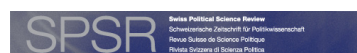


ORIGINAL ARTICLE



How Coordinated Capitalism Adapts to the Knowledge Economy: Different Upskilling Strategies in Germany and Switzerland

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Abstract

The rise of the knowledge economy challenges coordinated models of capitalism by requiring their skill formation systems to produce a workforce with higher skills. This paper examines how coordinated capitalism adapts to upskilling pressures by jointly studying general education and vocational education and training (VET) at both upper-secondary and tertiary levels. Employing a comparative research design covering German and Swiss upskilling efforts over the past 50 years, we observe important differences. Switzerland, with influential small firms and weak union presence, focuses on keeping VET an attractive option at upper-secondary level by favoring VET graduates' access to tertiary education. By contrast, Germany, marked by large firm dominance and influential unions, concentrates on expanding general education throughout and adding vocational elements later. Our analysis suggests that firms' reform preferences are conditioned by their size and political constraints to reform.

Zusammenfassung

Der Aufstieg der wissensbasierten Wirtschaft stellt koordinierte Marktwirtschaften vor die Herausforderung, ihre Bildungssysteme so weiterzuentwickeln, dass diese Arbeitskräfte mit höheren Qualifikationen hervorbringen. In diesem Beitrag wird anhand von Reformen der allgemeinen und der beruflichen Bildung auf der Sekundarstufe II sowie der Tertiärstufe untersucht, wie koordinierte Marktwirtschaften mit dieser Herausforderung umgehen. Ein Vergleich der deutschen und schweizerischen Reformbemühungen der letzten 50 Jahre

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zeigt deutliche Unterschiede auf. Die Schweiz konzentriert sich auf den Erhalt der Attraktivität der Berufsbildung auf der Sekundarstufe II, indem sie den Zugang von Berufsbildungsabsolventen zur tertiären Bildung fördert. Im Gegensatz dazu fokussiert sich Deutschland auf die Zugangserweiterung zu allgemeinbildenden Schultypen und fügt erst anschliessend berufsbildende Elemente hinzu. Die unterschiedlichen bildungspolitischen Entwicklungen lassen sich durch die Reformpräferenzen der beteiligten Unternehmen und die ungleiche Anpassungsfähigkeit der Berufsbildungssysteme erklären.

Résumé

L'essor de l'économie de la connaissance remet en question les modèles coordonnés de capitalisme en exigeant que leurs systèmes d'éducation professionnelle produisent une main-d'œuvre plus qualifiée. Cet article examine la manière dont le capitalisme coordonné s'adapte aux pressions d'amélioration des compétences en étudiant conjointement l'enseignement général et la formation professionnelle au niveau secondaire supérieur et tertiaire. En utilisant un modèle de recherche comparative couvrant les efforts d'amélioration des compétences de l'Allemagne et de la Suisse au cours des cinquante dernières années, nous observons des différences importantes. La Suisse, avec des petites entreprises influentes et une faible présence syndicale, se concentre sur le maintien de l'attractivité de la formation professionnelle au niveau du deuxième cycle du secondaire en favorisant l'accès des diplômés de la formation professionnelle à l'enseignement supérieur. En revanche, l'Allemagne, marquée par la domination des grandes entreprises et l'influence des syndicats, se concentre sur l'expansion de l'enseignement général tout au long de la scolarité et les compétences professionnelles n'interviennent que plus tard. Notre analyse suggère que les préférences des entreprises en matière de réforme sont conditionnées par leur taille et les contraintes politiques qui pèsent sur les réformes.

Riassunto

L'ascesa dell'economia della conoscenza rappresenta una sfida per i modelli di capitalismo coordinato poiché richiede di adattare i sistemi di formazione professionale per produrre una forza lavoro con competenze più elevate. Questo studio esamina come paesi che hanno sviluppato modelli di capitalismo coordinato si adattano a pressioni di riqualificazione e considera congiuntamente sia l'istruzione generale che la formazione professionale e sia il livello secondario superiore che il livello terziario. Con una ricerca comparativa che paragona le politiche di

riqualificazione dei sistemi educativi tedeschi e svizzeri negli ultimi 50 anni, argomentiamo che i due sistemi si riformano in modo differente. La Svizzera, caratterizzata da influenti piccole e medie imprese e da una debole presenza sindacale, cerca di mantenere la formazione professionale come un'opzione attrattiva a livello secondario superiore, favorendo l'accesso dei diplomati di istituti professionali all'istruzione terziaria. Al contrario, la Germania, dominata da grandi imprese e da influenti sindacati, si concentra sull'espansione dell'istruzione generale e sull'aggiunta di elementi professionalizzanti più avanti nei percorsi di formazione. La nostra analisi suggerisce che le imprese hanno differenti preferenze riguardo la riforma dei sistemi di formazione professionale, le quali dipendono dalle loro dimensioni e dai vincoli politici legati alle riforme.

KEYWORDS

coordinated capitalism, Germany, knowledge economy, Skill formation systems, Switzerland

INTRODUCTION

As liberalization and globalization challenge non-market coordination, the jury is still out on the future of coordinated capitalism. We study its resilience by focusing on the intersection between labor markets and education systems, an area where coordination among employers is traditionally most visible but challenged by the rise of the “knowledge economy” (Diessner et al., 2022; Thelen, 2014). This term refers to the growing reliance on knowledge and information instead of physical inputs or natural resources for economies to grow (OECD, 1996; Powell & Snellman, 2004). Knowledge economies have emerged from the revolution in information and communications technology of the 2000s, which fostered high-technology investments, and from deindustrialization, which triggered a shift from manufacturing to high-value-added services (Hall, 2020). The increased premium on high skills exerts pressure on employment structures and on education and skill formation systems.

To secure the adoption of new technologies, businesses in the knowledge economy increasingly require college degrees for occupations that used to depend on high school diplomas. In reaction to higher skill demands, governments encourage *upskilling*, which refers to providing (future) employees with more advanced skills (Durazzi, 2023). It involves retraining, facilitating access to (higher) academic education, and creating tailored opportunities for vocationally trained people to learn general competencies. It is crucial to understand upskilling in coordinated market economies, not least because of the role of vocational education and training (VET) for social inclusion. As governments have justified upskilling by associating higher levels of education with economic and social benefits, this has diminished the social standing of VET, increasingly associated with the “old” economy's manufacturing occupations that are not in demand anymore (Abrassart & Wolter, 2020). Nevertheless, economic and social benefits have also been pursued through VET, traditionally used “as an avenue through which working-class youth could move into secure and well-paid jobs” (Thelen, 2014, p. 10). Therefore, to assess changes in social inequality, we need to understand how upskilling involves the VET system.

Since the literature has generally equated upskilling with increasing tertiary enrollments, upskilling has been particularly challenging for coordinated capitalism, whose economy traditionally relies on VET to the detriment of higher education (Iversen & Soskice, 2019; Wren, 2013). However, we argue that upskilling is more complex than the extension of higher education enrollments. It can occur both in general education and VET systems and it can take place both at upper-secondary and tertiary level. This means that upskilling can occur by facilitating access to university but also by increasing enrollments in high schools to provide pupils with university-entrance degrees or by creating new educational institutions (e.g., universities of applied sciences, UASs). Thus, we see the act of upskilling as a political one that carries distributive implications and not as a top-down imposition.¹

We study the “upskilling strategies” of countries with strong VET components through a comparative-historical analysis. We choose the timeline from the 1970s until the 2020s because although countries configured themselves as “mature” knowledge economies only in the 2000s (Hall, 2020), educational reforms are path-dependent, meaning that we need a broader timeframe than the 2000s to understand their context. Our case selection follows a most similar systems design. The relevant variables for characterizing the cases as similar relate to their economies' vulnerability to knowledge economy-related pressures and to the adaptability of their education systems. From the economy's perspective, Germany and Switzerland are similar because they are prototypical coordinated market economies with large firm-based training systems and a strong focus on advanced manufacturing (Ebner, 2013; Hassel & Palier, 2020). Due to their export orientation and high real exchange rates, both countries must constantly adapt to changing economic conditions by moving up the value chain (Sorge & Streeck, 2018). From the point of view of their education systems, both countries' skill formation systems feature the dual model of apprenticeship combining school-based and firm-based learning. These systems involve employers and their associations in the financing and administration of training, leading to portable, certified, and standardized occupational skills (Busemeyer & Trampusch, 2012). Hence, both countries have historically relied on VET, which is argued to struggle in the knowledge economy.

