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I N S T I T U T I O N A L D I M E N S I O N S O F S W I S S V E T

**Measures of standardisation, differentiation and vocational specificity in
Swiss upper secondary vocational education and training.**

WORKING PAPER

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1 INTRODUCTION AND MOTIVATION

Swiss VET has a long tradition and is valued as an adequate preparation for labour market entry and for entry into vocationally oriented tertiary education (Cattaneo & Wolter, 2016). It represents the most important pathway into the labour market for Swiss youth, with two thirds of those finishing compulsory school enrolling in VET on upper secondary level (SERI, 2016, p. 11). The dual system, which combines apprenticeship training in a firm with lessons in vocational school and inter-company courses, provides highly specialized skill sets, which correspond closely to the competence profiles required in skilled workers positions. Thus, transition from VET to work is comparably smooth. However, not every diploma holder finds a (matching) job. In Switzerland there is a rising risk of unemployment and skill mismatch for young VET diploma holders. In some occupations there are considerable levels of youth unemployment (Salvisberg & Sacchi, 2014). Thus, there are substantial differences between education programs and training occupations in their capacity to integrate young skilled workers into the labour market.

In international comparative research, differences in institutional characteristics of education systems have been used to explain different patterns of labour market entry. Cross-country-differences in institutional characteristics, such as levels of standardisation, stratification, differentiation, vocational orientation, occupational closure, institutional linkage and certification have been proposed in order to explain why skill development and patterns of inequality at labour market entry differ between countries (Breen, 2005; de Lange, Gesthuizen, & Wolbers, 2014; Konietzka, 2002; Levels, van der Velden, & Di Stasio, 2014; van de Werfhorst, 2011; Wolbers, 2007). However, the mechanisms explaining national differences between occupations are located at the level of national educational programs and can thus not be reliably tested with country comparisons. In other words, there is a lack of research regarding the mechanisms, which explain how different institutional contexts lead to differences in skill development and labour market prospects. Thus, data on within country differences in institutional characteristics is needed. Moreover, with this data it is possible to further explore segment specific or regional differences in the effects of institutional dimension, e.g. the opportunities within labour market segments.

However, information on these within-country differences has hitherto been hard to obtain. Consequently, this topic is largely missing in recent research. Our aim is therefore to provide data on the differences in the institutional characteristics between Swiss upper secondary VET programs. We consider the following dimensions: exam standardisation, vertical differentiation, horizontal differentiation and vocational specificity. Apart from the fact that these dimensions have been fruitful when analysing school-to-work transitions in a comparative perspective, we have chosen these dimensions because they vary substantially between the training occupations of Swiss upper secondary VET. In addition information on these characteristics are easily obtainable in the curricula and ordinances of the training occupations.



Theories on labour market integration point to two main mechanisms explaining why institutional dimensions should affect labour market outcomes. Firstly, it is assumed that institutional dimensions impact the skill and competence development of students, both in terms of the skill profile as well as the competence level. Secondly, with regard to the labour market, it is argued that the signalling power is affected by the institutional arrangements of each training program. The signalling power of a VET Diploma in turn shapes employers hiring decisions and influences job quality features, such as income or the probability for fixed-term contracts, part-time employment or horizontal and vertical match. However, to explore these relationships further, the relevant institutional dimensions have to be defined and operationalized within a national framework. This paper describes the transfer of the theoretical concepts from the comparative literature to the Swiss VET context. In other words, we make suggestions on how to operationalize exam standardisation, vertical differentiation, horizontal differentiation and vocational specificity for Swiss upper secondary vocational education and training.

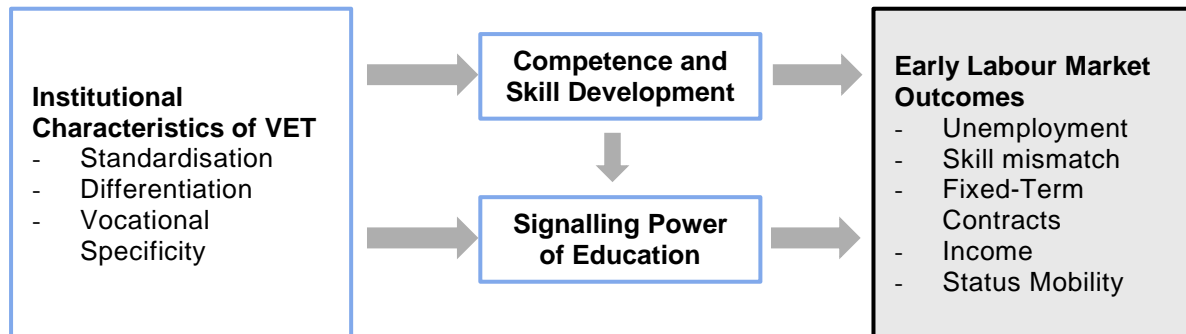
In the remainder of this paper we will give an overview of our theoretical framework and basic assumptions. Thereafter the existing literature regarding effects of institutional characteristics on skill development and labour market outcomes is briefly discussed. In these two sections, we will focus mainly on the theory and empirical evidence regarding labour market allocation. The collected data can, however, be used to investigate other aspects, such as career mobility, further training, inclusion, the apprenticeship market or companies' costs of apprenticeship training. In the fourth section the Swiss VET system as well as the operationalization of the different institutional dimensions within the Swiss context is presented. Last, we give an example on how our data can shed light on the institutional structures of Swiss upper secondary VET.

