools may be reluctant to invest in new part-

nerships with business since they must adapt their curriculum, give up part of training to firm, change own curriculum, upgrade quality of instructors, and at the same time satisfy regional and national curriculum standards. In all three countries, schools note that it is sometimes hard to reconcile national or regional educational requirements with the requirements of an apprenticeship system. For example, some professions recognized by firms (e.g. mechatronics) may not be recognized in the list of professions set by central government, or requirements for a particular diploma may conflict with the time spent in apprenticeships. If schools are rewarded for meeting goals such as increasing the number of diplomas awarded rather than matching their curriculum to needs of the local labor market, schools may regard it as more trouble than it is worth to reorient their curriculum to the needs of industry. Even when they are willing to do so, however, they often lack the production machinery equivalent to that which is used at firms.

Similarly, deep investment in VET may be difficult for medium- and small-size firms. In the absence of a coordinating body with the capacity to enforce commitments to the partnership agreement, it is hard to establish solidaristic VET institutions. This can leave a dominant firm in a position to dictate the content of educational programs, but it weakens the incentive for the school and government to shoulder the burden of implementing dual education more widely. Ultimately, this puts a dominant firm and its supplier firms at a disadvantage because the dominant firm is expected to bear most of the burden of subsidizing the costs of financing training for instructors, providing equipment to schools, and creating apprenticeships.

Therefore government's efforts to build new partnerships between VET institutions and employers tend either to align multiple firms and multiple schools around training in particular regionally-advantageous occupational fields, but with little commitment on the part of firms to delivering training; or toward the construction of a system of VET designed to serve the needs of a particular large firm. In the latter case—the “parental” model—there are often spillover benefits from the partnership as those who have acquired the education and training take advantage of their industry-specific skills to take jobs elsewhere. Such parental ar-

Conclusions

rangements provide a public good because the benefit to the firm from a well-designed VET program outweighs the risk of losing some skilled workers.

Government plays an essential role in all of these partnership arrangements. Government underwrites agreements between firms and schools (or industrial associations and consortia of schools). In all three of our cases, regional governments have primary responsibility for funding secondary and tertiary VET, so therefore can orient the schools to meet governmental economic and social policy objectives. At the same time, government can create favorable conditions to recruit or retain industry, not only by promising attractive tax regimes, but also by ensuring that VET programs will provide industry with a stream of well-trained labor. Government often enters partnership contracts as a third party. Government is motivated to the extent that government officials believe that they can take advantage of opportunity, in a politically competitive environment, by mobilizing available administrative and social resources.

Government plays the critical role of intermediary in some cases; in others, government works through sectoral associations. In the United States, a number of organizations may serve as intermediaries; these may include a local Chamber of Commerce, a Workforce Development Board, a community college, or a mayor's office. Generally speaking, intermediary bodies form through the adaptation of existing organizational resources more than their creation *ex nihilo*. Whatever body plays the role of intermediary organization, its effectiveness depends upon its ability to enforce commitment to the partnership. Dual VET is an extremely demanding system, requiring sustainable institutional solutions to multiple collective dilemmas. The deeper and broader the partnership, and the more that the partners must devote real time, effort, and material resources to it, the greater must be the monitoring and enforcement capacity of the intermediary.

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