Our empirical analysis documents important similarities between the two countries' upskilling strategies. We observe a growing share of youth attending general education institutions (e.g., *Gymnasium*) at upper-secondary and tertiary levels. In both countries, school-based VET has become less popular, whereas dual VET (i.e., apprenticeships) has remained an attractive option at upper-secondary level. In addition, the growth of tertiary institutions particularly relates to UASs.

However, significant cross-national differences indicate that the two countries' upskilling strategies prioritize different elements. Switzerland upskills mainly through its VET system, which is kept attractive for upper-secondary pupils through the vocational baccalaureate and features institutionalized pathways for VET graduates to access tertiary education. In contrast, Germany upskills mostly by expanding general education at both upper-secondary and tertiary levels, while vocational elements are added at later stages of the educational path. Hence, a large share of the youth upskills through general education *before* obtaining additional vocational training. We offer a tentative explanation for these differences, emphasizing firms' skills preferences and unions' institutionalized role as veto players. In a nutshell, we argue that the Swiss VET system is flexible enough to be reformed in order to offer opportunities to upskill.

¹Importantly, we do not argue that upskilling is the only policy to adapt to the knowledge economy. For instance, despite pushes for high skills, many countries suffer from a shortage of vocational mid-level skills, especially in technical and health-related occupations (e.g., the German term *Fachkräftemangel* regularly makes the news (cf. Wunsch & Buchmann, 2019). However, upskilling is a significant part of the solutions to adapt to the knowledge economy.

In contrast, the more rigid German system incentivizes large firms to rely on upskilling strategies outside the VET system.

This paper makes two contributions. Conceptually, we adopt an encompassing approach to VET reforms by considering their connections with general education and the junctures between education levels. We find that a significant proportion of upskilling efforts occurs at the nexus of general and vocational education as well as between upper-secondary and tertiary education (e.g., creating innovative paths for upper-secondary VET graduates to access tertiary education). While the existing literature has rarely done so, we argue that these different fields and levels need to be considered together. Empirically, we undertook a major data collection effort to examine comparative temporal patterns of upskilling, gathering educational enrollment data from multiple German and Swiss sources. The online appendix provides a complete list of sources and further details on the data collection process. Although other studies have also compiled data on educational attainments across time (e.g., Weber et al., 2010) or countries (e.g., Ebner & Nikolai, 2010), they do not detail each path comparatively. Hence, our data represent, to our knowledge, the most extensive and detailed documentation of educational pathways for German and Swiss youth.

This paper proceeds as follows. The next section reviews the literature on skill formation systems in a knowledge economy and offers some preliminary theoretical reflections to account for different upskilling strategies. The subsequent section provides a comparative assessment of the two countries' upskilling efforts by integrating statistical data with a review of policy developments. We then examine our tentative explanation for these cross-national differences. A final section concludes.

THE KNOWLEDGE ECONOMY AND SKILL FORMATION SYSTEMS

The transformation of education and training systems has been the topic of considerable research. The literature on upskilling separates systems providing VET or general (academic) degrees, and, within each, treats upper-secondary and tertiary paths as separate compartments (Baethge & Wolter, 2015). On the one hand, the education literature typically discusses general tertiary education, i.e., increasing university enrollments (Brown et al., 2012; Ornston, 2012; Schulze-Cleven et al., 2017). On the other hand, the literature on skill formation focuses on upper-secondary training and typically disregards post-secondary VET (exceptions include Culpepper, 2007; Di Maio & Trampusch, 2022; Durazzi, 2023). Attention has been devoted to how skill formation systems remain socially inclusive (Bonoli & Emmenegger, 2021; Durazzi & Geyer, 2020). However, the link between these different realms has rarely been made, with the consequence that we know relatively little about how skill formation systems upskill. To reach a holistic understanding of upskilling, we argue for the need to comprehensively address all education levels in general education and VET. Thus, upskilling takes place through policies that simplify transitioning from upper-secondary to tertiary education, and between general education and VET, locating upskilling reforms precisely at these connection points.

Upskilling in coordinated market economies with a strong focus on advanced manufacturing can mean different things. The growth models and varieties of capitalism scholarship assumes a symbiotic relationship between VET and the manufacturing sector, on the one hand, and higher education and the service sector, on the other (Thelen, 2014; Wren, 2013). Thus, Germany and Switzerland, as examples of a high-quality manufacturing export-led growth regime (Hassel & Palier, 2020, p. 40), are expected to upskill through VET and feature comparatively low levels of enrollment at universities. By contrast, Iversen and Soskice (2019) argue that “industrial production has become increasingly digitalized, decentralized, and dependent on workers with high cognitive and analytical skills, causing demand for employees with

university [...] degrees to rise, while VET training has become relatively less important” (p. 180). Hence, they expect Germany and Switzerland to upskill through general education and witness higher levels of enrollment at universities. Durazzi (2023) reconciles these two views by arguing that rather than a wholesale turn to general education, upskilling should include an emphasis on general education layered with vocational elements. Although economies are pushed to upskill, manufacturing firms in coordinated market economies continue to have rather narrow skill needs, concentrated in areas such as engineering (Herrigel, 2015). Therefore, upskilling in Germany and Switzerland is likely to take place across general education and VET.²

Similarly to other contributions in the study of collective skill formation systems, we explain variation in upskilling strategies through a historical-institutionalist framework (e.g., Graf, 2018; Thelen, 2014; Trampusch, 2010). Hence, we consider institutional rules as the principal factors structuring collective behavior and generating distinctive reform outcomes (Hall & Taylor, 1996, p. 937). This view acknowledges that conflict among rival groups lies at the heart of politics but highlights the political context in which conflicts over institutions take place. Mahoney and Thelen (2009) define this political context in terms of the level of discretion awarded to agents of change in interpreting institutional rules and the veto possibilities of status quo defenders. The potential for institutional innovation is high where institutions offer agents of change a high level of flexibility in reinterpreting rules, whereas veto possibilities are high when actors have access to institutional or extra-institutional means to block change.

Moreover, in line with the literature in Comparative Political Economy, we expect employers and unions to be the most likely agents of change, given their stakes in the politics of training. This is not to deny the relevance of political parties (cf. Bussemeyer, 2015). However, differences in party positions on educational reform are likely to be informed by their links to producer groups and unions (Thelen, 2014). Especially in firm-based training regimes, employers are pivotal actors because a substantial part of training takes place in firms and because their intermediary associations participate in the financing and administration of training (Bussemeyer, 2012). Furthermore, the structural and enduring differences that we observe in the upskilling strategies of Germany and Switzerland are not in line with explanatory accounts that emphasize short-term fluctuations in policy design and goals over time.

What are employers' preferences in education and training? Even though firms are cost sensitive, the specific behavior through which they train largely depends on their skill needs. Although the literature tends to differentiate large versus small firms, this cleavage subsumes an array of differences beyond the number of employees. Large firms not only have more employees than small ones but have larger profit margins, face more international competition, are more export-oriented, and have a stronger discursive power to define which skills the workforce needs. For these reasons, the literature argues, large firms conceive of training differently than small firms. Since large firms can offer attractive working conditions to higher education graduates, they are better positioned to screen their prospective labor force and retain only the best candidates. Training is, thus, a way to prepare the pre-selected best candidates. By contrast, small firms often are not attractive enough to recruit externally. Training for them is a cost of production which, thanks to corporatist wage compression, is quite cheap (Culpepper & Thelen, 2008; Graf, 2018; Thelen, 2014).

This cleavage has important repercussions when it comes to training preferences. Most notably, large firms require more skills with broad applicability across tasks and occupations,

²The connection between VET and manufacturing is overstated. In both Germany and Switzerland, service sector firms offer more apprenticeships today than manufacturing firms.

known as general skills, as opposed to the technical and occupational skills demanded by small firms, known as specific skills. According to the literature, there are three main reasons for this. First, large firms face stronger international competition than small ones. Second, large firms put a premium on functional flexibility, i.e., the ability of employees to take over different functions within the same firm. Third, large firms are less concerned about poaching because they are aware of their attractiveness as employers (Busemeyer, 2012; Culpepper, 2007; Emmenegger & Seitzl, 2019; Graf, 2018; Streeck, 1991; Trampusch, 2010).