2 THEORETICAL BACKGROUND

Labour market allocation after completion of VET is the result of a complex interplay between individual agency, labour market opportunities and institutional structures (W. Müller & Gangl, 2003). Although we acknowledge the importance of all these factors, we take an institutional perspective on training occupations and their impact on labour market outcomes. In line with this perspective, our key assumption is that institutional characteristics of training occupations, such as their degree of standardisation, differentiation or vocational specificity, shape learning processes and the competence development of apprentices, which in turn affect their transition into the labour market and their early labour market outcomes (i.e., the probability for unemployment, skill mismatch, income or status mobility). Our basic conceptual model is depicted in Figure 1. We posit that the relationship between institutional characteristics and labour market outcomes may be explained by two central mechanisms: The first refers to the development of human capital through education, the second to the signalling power of a VET diploma. Based on the literature we argue that the extent of standardisation, differentiation and vocational specificity of training programmes is particularly relevant for explaining differences

in the competence and skill development, in the signalling power and thus in the early labour market outcomes of Swiss VET Diploma holders.

Figure 1: Conceptual model of the relationship between institutional characteristics of VET and labour market outcomes



The first mechanism pertains to VET learners' competence and skill development, which is affected by institutional characteristics. In Becker's (1962) terms, education expands individuals' human capital. This in turn, affects their productivity level and ability for further learning, which are rewarded in the labour market. Both the *content* and the *manner of skill acquisition* during education and training are likely to matter in this process. The content of skill acquisition depends on the curriculum and learning objectives of each training occupation. It shapes the apprentices' knowledge and skill development. Depending on how well the learning objectives match the skill requirements in the labour market and how well they prepare for further learning, apprentices' human capital will be sought after and rewarded by employers to different degrees. The manner of skill acquisition depends on the structure and quality of the learning environment, which also matters for the development of skills and knowledge. Learning environments differ between training occupations regarding, for example, their share of practical and theoretical training in different learning locations, the education requirements for teachers and trainers or the tracking of apprentices into different groups according to their intellectual abilities. Such differences between the institutional regulations are likely to impact the process of skill acquisition.

The second mechanism is based on Spence's (1973) signalling theory, which claims that education degrees serve as a signal of productive capacities and trainability. These signals are crucial for the matching of job seekers to jobs. In this process employers seek to fill their vacancies with productive workers with particular skills and (labour market relevant) characteristics. Due to the high degree of uncertainty regarding job applicants' resources and productivity employers strongly rely on educational degrees when making a hiring decision. This holds especially regarding individuals with little or no work experience, who have only just finished their upper-secondary vocational education and training (W. Müller, Gangl, & Scherer, 2002).



The signalling power of a diploma is likely to depend both on the content and the manner of skill acquisition. If the curricula and thus the skill content is labour market relevant the diploma will send a signal of high initial productivity. However, independent of the content, the signals can be seen as more or less reliable, that is have low or high signalling power. High signalling power is likely to be the result of transparent learning contents as well as homogenous groups of learners (W. Müller & Shavit, 1998). With transparency and homogeneity skills and skill levels will vary less within one training occupation. Thus employers can rely more on these signals. High degrees of transparency and learner homogeneity are, for example, more likely in training occupations with a high level of exam standardisation or narrowly defined occupational fields. As a result the signalling power of the diplomas is assessed more positively.

As outlined in the introduction, we assume that the three institutional dimensions standardisation, differentiation and vocational specificity are of particular importance for early labour market outcomes. In the remainder of this section we will conceptualise these dimensions and explain how they are related to students' competence and skill development and the signalling power of degrees.

Firstly, output standardisation describes the extent to which "performance is tested with the same standards nationwide" (Bol & Van de Werfhorst, 2013, p. 6) . In previous research standardisation is defined as centralization of final exit exams as opposed to final grades based on teacher evaluation during the schoolyear. Final exams are classified as centralized when all pupils/students get the same or equivalent exam assignments set by a central and independent authority (Klein, Kruger, Kuhn, & van Ackeren, 2014). Implicitly it is assumed, that these exams are assessed and graded by an independent authority as well. It is argued that centralization makes it easier for different stakeholders like parents, school administration and school authorities to monitor the student's performance. Since schools can neither influence the exam questions nor the grading it's impossible to lower the grading standards to improve final results. Exam standardisation therefore functions as an incentive for the teachers and schools to increase their quality of teaching in order to improve the final average grades (Wössmann, 2002). Competence development and student performance are therefore likely to improve with exam centralization. Further, signalling theory states that degrees are more reliable and comparable with respect to competences acquired during education when final exams are centralized (Piopiunik, Schwerdt, & Wössmann, 2014). In other words exam standardisation increases both individuals' competence level as well as the signalling power of the diploma.

Secondly, differentiation, i.e. the degree to which students are sorted into different tracks and levels, both affects competence development as well as the signalling power of a degree (Brunello & Checchi, 2007). Differentiation has a vertical and a horizontal dimension. Horizontal differentiation describes the sorting of students into different subject specializations. Education programs with a high degree of horizontal differentiation provide students with a



narrow and highly specific set of skills. The signalling power of the corresponding degree will therefore also be stronger. Vertical differentiation, also called stratification, refers to the sorting of students into tracks according to their intellectual abilities. Within the same track students have similar abilities, thus the student group will be more homogenous and the education credential will have a higher signalling power. However, vertical differentiation increases performance inequality (Hanushek & Wößmann, 2006; Van de Werfhorst & Mijs, 2010). Students in higher levels gain from vertical differentiation whereas students in lower tracks achieve less than they would in more heterogeneous classes. This in turn hampers intergenerational mobility on the labour market (Brunello & Checchi, 2007).

Thirdly, human capital theory points to the importance of specific skills for labour market entry. It posits that both the amount of competences as well as the type of skills matter for productivity on the labour market. Regarding the latter, early versions of the theory distinguished between firm-specific and general human capital (Becker, 1962). General capital is transferable between firms while specific capital can be of use only in a particular firm and lacks transferability. Research within this tradition has further developed the distinction between firm-specific and occupation-specific capital (Allmendinger, 1989; B. Müller & Schweri, 2015; W. Müller & Shavit, 1998; Shaw, 1987). Occupation-specific capital is useful within the training occupation and transferable between firms. It will therefore only be rewarded when former apprentices stay in their training occupation after completion of their training. In other words occupation-specific capital is relevant for productivity within the trained occupation. Persons with occupation-specific capital need less on the job training, and are sought after employees (Konietzka, 1999; Lazear, 2009; W. Müller & Shavit, 1998). Their labour market entry should therefore be relatively smooth. However, these individuals could encounter difficulties if their skills become obsolete or if labour supply in the field is higher than demand. General human capital, on the other hand, is transferable between occupations and firms and thus supports occupational mobility (Coenen, Heijke, & Meng, 2015; Hanushek, Schwerdt, Wößmann, & Zhang, 2017; Korber & Oesch, 2016). General capital should therefore be rewarded more throughout the career, for example through further training, or when moving into another occupational field. The proportion of general and occupation-specific skills taught in the educational system is therefore likely to matter at labour market entry and with regards to career opportunities and further education (Rinawi, Krapf, & Backes-Gellner, 2014; Van Eijs & Heijke, 2000; Vogtenhuber, 2014).

3 EVIDENCE ON INSTITUTIONAL EFFECTS

Based on these theoretical strands, research has tested the impact of standardisation, vertical and horizontal differentiation and vocational specificity on educational outcomes. Evidence from international comparative research points to effects of several of these dimensions on, for example, student's performance, unemployment and income. In the next section we will give an overview of the literature, discussing each dimension separately.



Output standardisation, that is centralization of exams, has been connected mainly to competence outcomes in previous literature. Research using the PISA and TIMSS test-scores find that pupils from countries with centralized final exams at the upper secondary level have better math and science scores than those from countries without centralized final exams (Fuchs & Wössmann, 2007; Wössmann, 2003) (See Bol & Van de Werfhorst, 2013 for a contrary result). The positive effect of centralized exams on student cognitive abilities and thus on student performance is confirmed in several studies exploiting regional variance in exam centralization or system changes within countries (Bishop, Moriarty, & Mane, 2000; Jürges, Schneider, & Büchel, 2005; Lüdemann, 2011; Wössmann, 2010). Although the relationship between student performance and labour market outcomes are well known (see Piopiunik, et al., 2014, p. 39 for an overview), only few contributions have tested the effects of exam standardisation on labour market outcomes and further education. Using data from 20 European countries, Levels, van der Velden and Di Stasio (2014) find no evidence that output standardisation affect vertical education-to-job match. Limiting the sample to baccalaureate graduates in Germany, Backes-Gellner and Veen (2008) find no effect of centralized final exams on wages. However, they argue that standardisation of upper secondary school exams should have a greater impact on pupils entering the labour market directly after completing upper secondary level than on pupils who continue their education for several years at the tertiary level. Indeed, Piopiunik, Schwerdt and Wössmann (2014) find that income increases with final exam standardisation for students from school types directly bound for the labour market. Further they find that exam centralization is associated with a lower risk of unemployment.