These different preferences condition firms' behavior vis-à-vis skill formation. In general, as providers of employment, employers have a say in the overall adequacy of training systems (Busemeyer, 2012; Carstensen & Ibsen, 2021). However, absent collective action, small firms do not have the weight to make their preferences heard to the same extent as large firms (Emmenegger & Seitzl, 2019). Moreover, small firms are not large enough to cooperate with higher education institutions independently (Graf, 2018). Consequently, small firms are likely to have a clear preference for keeping the firm-based training system at the center of any upskilling strategy, as it is what they rely on to source skilled workers (Trampusch, 2010). By contrast, large firms do not have to satisfy their skill needs through the VET system and can look for upskilling strategies outside the traditional confines of the VET system.

Importantly, the VET system offers many advantages to firms, not least large ones, as it allows them to exercise formal institutional control over training policies (Emmenegger & Seitzl, 2019). However, VET systems differ in their flexibility in adapting to firms' needs. Some VET systems are more hierarchically organized and structured, leaving firms and their intermediary associations little room to reinterpret existing rules and align the systems with their skill needs. In contrast, other VET systems give firms more room to innovate, redefine contents and requirements, and add more demanding training programs. If the VET system does not allow enough discretion to firms, large firms with skill shortages are better positioned than small ones to find outside options and cater for their skill needs in innovative ways (Graf, 2018).

Moreover, other actors might challenge employers' ability to define skill requirements and redeploy the VET system to satisfy these skill needs. In the VET context, unions are certainly the most important veto player. The literature has repeatedly emphasized how unions constrain employers' freedom in training choices through beneficial constraints (Streeck, 1997), prompting employers to move beyond individual short-term profit maximization strategies and share the costs of skill formation (Acemoglu & Pischke, 1999; Emmenegger et al., 2020; Marsden, 1999). However, these same constraints also limit the extent to which employers can adapt skill formation systems and align them with their skill needs. In other words, the role of unions constitutes a powerful veto point, among others, for the upskilling of skill formation systems.

What does this imply for upskilling strategies? Based on this literature review, we should expect large firms to push for reforming the VET system and suit it to the provision of upskilling opportunities, which is cheaper than creating their own training systems and awards them more control over broad reforms. However, large firms' degree of influence on educational reforms depends on their interaction with unions, which can be veto players who may enable or constrain the opportunity to reform VET for the purposes of upskilling. If employers' preferences can be accommodated, not least due to the lack of union power, employers are likely to reform the VET system to allow upskilling through it. In contrast, if unions are strong veto players in skill formation systems, large firms may look for options to upskill their workforce from outside the rigid rules of the VET system. For instance, they can rely on the general education system to upskill, as they have sufficient weight in national labor markets (i.e., partnering with higher education institutions) and are attractive enough to hire general education graduates. Finally, the literature expects small firms to prefer a more modest upskilling than large firms, which can primarily be achieved through reforming the VET system, as small firms usually do not have enough resources to create upskilling opportunities outside of the

formal system. Like large firms, their preferences are more likely to be accommodated in the case of unconstraining unions.

UPSKILLING IN GERMANY AND SWITZERLAND

In this section, we document developments in Germany and Switzerland from the 1970s until the 2020s. We structure our discussion along education levels. We first review similarities, namely the growth of enrollments in general upper-secondary and tertiary institutions. Then, we highlight differences, most notably the different emphasis on upskilling through VET at the upper-secondary level.

Parallels

Both Germany and Switzerland share several key features. For instance, their shares of students attending general education has strongly increased at upper-secondary and tertiary level across our timeframe (especially among women). At upper-secondary level, we differentiate between general education (i.e., *Gymnasium*), which prepares students for university entrance, and VET, which consists of either full-time vocational schools or apprenticeships and prepares students for specific occupations. Figures 1 (Germany) and 2 (Switzerland) show shares of students by educational tracks at upper-secondary level and document increasing enrollments in general rather than in vocational upper-secondary institutions.

While our figures document this trend from the 1970s onwards, it started in the 1950s, especially after the so-called “Sputnik shock” in 1957, when demand for highly skilled workers started to increase, and coincided with women's catch-up process in educational attainment. Over the last 45 years, attendance in the German *Gymnasium* grew from 25% to 39% among all

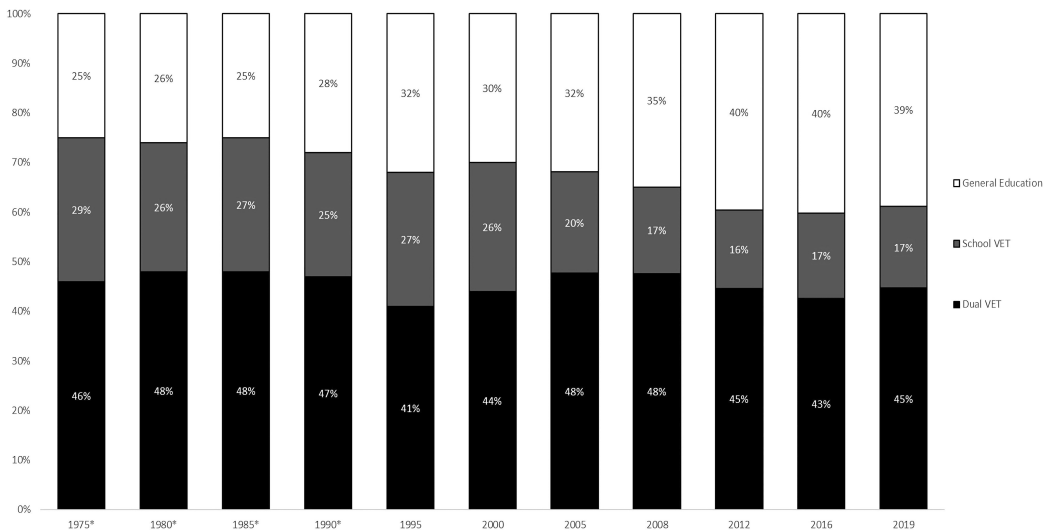


FIGURE 1 Share of students in upper-secondary education by educational track, Germany, 1975–2019.

Note: Years 1975–2000 display entrants. Years 2008–2019 display overall students. Years indicated with * only include Western Germany. Dual VET includes students in part-time vocational school; school-based VET includes pre-vocational training year, two-year full-time vocational school, basic vocational training year, vocational extension school, and full-time vocational school; general education includes *Gymnasium*, integrated comprehensive schools, evening grammar school, specialized grammar school, specialized upper secondary school, free Waldorf schools, and colleges.

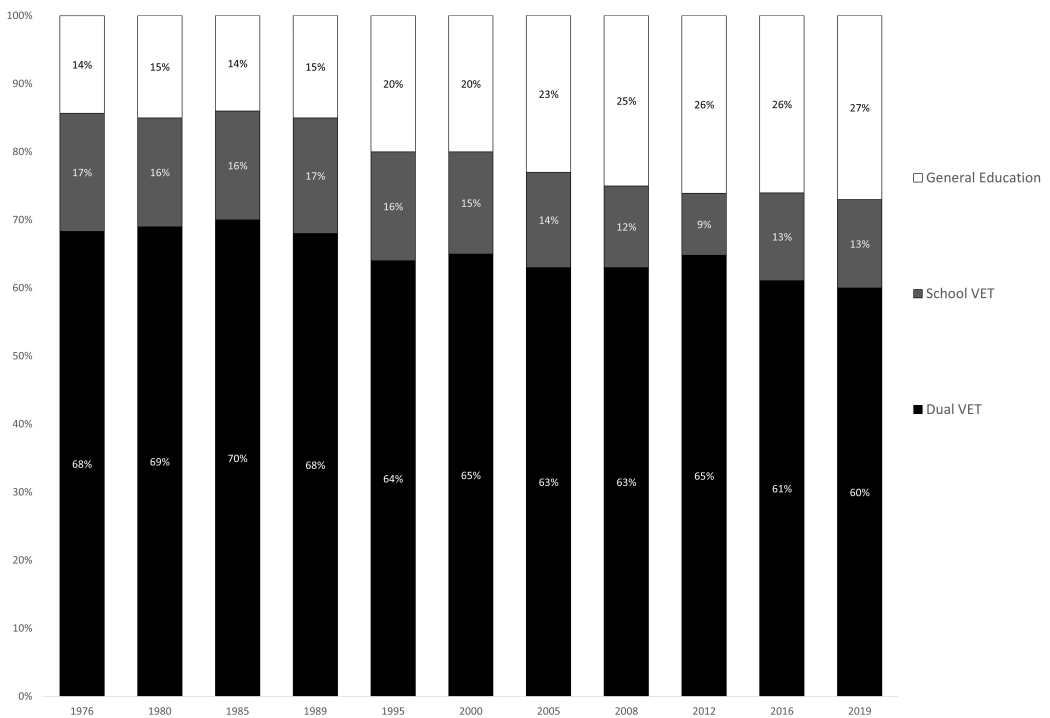


FIGURE 2 Share of students in upper-secondary education by educational track, Switzerland, 1976–2019.
Note: Years 1976–2005 displays entrants. Years 2008–2019 display overall students. Dual VET includes federal VET diploma, federal VET certificate, and non-regulated VET professions (excl. non-formal two-year apprenticeships); school-based VET includes trade / IT school and specialized school certificates; general education includes specialized baccalaureate, (academic) baccalaureate.