The impact of vertical differentiation of education systems on students' performance and inequality is a much researched topic within social science. Although tracking is operationalized in different ways, for example through the timing of differentiation, the number of tracks at a certain school level and/or the share of the curriculum that is differentiated, a relative clear picture of the results of vertical differentiation emerge from the literature. It has a negative impact on the performance of students in lower tracks, whilst students in higher tracks perform (slightly) better in homogenous groups than in mixed-ability-groups (Hallinan, 1988; Huang, 2009; Van de Werfhorst & Mijs, 2010; Zimmer & Toma, 2000). Consequently tracking seems to lead to higher inequality of learning achievement (Bol & Van de Werfhorst, 2013; Hanushek & Wößmann, 2006; Heisig & Solga, 2015). Tracking also reinforces the effects of family background on achievement and educational attainment (Brunello & Checchi, 2007; van Elk, van der Steeg, & Webbink, 2009). However, regarding labour market outcomes, the literature is less clear about the results of differentiation. Using several international data sources Brunello and Checchi (2007) find that with increasing duration of tracking the effects of social background on earnings and the probability of unemployment increase. Tracking hence leads to less inter-generational mobility. The fact that differentiation increases the signalling power of diplomas could be the reason why Levels, van der Velden and di Stasio (2014) find a



positive relationship between differentiation and vertical education-to-job-match, and Bol and Van de Werfhorst (2013) find no effects of tracking on unemployment levels.

Lastly, the effects of vocational specificity have been a reoccurring topic in international comparative research, mainly with respect to labour market outcomes. A number of different indicators have been used to capture vocational specificity, depending on the scope of the studies. Often either the manner of skill acquisition or the content of the skill profiles is taken into account. It is assumed that school-based training facilitates analytical and theoretical skills whereas workplace-based learning is assumed to further specific skills (Jonker, van Ophem, & Hartog, 2006; B. Müller & Schweri, 2009). In order to measure skill specificity, international comparative research has therefore often made use of the share of students enrolled in upper secondary education with some sort of workplace-based (so called dual) training (Bol & Van de Werfhorst, 2013; Breen, 2005; Levels, et al., 2014). Alternatively, a few studies have measured specificity with similarity indexes of skill profiles (Eggenberger, Rinawi, & Backes-Gellner, 2015; Vogtenhuber, 2014).

The findings of this body of work shows that the share of dual training in a country positively impacts the numeracy skills of the students (Heisig & Solga, 2015), and reduces national unemployment ratios as well as individual unemployment risks (especially at career entrance) (Bol & Van de Werfhorst, 2013; Breen, 2005; de Lange, et al., 2014; Wolbers, 2007). However, Wolbers (2007) find that specificity has a negative impact on the socio-economic-status of the first job. These findings from comparative research are largely confirmed by research on national education systems. Comparing school-based and dual vocational training, Müller and Schweri (2009) and Eymann and Schweri (2011) find that school-leavers from school-based VET have a higher probability of being unemployed or inactive. Graduates from general training, however, experience higher wage and status gains (Jonker, et al., 2006; Korpi, de Graaf, Hendrickx, & Layte, 2003; Vogtenhuber, 2014). Turning to the impact of specificity on horizontal and vertical education-to-job-match we see less clear research evidence. Levels et. al. (2014) find that the vocational orientation of an education system, that is the share of students enrolled in VET, has a negative impact on the horizontal match. For the vocationally trained this also holds for the vertical match. However, research differentiating between dual and school-based VET shows that the share of dual training increases the probability of both a horizontal and vertical skill match, whilst the share of school-based training is found to reduce the probability of a horizontal match (Levels, et al., 2014; Wolbers, 2003). The results from research comparing students of different occupations and training programs in the German speaking countries generally shows that vocational specificity increases the probability of finding a horizontally matching job (Eggenberger, et al., 2015; Geel & Backes-Gellner, 2011; B. Müller & Schweri, 2009; Vogtenhuber, 2014) (see Damelang, Schulz, & Vicari, 2015 for a contrary result). To our knowledge, there is no national research on the effect of specificity on vertical education-to-job-match.



In sum, we see positive effects of exam standardisation on student performance. However, it is still not possible to conclude on the effect of standardisation on labour market outcomes because of limited research and ambiguous results. Differentiation increases performance inequality but also group homogeneity. It is likely that these mechanisms both hamper and facilitate labour market entry depending on the group taken into consideration. This could explain the inconsistent results regarding differentiation and labour market outcomes. Vocational specificity facilitates a smooth labour market entry and prevents horizontal skill mismatch. Some evidence suggests that those with more general education have steeper career trajectories than those with predominantly occupation-specific skills.