upper-secondary students. If this trend continues, nearly half of all students will be in general education by 2040. Similarly, in Switzerland, the share of *Gymnasium* students nearly doubled from 14% in 1976 to 27% in 2019. In both cases, the substantial growth of general education has mostly come at the expense of school-based VET. This is especially pronounced in Germany, where the share of students in full-time vocational schools almost halved between 1975 and 2019, from 29% to 17%. In Switzerland, the decline is less steep but still significant. While at 17% in the 1970s, today only 13% of upper-secondary students attend school-based VET. By contrast, apprenticeships remain relatively stable over time, being attended by around 45% of German and 60% of Swiss students.³

At tertiary level, we observe similar developments. The number of students at higher education institutions has been constantly increasing since the 1960s in both countries (see Figure 3). In Germany, this was encouraged by laws restricting the self-governance of universities and increasing their number already in the 1960s, which made the quantity of students enrolled in tertiary

³The figures show that the two countries departed from different points in the 1970s. One could argue that later country differences are a path-dependent consequence of this initial difference. However, we submit that the different starting points are reflections of the same upskilling trajectories we observe. As argued by secondary literature, already in the 1960s, both countries suffered from labor shortages for high-skilled positions and started upskilling according to the strategies we argue. Germany raised its *Gymnasium* attainment rate, for instance through the 1972 Secondary School reform, which reduced the number of mandatory subjects needed to obtain the university entrance qualification (Abitur). Hence, *Gymnasium* and, subsequently, university enrollments skyrocketed (Bölling, 2008). In contrast, Swiss reforms in the 1970s strengthened dual VET's role in providing high skills, for instance through the expansion of vocational colleges (*Berufsmittelschulen*), which added a second day of full-time schooling to dual VET tracks at upper-secondary level (Culpepper, 2007). Conversely, unions' attempts to expand general education or promote school-based VET found little support (Gonon & Maurer, 2012).

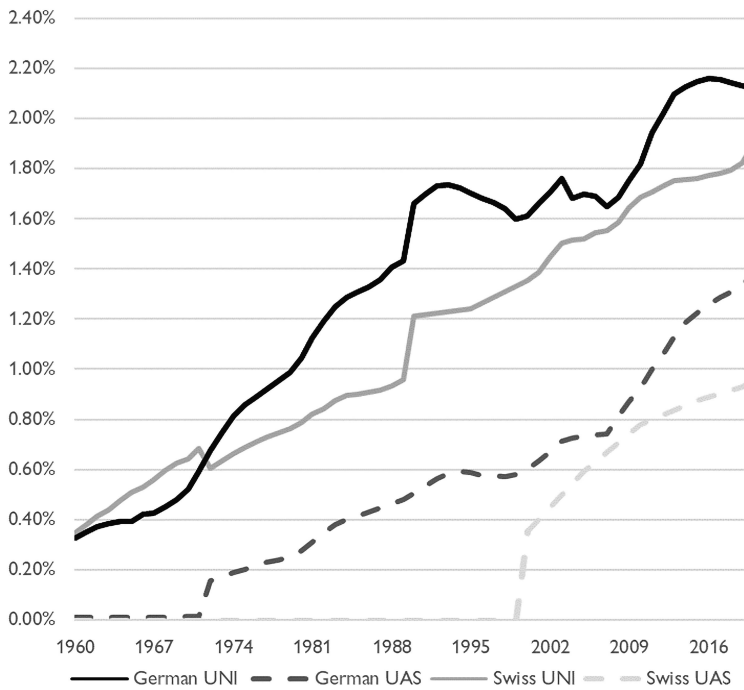


FIGURE 3 Students enrolled in German and Swiss UAS and universities (UNI) as a proportion of the overall population, 1960–2020. *Note:* German data: UAS (since 1972) include the following institutions: Academies of fine arts (since 1960) and schools of public administration (since 1973). Enrollment numbers refer to the Winter Semester. University enrollment numbers include promotion and habilitation as well as teacher's colleges. Swiss data: Data includes the following universities: Zurich, ETH, Basel, Geneva, Bern, Lausanne (including EPFL), Freiburg, and Neuchâtel, excluding St. Gallen until 1989. University enrollment numbers include promotion and habilitation. Universities of applied sciences exclude teachers' colleges. The teachers' college of St. Gallen is instead included in the university numbers from 1990–2020. Enrollment in other teachers' colleges has been excluded to increase comparability because the Swiss Federal Statistical Office provides UAS data excluding them, while German statistics put them in UNI numbers.

education significantly jump in the 1970s. In Switzerland, the number of students attending regular universities also grew steadily since the 1960s, from 18,492 in 1958 to 85,940 in 1990.

The tertiary expansion became increasingly driven by UASs (see Figure 3). In Germany, enrollment at UASs increased by 50% from 1972 to 1978, then doubled from 1978 to 1988, and continued growing throughout the following three decades. In absolute numbers, UASs' enrollments increased from 400,000 in 1990 to 1 million in 2015. In contrast, enrollment at universities grew less, from 1.3 million to 1.7 million over the same period. In recent years, Germany actively encouraged the growth of UASs by providing them with considerable public funds (Durazzi & Benassi, 2020; Hüther & Krücken, 2018).

Switzerland introduced UASs in 1997 to strengthen the VET system and overcome perceived skill shortages (Gonon, 1994, 2013; Graf, 2013). Despite lukewarm support from small and medium-sized firms due to cost concerns, enrollment at UASs increased by 68% from 2000 to 2005 (12% at universities) and 32% from 2005 to 2010 (10% at universities). Their inception satisfied both large employers' skill needs (Culpepper, 2007; Trampusch, 2010) and the vocational colleges of higher education, key providers of post-secondary VET, many of which wanted to upgrade their status into UASs (Gonon & Maurer, 2012).

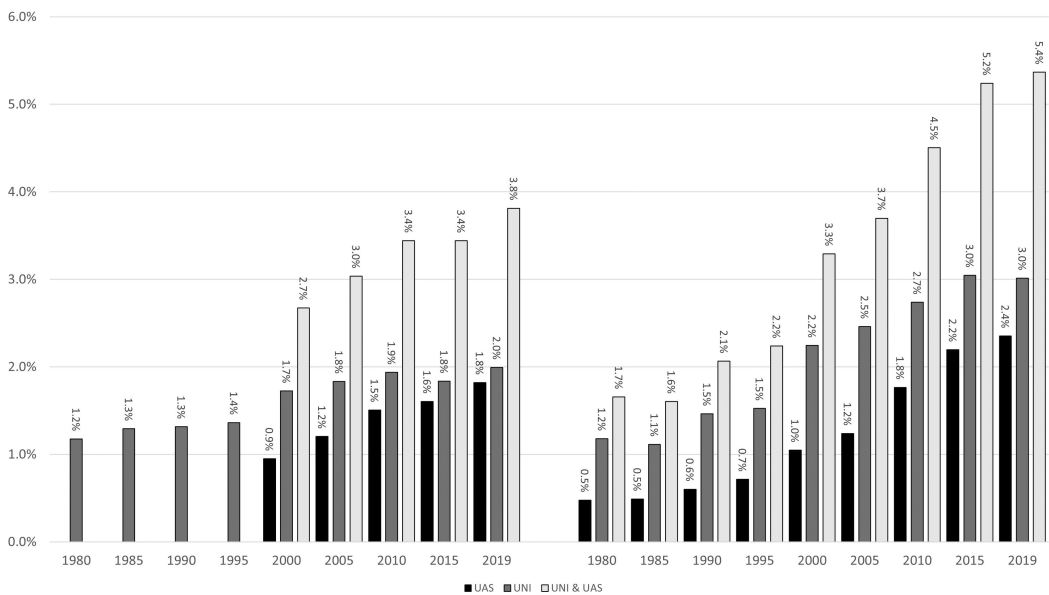


FIGURE 4 UNI and UAS entrants as shares of the age cohort 20–29 in Switzerland (left panel) and Germany (right panel), 1980–2019. *Note:* Swiss UAS entrants excluding students of teacher education track.

Differences

Despite these parallels between Germany and Switzerland, we also observe significant differences in their approaches to upskilling. Fundamentally, the growth rates of universities and UASs are higher in Germany than in Switzerland. [Figure 4](#) compares the numbers of students entering regular universities and UASs as shares of the total population aged 20–29 years. In Germany, these shares are considerably larger than in Switzerland. Moreover, although both countries relied on UASs to expand their tertiary education, this trend was stronger in Germany than in Switzerland. Over the last twenty years, the share of Swiss UASs entrants doubled, while in Germany the equivalent share increased by a factor of 2.4. During the same period, the shares of university entrants grew in Switzerland only by a factor of 1.2 and in Germany by a factor of 1.4. These differences indicate that there is more emphasis on general education in Germany.

Instead, Switzerland is more focused on maintaining the attractiveness of VET at upper-secondary level by creating pathways to tertiary academic education. Switzerland achieves this through institutions such as the vocational baccalaureate, which was suggested by the Swiss Science Council (1992) as an alternative to the rapidly growing *Gymnasium* (Criblez, 2001; Gonon, 1994). The vocational baccalaureate is a vocational upper-secondary path that can be pursued in addition to a regular VET degree and offers direct access to UASs. By contrast, graduates from *Gymnasium* must pass a practice year to enter UASs, whereas vocational baccalaureate graduates, after an additional year of studying, must pass a demanding exam to access university (*Passarelle*). The model was originally depicted as a “15/15” solution, where 15% of an age cohort were supposed to pursue an academic and another 15% a vocational baccalaureate. Today, approximately 40% of all baccalaureates in Switzerland are vocational ones (see [Figure 5](#)).

Moreover, most of the students at Swiss UASs are VET graduates (see [Figure 6](#)). Consequently, the number of students at UASs with a VET background is considerably higher in Switzerland than in Germany. In 2019, about 60% of Swiss UAS students had a VET degree as their entry ticket to the UAS. In Germany, although an institution called vocational baccalaureate does

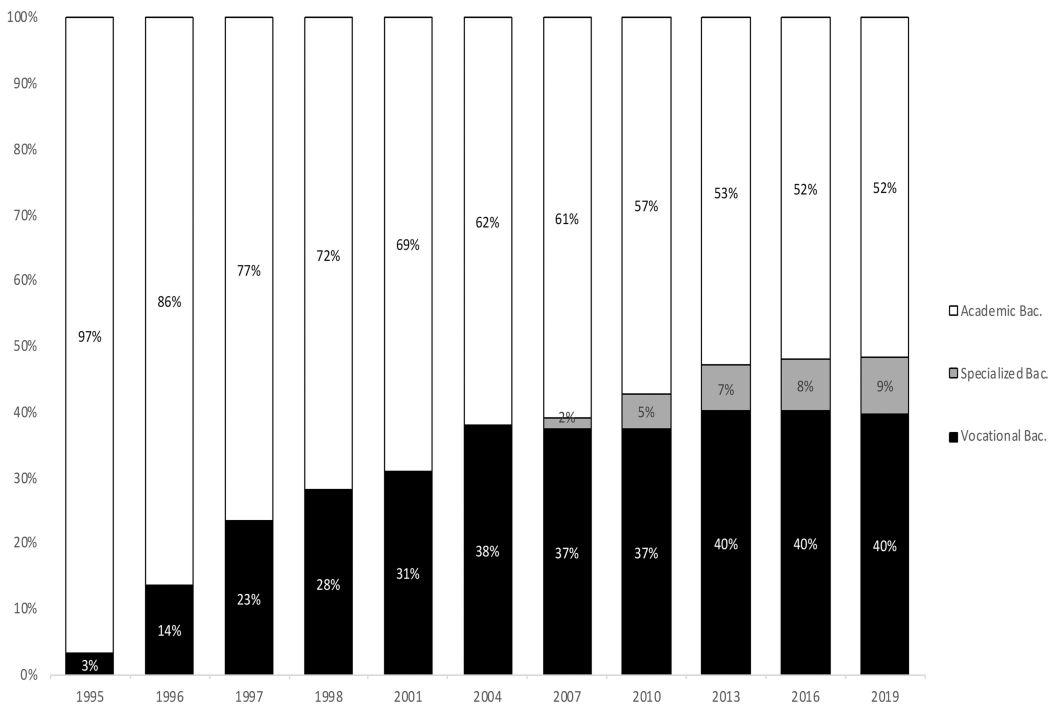


FIGURE 5 Share of different baccalaureates, Switzerland, 1995–2019. *Note:* The specialized baccalaureate is an academic baccalaureate, although it mainly prepares students for UAS (social work, health, teachers etc.).

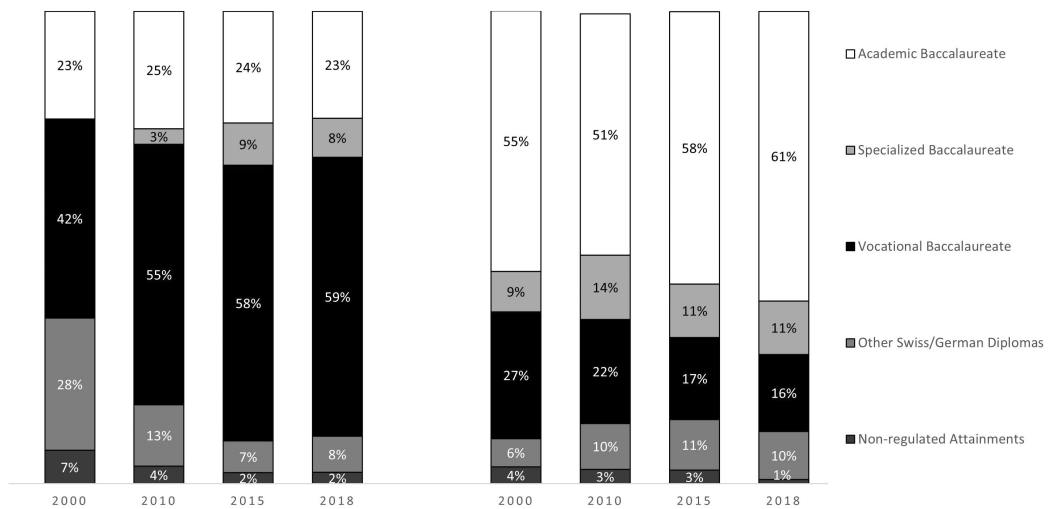


FIGURE 6 Background of UAS entrants in Switzerland (left panel) and Germany (right panel), 2000–2018. *Note:* Excluding students with diplomas issued abroad.

not exist, we consider the *Fachoberschule* to be comparable to the Swiss vocational baccalaureate. After the 12th grade it grants access to UAS, and after the 13th grade to universities (which is the case also for people pursuing the Swiss vocational baccalaureate together with the

Passarelle). Nevertheless, **Figure 6** shows that German UASs primarily recruit their students among general education graduates.

In Switzerland, several other reforms aimed to strengthen the role of VET, both at the upper-secondary and post-secondary levels, especially in 1963 and in 2002 (Culpepper, 2007; Trampusch, 2010). Importantly, these proposals found support among employers, representatives of educational institutions, and regional political authorities alike. They all agreed that the VET system needed to be updated, as there would otherwise be growing student numbers at *Gymnasium* and universities. In turn, this would deteriorate the quality of teaching, entry requirements, and public budgets (Bonoli & Vorpe, 2022; Gonon, 1994; Kiener & Gonon, 1998).⁴ Discussions on whether entry restrictions to UASs and universities should be relaxed have never completely disappeared, but there has always been strong resistance (Bundesrat, 2010; Culpepper, 2007; Gonon, 2013; Maurer, 2013) and generally there is a widespread consensus that young people should be encouraged to pursue a VET diploma (Bundesrat, 2010; Maurer, 2013; Widmer, 2022; but see Sarasin, 2014). Instead, Swiss education policy emphasizes the equal value (*Gleichwertigkeit*) of VET and general education but also their difference (*Andersartigkeit*). This is because VET and general education both give access to good job prospects and further training opportunities (Hotz-Hart, 2010). Hence, Switzerland does not want to (rapidly) expand the number of students in *Gymnasium* – a strategy that is openly supported by representatives of business and science (Economiesuisse, 2021; Hippach-Schneider & Schneider, 2018; Schweizerischer Arbeitgeberverband, 2023; Schweizerischer Wissenschafts- und Innovationsrat, 2014).