4 IMPLEMENTATION WITHIN A SWISS FRAMEWORK

The main aim of this contribution is to describe the transfer of the institutional dimensions found to be important in international comparative research to the Swiss upper secondary VET context and the ensuing data base. In other words, we ask how we can move from global-cross country indicators to more specific and precise indicators that take into account within country variation in institutional characteristics. Before discussing the operationalization and distribution of each dimension in our newly created data base, we will briefly give an introduction to the Swiss vocational education and training system as well as describe our data sources.

In contrast to compulsory and higher education, vocational (and professional) education in Switzerland is collectively governed by the State, Cantons and professional organizations. This collective governance implicates that each upper secondary training occupation is regulated by a federal ordinance and a federal curriculum. In these ordinances and curricula the educational objectives as well as the institutional conditions (e.g. organization of the examination, share of learning locations) are described in detail. These documents are nationally valid and regularly revised. Therefore there is limited regional difference regarding institutional characteristics. However, Swiss upper secondary VET is highly differentiated, offering approximately 230 different three to four year training occupations leading to a Federal Diploma of VET. This is important for our research, because institutional characteristics such as specificity, differentiation and standardisation vary considerably between training occupations. The target of our data collection is therefore to capture the institutional variation between the occupations. Our data collection is based on the ordinances and curricula of upper secondary training occupations lasting three or four years. Due to the extensive VET reform taking place around 2000 and the limited accessibility of older documents, we consider ordinances and curricula which were in force between the years 2000 and 2015. To cover as many diploma holders as possible across this time period we included the documents in force at the time of the data collection as well as (at least) one previous repealed version of the documents. Our data thus include approximately 550 current and repealed ordinances.

4.1 Standardisation

With the first institutional dimension, standardisation, we measure centralization of the final exams. Since the examination process in Swiss VET is rather complex, we first give an overview of the different competence areas and how they are assessed. We then discuss how we define standardisation within this system.

Figure 2: Composition of the final grade in Swiss upper secondary VET*

	Competence area	Type of assessment
Final Grade	Practical occupation-specific skills	<ul style="list-style-type: none"> • Practical exam(s)
	Theoretical occupation-specific knowledge	<ul style="list-style-type: none"> • Theoretical exam • Previous performance grade(s)
	General knowledge	<ul style="list-style-type: none"> • Theoretical exam • Previous performance grade(s) • Essay

*Simplified Version. See Wettstein, Schmied & Gonon (2014, pp. 253-254) for a complete description.

As depicted in Figure 2, the final grade shown in Federal Diplomas is based on different competence areas: practical occupation-specific skills, theoretical occupation-specific knowledge and general knowledge. These competence areas are assessed in different ways. Practical skills are assessed with one or two practical exams. These exams can either be set and graded by an external cantonal authority or by the trainer in the training firm. Theoretical occupation-specific knowledge is assessed through a theoretical exam and through previous performance grades. Theoretical occupation-specific exam assignments are always set by cantonal authorities. However, these exams can include an oral exam in addition to the written exam. In addition to the exam, theoretical occupation-specific knowledge is assessed with previous performance grades. These are grades based on school and inter-company course performance given by teachers or course-trainers. The weight of these grades within the final grade differs between the occupations. Further, occupations differ regarding how much freedom cantons have to decide on the type of assessment in each competence area. In some occupations the same type of assessment is used across the country. In other occupations the type of assessment varies between the cantons (for an example see chapter 4.1.1). Since the assessment in general knowledge does not vary between the occupations, we do not consider this competence area.

Previous research on standardisation has emphasized the importance of centralization of the *exam setting*, that is whether or not the exam-questions and assignments are defined by a central authority (Klein, et al., 2014). In addition to this aspect, we include centralization of the *exam grading process* in our data. Since these two aspects of centralisation do not necessarily coincide in Swiss VET it is important to consider both. We define centralized grading as final



grades assigned by independent experts who use standardised assessment criteria. By considering both the exam setting process and the grading process separately we have a more adequate measure of output standardisation for the Swiss VET system.

Figure 3 shows which facets of the exam setting and grading process we consider as highly versus lowly standardised. We consider exams set by cantonal authorities to have a standardized content whereas practical exams set by trainers in apprenticeship firms are less standardized. Oral exams and teacher and trainer evaluation are more prone to assessors' subjective standards. Results and grades are thus less comparable between apprentices. We therefore consider occupations with oral exams and a high weight of the previous performance grades to be less standardized than written exams and a low weight of the previous performance grades. Further, we consider training occupations to be less standardised if the cantons differ in how they test the competence areas (not shown in Figure 3). For each training occupation in our data we include indicators capturing the exam setting and the grading agency for each competence area and concomitant assessments. In addition we include the relative importance of each assessment for the final grade.