In Germany, no parallel development to the ones leading to the Swiss vocational baccalaureate can be observed. Conversely, *Gymnasium* enrollments have risen disproportionately in opposition to non-academic upper-secondary tracks (Baethge & Wolter, 2015; Durazzi & Benassi, 2020; Klitgaard, 2007; Wilde, 2002). Due to the rising enrollment in *Gymnasium*, the proportion of students with university entrance qualifications also rose, inflating university participation. The expansion of university education started in the 1960s and 1970s and was politically supported, among others, through the creation of direct pathways from vocational schools to universities (Bittmann & Schindler, 2021; Schindler, 2017), student loans and grants at traditional universities (Garritzmann, 2016), and by increasing investments in universities (Mitterle & Stock, 2021; Wolter, 2017).

These developments have similar causes in Switzerland, among which the increasing credentialism among young people and their families and the changing labor market conditions, with intermediate occupations disappearing to the advantage of professional and managerial ones. Yet, the response of German education policymakers was different. Employers were openly supportive of the expansion of universities and doubtful of the suitability of the VET system in a context of competitive pressures throughout the 1990s. Hence, firms increasingly relied on university graduates, thinking they could better adapt to changing economic circumstances (Haasler, 2020). Moreover, in the 2000s, employers lamenting a shortage in engineering and technical skills had a fundamental role in cajoling the German government to sign the 2007 Higher Education Pact. With the Pact, the government committed to increasing public funding for universities, in particular UASs, and especially in Science, Technology, Engineering, and Mathematics (Durazzi & Benassi, 2020). No parallel investments in VET at the upper-secondary level are planned.

However, Germany did not simply expand general education, but it also upskilled its vocational education by adding vocational elements to its tertiary education (Deissinger & Gonon, 2021). This was achieved, for instance, through dual study programs. They were born as a reaction by large manufacturing firms in Baden-Württemberg to the growing

⁴There are, however, important differences between cantons, as some cantons emphasized general education more strongly (Bonoli & Vorpe, 2022).

reliance on high qualifications of the German education system (Graf, 2013; Kahlert, 2006; Schwiedrzik, 2001). Although they formally belong to tertiary education, they allow students (and firms) to combine (gainful) employment at a firm with the pursuit of an academic degree tailored to the needs of (typically large) firms.

Dual study programs were expanded through several policy initiatives. First, since 2000, they have become available in all states. Second, the Bologna process pushed their elevation to higher education by extending the categories of Bachelor and Master to them. Third, the number of courses expanded from 500 to 1,592 between 2004 and 2016, also thanks to dual studies starting to be offered by UASs and not only universities (Deissinger & Gonon, 2021; Graf, 2013). By 2016, more than 100,000 students participated in such dual study programs (Busemeyer & Thelen, 2022, p. 236), up from 40,000 in 2004 (Durazzi & Benassi, 2020, p. 328). Although this is a rather small group compared to the overall size of higher education, dual study programs “are increasingly diverting the most capable and motivated youths from [the] traditional [VET] system” (Graf, 2018, p. 190).

The expansion of dual study programs was encouraged by large employers who thus could influence skill formation. Graf (2018) argues that large firms could circumvent the veto power of unions, sectoral chambers, and employers' associations by placing dual studies outside the confines of the VET system and in direct cooperation with higher education institutions keen on expanding their student numbers. Although unions and small firms were openly critical of dual study programs out of fear of less portable skill profiles and a preference for traditional apprenticeship training, large firms were able to expand dual studies on their terms because these actors were excluded from policymaking (Durazzi & Benassi, 2020).

In addition, in Germany, large numbers of general education graduates enter the VET system. Haasler (2020) reports that the proportion of students with a university entrance qualification (*Abitur*) that subsequently attend dual VET training has risen constantly, now reaching almost 30%. In contrast, Switzerland's need for skilled workers did not transform into the view that “everyone should go to high school” (Panchaud, 1967, p. 382). This stability of dual VET enrollments also explains why there is little movement of students with a university entrance qualification (*Matura*) into VET. The limited data available shows these numbers are negligible (Bundesamt für Statistik, 2018, p. 15).

There are no Swiss dual study programs because Switzerland could formally reform its existing VET system without having to create institutional innovation around it. This consisted in officially recognizing post-secondary VET as part of tertiary education. Although a 2020 reform aims to upgrade post-secondary VET to tertiary level also in Germany, the focus there is on universities and UASs, not on post-secondary VET.

The marked popularity of post-secondary VET in Switzerland is shown in Figure 7, which illustrates the shares of VET graduates who obtain an additional tertiary VET degree. In Switzerland, this share grew from 26% of all VET graduates in 2001 to 40% in 2019. By contrast, this percentage remains at around 13% in Germany for the entire period. Today, almost half of all Swiss tertiary-level diplomas are obtained within the VET system, whereas the other half are obtained at UASs or traditional universities (Schmid & Gonon, 2013, p. 147). Hence, the development of dual studies remains a German prerogative and, for the large firms, represents a functional equivalent to Switzerland's higher VET system.

Switzerland's emphasis on vocational education at tertiary level is the result of several reforms. In 1978, Switzerland recognized vocational colleges of higher education as an official part of post-secondary VET (Gonon & Maurer, 2012, p. 138; Schmid & Gonon, 2013, pp. 147–150). Culpepper (2007) identifies large employers and their intermediary associations as the main driving force behind this development (pp. 626–627). In cooperation with regional political authorities, they looked for ways to combat the perceived lack of engineers and other technical employees. Moreover, as mentioned, the 2002 VET act recognized post-secondary VET as part of tertiary education, thus placing post-secondary

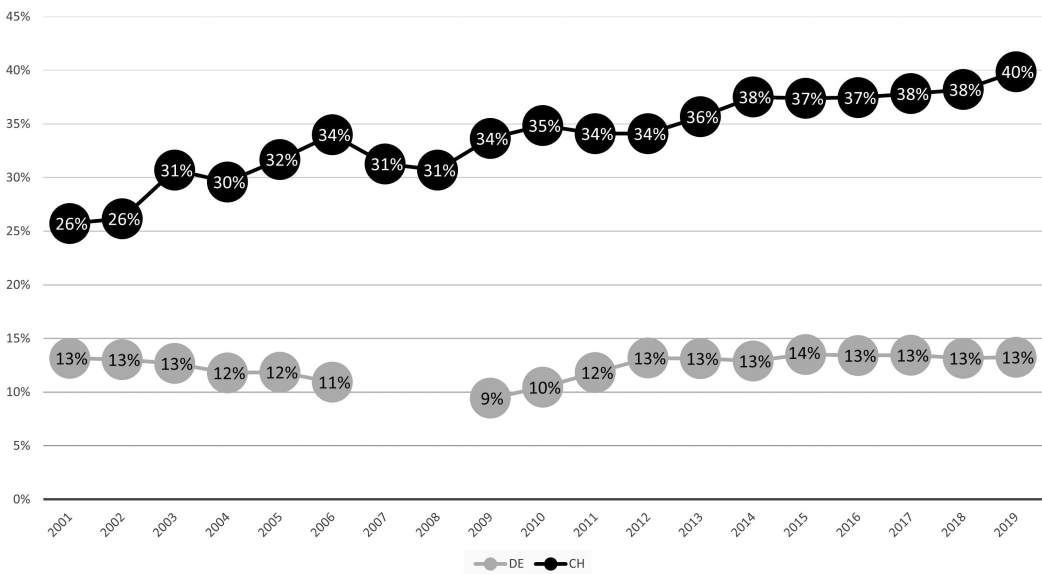


FIGURE 7 Share of VET graduates who received an additional post-secondary/tertiary VET degree, 2001–2019. *Note:* Swiss post-secondary VET includes advanced federal diploma of higher education (transition to UAS), federal VET diploma, and federal VET certificate; German post-secondary VET includes further training examinations. German VET attainments include degrees from dual VET and full-time vocational school since completing those paths grants access to post-secondary VET.

VET diplomas at the same level as those issued by UAS and regular universities (Schmid & Gonon, 2013, pp. 151–152). This law emerged out of the need by the government to relieve *Gymnasium* and regular universities from growing student numbers and to strengthen the newly introduced UASs (Bundesrat, 1996, pp. 8–14, 1998, p. 319). Recently, the federal state further increased financial support for individuals pursuing a tertiary-level VET degree and strengthened the position of vocational schools of higher education (Staatssekretariat für Bildung, Forschung und Innovation, 2021).

Representatives of Swiss small and medium enterprises have played key roles as the most vocal supporters of dual apprenticeships and the loudest critics of general education expansion (Bernier, 2013; Emmenegger & Seitzl, 2019; Trampusch, 2010). Importantly, however, representatives of large firms are also openly supportive of dual VET (Economiesuisse, 2021; Schweizerischer Arbeitgeberverband, 2023). Nevertheless, they have over the years expressed more concerns about the need to upskill, for instance by pushing for the introduction of vocational schools of higher education in the 1960s and 1970s and the introduction of the vocational baccalaureate and UASs in the 1990s (Culpepper, 2007; Trampusch, 2010).⁵

By contrast, in Germany, small and medium-sized enterprises, especially in the crafts sector, are increasingly complaining that post-secondary VET is losing ground against tertiary education. In response, the German government adopted the federal VET law in 2020 and officially recognized post-secondary VET as part of tertiary education. However, to implement changes, the different occupational ordinances need to be adapted. While this process has already begun in the crafts sector, it remains to be seen whether and how other occupations adapt their training ordinances to this new possibility. Hence, for now, the share of VET

⁵Importantly, Swiss firms increasingly recruit general education graduates with tertiary degrees abroad. Since the late 1990s, immigrants with tertiary qualifications tend to outnumber immigrants with lower educational attainments. In this way, immigration compensates for the education system's comparatively strong focus on VET.

graduates who receive an additional post-secondary VET degree remains comparatively low (see Figure 7).

In sum, both Germany and Switzerland have upskilled their skill formation systems. At upper-secondary level, the share of students in general education has increased since the 1970s at the expense of school-based VET, with dual VET remaining relatively stable. At tertiary level, the share of students has increased in the last decades, especially due to UASs. However, there are important differences. Switzerland continues to emphasize VET at upper-secondary level, has developed a large post-secondary VET system, and has created pathways that facilitate VET graduates' access to UASs. In contrast, Germany increasingly prioritizes general education at upper-secondary level and encourages general education graduates to obtain vocational skills at tertiary level (at UASs or in dual study programs) or by means of regular apprenticeships, whereas post-secondary VET remains underdeveloped.

WHAT EXPLAINS THESE DIFFERENCES IN UPSKILLING STRATEGIES?

The previous section has shown that skill formation systems have undergone considerable change in both Germany and Switzerland. To explain the differences between the two countries, we turn to the Comparative Political Economy literature and, following Graf (2013), analyze the national embeddedness of skill formation systems. We argue that employers' upskilling preferences and the unions' veto possibilities can account for the differences in upskilling strategies (see Table 1).

The German and Swiss skill formation systems offer different political contexts for reform. The Swiss VET system is comparatively voluntaristic and gives firms ample room to redefine contents, add more demanding training programs, and align training with their skill needs. Moreover, there are no national regulations regarding the way intermediary associations in charge of VET occupations organize, which contrasts with the more hierarchically organized and structured German system (Graf, 2013; Rauner, 2008; Strebel et al., 2020). In particular, at the level of individual VET occupations, Emmenegger et al. (2020) show that Swiss unions rarely participate in VET governance, whereas they have to be involved in the German VET system, giving German unions strong veto possibilities. German trade unions are also strongly involved at the level of policy development. In contrast, in Switzerland, “employers play an important role in the development of VET, whereas trade unions have a much weaker leverage on

TABLE 1 Different upskilling strategies in Germany and Switzerland

	Germany	Switzerland
Level of discretion	More hierarchically organized and structured VET system	Voluntaristic VET system with high level of flexibility
Unions' veto possibilities	Unions prominent in VET governance	Unions have limited influence
Employers' outside options	Large firms are increasingly dominant in training provision; large firms are the main constituency of peak-level associations	Both large and small firms are important training providers; both have influential peak-level associations
Upskilling strategy	Growing focus on general education	Continued focus on VET

policy formulation and implementation (Gonon & Maurer 2012, p. 129; see also Emmenegger & Seitzl 2020, p. 40; Rohrer & Trampusch, 2011, p. 148).

Hence, the German system provides unions with strong veto powers, whereas Swiss unions have rather limited influence. According to Mahoney and Thelen's (2009) logic, it follows that the Swiss VET system can be easier to reform than the German one, for instance by creating talent tracks for academically gifted apprentices and adding training possibilities at the post-secondary level. In contrast, the nature of the German skill formation system is constraining, which encourages firms with sufficient resources to look for alternative training opportunities outside the traditional VET system (Graf, 2018).

Who might exploit such reform opportunities? In the Swiss VET system, small and medium-sized firms play a key role as training providers. Around 40% of Swiss apprentices work in firms with nine or fewer employees, whereas slightly more than 10% work in firms with 250 or more employees (Mueller & Schweri, 2012).⁶ In addition, Swiss employers' interests are organizationally divided and the peak-level organization of small and medium-sized firms, the Swiss Trade Association (*Schweizerischer Gewerbeverband*), is an active and influential VET advocate (Emmenegger & Seitzl, 2019; Trampusch, 2010). Therefore, the high level of employer discretion and the prominence of small firms contribute to explaining an upskilling strategy that emphasizes reforming the VET system. In contrast, in Germany's more constraining system, only 15% of apprentices work for firms with nine or fewer employees and 30% for firms with 250 or more employees (Bundesinstitut für Berufsbildung, 2021, p. 191).⁷ Moreover, since employers' interests are organized along industry lines, large firms tend to dominate (Thelen, 2019; Trampusch, 2010). Therefore, an inflexible system where unions are strong veto players and large firms dominate tends to incentivize large firms to look for upskilling opportunities outside the VET system.

Undoubtedly, more research is needed to substantiate this explanation for the observed cross-national differences. To further plausibilize our account, we address three alternative explanations in the following.

First, differences in upskilling strategies might be the result of the different composition of economic sectors. Historically, VET in the form of dual apprenticeships was conceived to offer specific skills to the manufacturing and crafts sectors. Consequently, VET is historically less well-established in the service sector, where more general skills are required (Culpepper & Thelen, 2008). However, with regard to deindustrialization, there are no significant differences between Germany and Switzerland (Durazzi, 2023). Looking at subnational differences casts further doubt about this explanation. German regions traditionally considered the heartlands of VET, such as Baden-Württemberg, display shares of the workforce trained in general education that are even higher than those found in German regions less focused on VET (see Figure 8). At the same time, neighboring Northeastern Switzerland, which due to geographical proximity and regional economic integration, displays similar economic endowments, has primarily focused on keeping dual VET strong and access to general education restricted (Maurer, 2013). Hence, differences in economic structure cannot explain the divergent upskilling paths.

Second, reunification might explain the German focus on academic upskilling. VET, especially in its dual form, has been historically weaker in the Eastern states as opposed to the Western ones (Culpepper & Thelen, 2008). This may suggest an overall declining profile of VET in Germany and a push for upskilling through general education due to reunification. In particular, the Eastern states might have no option but upskilling through general education.

⁶These data are based on the Swiss Company Census conducted by the Federal Bureau of Statistics until 2008.

⁷The German data do not refer to full-time equivalents, while the Swiss data do. Taking full-time equivalents into account reduces the differences between the two countries, but it is unlikely that the difference disappears entirely.