Figure 3: Indicators for the standardisation level of assessment types (final exams and grades)*

Level of Standardisation	Exam setting agency	Grading agency
High	<ul style="list-style-type: none"> • Practical and theoretical exam prepared by cantonal authorities 	<ul style="list-style-type: none"> • Practical exam graded by experts (Prüfungsexperten) • Written theoretical exams • Low importance of previous performance grades
Low	<ul style="list-style-type: none"> • Practical exam prepared by the trainer in the firm 	<ul style="list-style-type: none"> • Practical exam graded by trainer in the firm • Partly oral theoretical exams High importance of previous performance grades

*Final exams of training occupations with cantonal differences regarding the exam setting and grading agency are defined as lowly standardized.

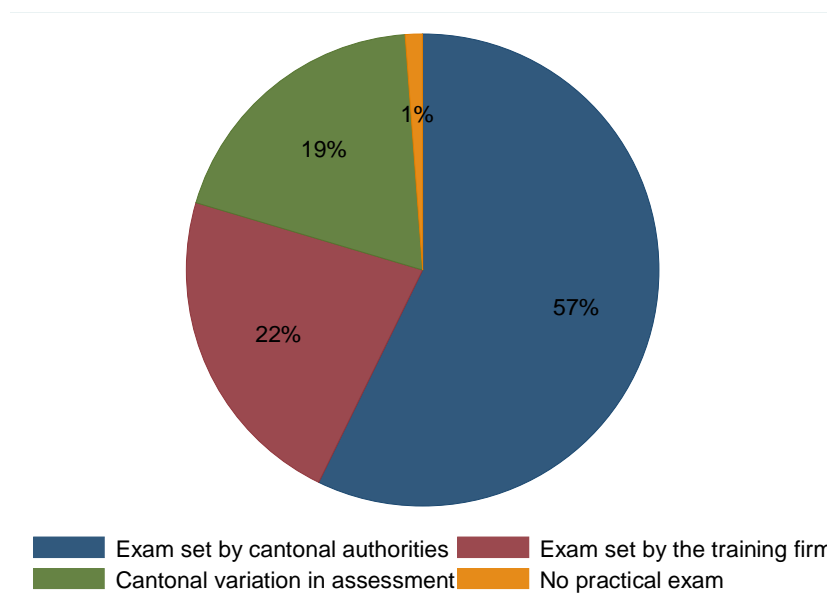
4.1.1 Current Situation

How are standardized and less standardized exams distributed across the current¹ training occupations? Figure 4 shows the distribution of the standardisation level of the practical exams across the 255 current training occupations and field specialisations. 57% of the current training occupations have a standardised practical exam set by cantonal authorities and

¹ All ordinances and curricula in force in 2015

graded by experts. In one fifth of the occupations, each apprentice is given a less standardised exam, prepared and graded by the apprenticeship trainer. Another less standardised group of occupations are those, where the type of practical exam differs between regions (approx. 20%). In these occupations, some cantons prefer to conduct centrally set exam, while other cantons prefer exams set by the trainer. One occupation, commercial employees, does not have a practical exam. Overall, almost two thirds of the occupations conduct standardized practical exams.

Figure 4: Current distribution of practical exam type



4.2 Differentiation

Considering our second dimension, differentiation, we want to measure the degree to which students are sorted into different groups or tracks, both horizontally and vertically. Both types of differentiation can be found in Swiss VET-Occupations. Horizontal differentiation means the sorting of students into different groups which specialize differently. We distinguish between two types of horizontal differentiation within training occupations:

- Field Specializations
- Subject Specializations

In training occupations with field specializations apprentices choose one field. In the last year of training lessons in school and/or in inter-company courses usually focus on the chosen field. The field specialisation is always stated in the federal diploma, where it acts as a highly visible signal to employers. Subject specializations are also chosen by the apprentices and provide the opportunity to acquire more in-depth knowledge of one or several subjects. However this training is usually less extensive than field specializations, (e.g. covers less lessons). In addition subject specializations are not mentioned in the diploma. We include the number of options for both types of specialization within each training occupation in our data. To our

knowledge measures of within-country variation in horizontal differentiation has not been examined before in social research.

In a similar manner, two types of vertical differentiation can be found in Swiss upper-secondary VET:

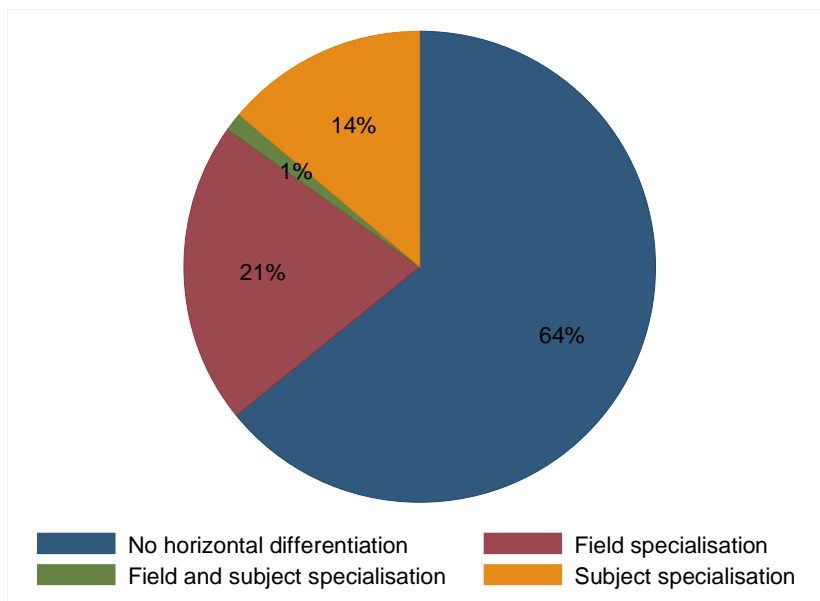
- Basic and advanced levels of training
- Two year programs leading to a Federal Certificate of VET

Firstly, vertical differentiation is found in occupations which distinguish between basic and advanced levels of training. Higher levels are intellectually more demanding and include more lessons in vocational school and sometimes less training in the firm. The completed level is indicated in the diploma. Secondly, several occupational fields have established two year VET programs leading to a Federal Certificate of vocational education and training. These training occupations have lower intellectual requirements than the corresponding three to four year programs. In our data we consider both the levels within the training occupations as well as the occurrence of a Federal Certificate in the same occupational field to represent vertical differentiation.

4.2.1 Current Situation

Taking a look at the current distribution of horizontal differentiation in figure 5, we see that the majority of the training occupations are not horizontally differentiated (64%). 22 % of the current training occupations are divided into two to six field specializations, while 15 % of the occupations provide between one and 21 options for subject specialisation. Regarding vertical differentiation, five occupations are divided into basic and advanced levels (3%) and 35 % of the occupations correspond with a Federal Certificate (not depicted).

Figure 5: Current distribution of horizontal differentiation.





4.3 Specificity

Considering the last institutional dimension, specificity, we distinguish between the types of skills or human capital presented in chapter 2: general, occupation specific and firm specific skills. General education in vocational school pertains to the fields language and communication and society. Subjects in the field of society are ethics, history, politics, identity and socialization, culture, ecology, law, technics and economics. In some training occupations additional lessons in these subjects as well as additional lessons in foreign languages are taught. Occupation specific knowledge is taught in occupation-specific lessons in school as well as in inter-company courses. The main aim of inter-company courses is to provide occupation-specific competences that cannot be acquired in the firm due to firm specialization. During the time apprentices spend in their training firm they adopt occupation specific as well as firm specific skills.

In previous research it has been assumed that general knowledge is to some degree provided in all types of school lessons, including occupation-specific lessons, since theoretical school lessons facilitate the development of analytical skills. In contrast practical training has been assumed to exclusively facilitate the development of work-oriented or occupation-specific skills and knowledge (Eymann & Schweri, 2011; Jonker, et al., 2006; Polidano & Tabasso, 2014). Theoretical education of occupational skills in school is therefore less specific than practical training in apprenticeship firms. This means, in other words, that the level of occupational specificity depends not only on the type of skill but also on the manner of teaching. However, measures of specificity used in previous research have not distinguished between the type of skills taught and how they are taught. Rather these two dimensions are blurred. With information from the curricula and ordinances we are able to disentangle the “what” and “how”-dimensions of vocational specificity and include this in our database. With this data we are able to unravel the effects of the type of skills and the effects of the manner of skill acquisition.

In Swiss VET theoretical education mainly takes place in vocational school. These school lessons include occupation-specific lessons, lessons providing general knowledge and sports lessons. Practical training is provided in the firm. Inter-company courses have an intermediary function, establishing the connection between occupation-specific theory and practice (Wettstein, Schmid & Gonon, 2014: 263). However, since inter-company courses are organized by professional associations and are held in big firms or firm-like centres, we suggest that this training is more practical than theoretical. Figure 6 depicts the type of skills and the manner of skill acquisition in the three different learning locations. Our data includes information on where the competences are taught as well as the proportion of lessons or training received in each location.