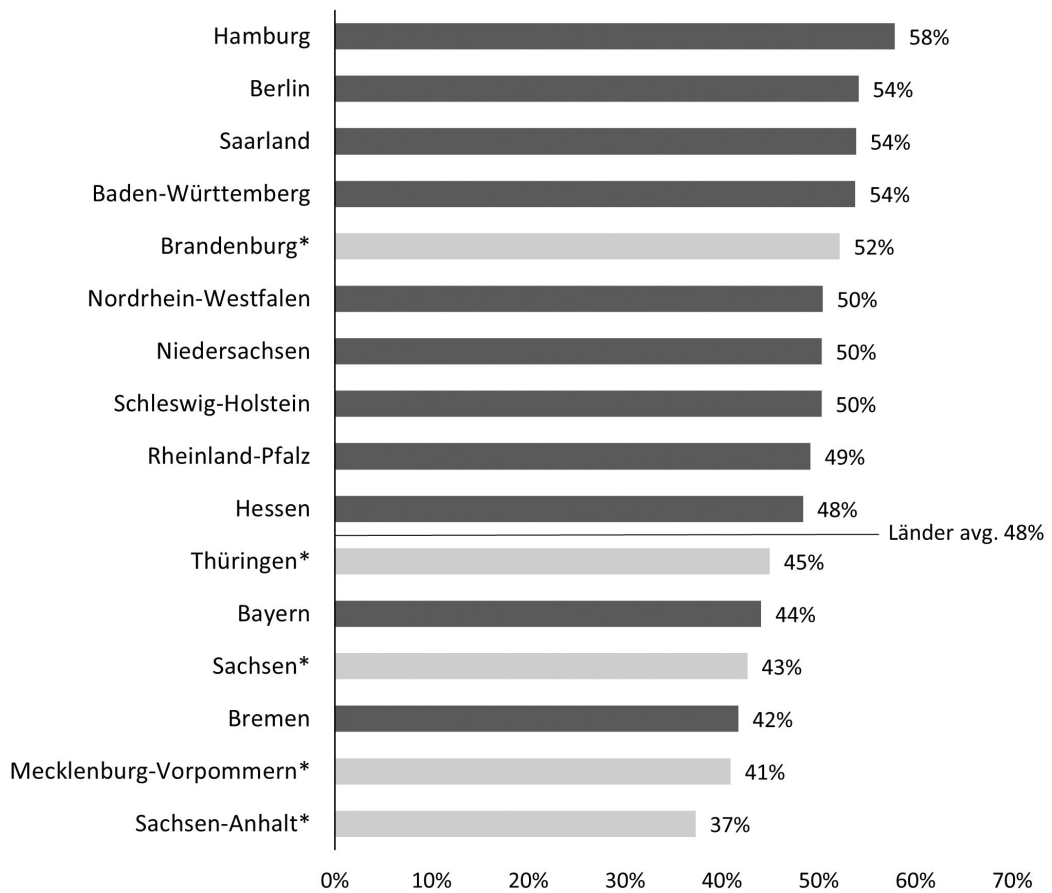


FIGURE 8 Share of school graduates with an academic baccalaureate in German Länder, 2020. *Note:* Light grey indicates Eastern Länder.

However, there seems to be no empirical support for such a claim, as the Eastern states feature lower shares of school graduates with an academic baccalaureate than the national average (see Figure 8). Therefore, reunification does not help explain the German focus on upskilling through general education rather than VET.

Finally, Europeanization processes might have affected the two countries differently. In both countries, the free movement of people within the EU and the resulting mutual recognition of diplomas triggered reform debates, in particular due to concerns about European countries not recognizing diplomas from technical and engineering schools as equivalent to their tertiary-level diplomas (Gonon, 1994; Kahlert, 2006). In return, both countries responded by upgrading these schools to UASs to facilitate the mutual recognition of diplomas. However, the two countries did so at different points in time. As one of the six founding members, Germany faced the question of diploma recognition earlier than Switzerland, which engaged in these reform debates only in the late 1980s, triggered by the prospect of its (ultimately failed) accession to the European Economic Area.

However, this alternative explanation does not convince. The EU's big push towards tertiary education started only in the 1990s. Before that, its discourse focused on the apprenticeship crisis and on how to reform the VET system accordingly. It is therefore not clear why Switzerland should have responded to this outside pressure by emphasizing VET, whereas Germany opted to emphasize general education instead. Alternatively, it could be argued

that in Germany, the turn to general education simply started earlier. In this perspective, Switzerland will ultimately follow in Germany's footsteps – albeit with a time lag. However, so far, Swiss policymakers have resisted any change in their strategy (Maurer, 2013, pp. 21–23). While a convergence to the German approach cannot be ruled out, there is no indication that this will happen anytime soon (Widmer, 2022).

CONCLUSION

The spread of technology and the deindustrialization of societies contribute to economies' increasing reliance on knowledge as a substitute for physical inputs and natural resources. This has implications for advanced capitalism's skills distributions, which increasingly shift upwards according to a trend known as “upskilling”. We consider upskilling to be a deeply political endeavor. To understand it, we must consider the role of the political context in which it takes place. This paper is interested in how upskilling plays out in the countries most reliant on firm-based VET systems to source their skill supplies, namely coordinated market economies (Culpepper, 2001, p. 275). These economies have traditionally relied on large manufacturing sectors supported by mid-skilled workers trained through VET. However, due to demographic change and credentialism, VET has a diminished social standing and education systems are generally pushed to upskill. We ask whether there is still a role for VET in a knowledge economy or whether it is a leftover of the Fordist era. This question is important because VET systems have not only enabled the economic success of coordinated market economies but also performed an essential social inclusion role by including the less academically gifted students, not least working-class youth, into the education system. Reforming VET to upskill should thus also be seen as a social policy, as an upskilled VET system might help a substantial portion of the population succeed in a knowledge economy.

We compared the German and Swiss approaches to upskilling over the period 1970–2020. The comparative-historical analysis finds that in both cases, a growing share of students enters general education at upper-secondary level. This has disadvantaged school-based VET, while dual VET has remained strong. Moreover, the tertiary level has expanded in both countries, especially thanks to the growth of UASs. Hence, in contrast to perspectives influenced by the varieties of capitalism framework (Hall & Soskice, 2001), coordinated market economies have greatly enlarged their higher education sectors (Durazzi, 2023).

However, there are important differences in upskilling strategies. In Germany, we observe upskilling mainly through general education, while vocational elements are added at later stages, for instance through dual study programs. In contrast, Switzerland keeps VET an attractive option at upper-secondary level, by providing VET graduates easy access to more education, for instance through the vocational baccalaureate, conceived as the entry ticket to UASs. Switzerland's decision to emphasize VET is noteworthy. Generally considered to be among the most competitive and future-oriented economies in the world, Switzerland's continued reliance on VET (at both upper-secondary and tertiary levels) suggests that, despite suffering from “image” problems, VET is not necessarily at odds with the skill requirements of a knowledge economy, especially in coordinated market economies. However, we hasten to add that we expect national characteristics to play an important role in informing these adaptation strategies (for instance, on Austria, see Durazzi & Geyer, 2020).

This paper offers a tentative explanation for the observed differences between Germany and Switzerland. The explanation emphasizes firms' skills preferences, the influence of the institutional context on firms' preference formation, and unions' institutionalized role as veto players. We argue that Switzerland's voluntaristic VET system provides firms with plenty of opportunities to reform the VET system. Moreover, the influential peak-level association of small and medium-sized firms has an interest in keeping the VET system strong and attractive.

As a result, Swiss firms, including large ones, pursue an upskilling strategy that strongly relies on the VET system. By contrast, the strong constraints present in the German VET system make it comparatively rigid and allow reforms only at the margins. It is therefore in the interest of firms, in particular large ones, to strengthen general education and add vocational elements around general education only in a second step, and preferably outside the confines of the traditional VET system. While it is likely that these findings can translate to the other coordinated market economies (e.g., Austria, Denmark, and the Netherlands), further research should conduct in-depth process tracing of these countries' upskilling trajectories to ascertain their micro-foundations.

Our findings have empirical and theoretical implications. Empirically, we contribute to the research agenda studying the interaction of structural transformations with coordinated capitalism. Our analysis shows that constitutive elements of coordinated capitalism, such as firm-based VET, can be updated and remain key to countries' adaptation to the knowledge economy. We also emphasize the key role of the institutional context in informing firms' preference formation. Broadly, this shows that there is nothing fundamentally inevitable about structural transformations, as they are deeply political (Herrigel, 2020). Importantly, these reformed versions may have the same potential to balance efficiency and equity as their predecessors. Theoretically, we argue for the need to study upskilling by connecting developments in vocational and general education and in upper-secondary and tertiary education. This is because upskilling often occurs through blurring boundaries to create permeability between systems and hybridizing them (Busemeyer & Thelen, 2022; Graf, 2013). We argue that comparative research should encompass different types and levels of education. Aware of the inherent difficulty of comparing different education systems, we argue that considering points of junction between these separate realms can highlight crucial dynamics unfolding in the knowledge economy.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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