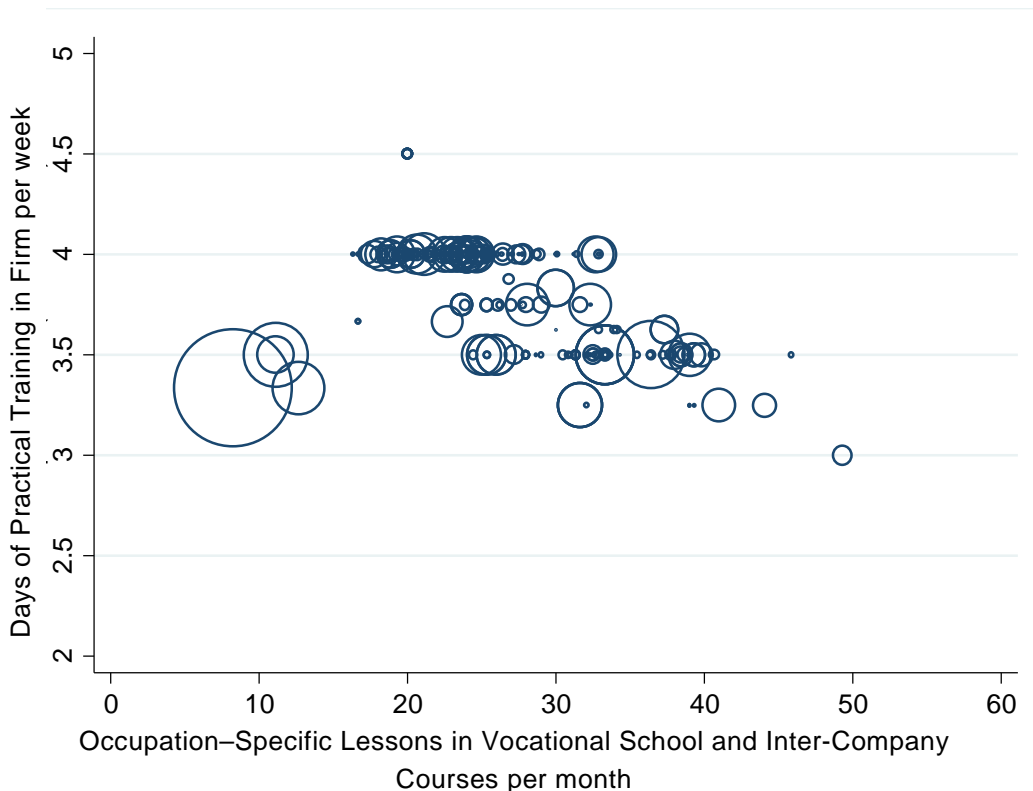
Figure 6: Type of skills and manner of skill acquisition in the different learning locations

Manner of skill acquisition (how)	Type of skills (what)		
	General	Occupation-Specific	Firm Specific
Theoretical	General education in voc. school	Occupation specific lessons in voc. school	
Practical		Lessons in inter-company courses	
			Apprenticeship training in firm

4.3.1 Current Situation

In Figure 7 the distribution of training in the firm and occupation-specific lessons in vocational school and inter-company courses in the current training occupations is depicted. This figure shows in which occupations there is an emphasis on occupation specific knowledge (type of skills) and how this knowledge is taught (manner of skill acquisition). On the vertical axis practical training in the apprenticeship firm is measured in days per week. On the horizontal axis theoretical occupation-specific lessons are measured in lessons per month. Each circle represents one training occupation, weighted by the number of diploma holders within the occupation in 2015. We will first take a look at the numerical distribution and then discuss the weighted distribution, which takes the size of the circles into account.

Figure 7: Current distribution of practical firm-specific training and occupation-specific lessons





There is considerable variation in the number of occupation-specific lessons between the training occupations, from less than 8.2 lessons per month to almost 49.3 lessons per month (Average: 26.3). The number of days of training in the firm per week varies between 3 and 4.5, with an average of 3.8 days a week. A whole range of training occupations emphasize practical training with four (or 4.5) days of training a week and a moderate number of theoretical lessons (upper left side). Another large group of occupations emphasizes theoretical education, with up to almost fifty occupation-specific lessons a month and less practical training (lower right side). Only a few occupations have a comparably low share of theoretical and practical occupation-specific education and training (lower left side). These are occupations that provide more general education than the mandatory ten lessons per month (general lessons not depicted).

So far we have only looked at the numerical distribution of training occupations without taking into account the varying size of the training occupations. The large differences in size of the training occupations can impact the distribution of the institutional characteristics. On the one hand, the ten most popular training occupations cover around half of all apprenticeship contracts in Switzerland (SERI, 2016: 14). On the other hand there are many so called micro-occupations (Kleinstberufe) with only a very small number of apprentices. This can result in a shift in the distribution of the institutional characteristics. Considering specificity, two observations can be made in this regard. Firstly, although only a few occupations do not emphasize specific knowledge (retail employees and commercial employees), they represent a high share of the apprenticeship population. Secondly, occupations with a high number of theoretical lessons and comparably little training in the firm are sparsely represented in the current apprenticeship population. In order to cover the full spectrum of specificity in a sample of apprentices one would have to oversample the occupations with a high number of occupation-specific lessons and a low amount of practical training in the firm, possibly at the expense of retail clerks and commercial employees. This example shows that in order to analyse the impact of institutional characteristics on an individual level, it is important not only to cover a high variety of training occupations during the sampling procedure, but also to take into account how they are distributed across institutional characteristic to maximize institutional variation.

5 SUMMARY

The starting point of this paper was twofold. Firstly, although the dual VET system in Switzerland is considered to be very successful, there are considerable differences between training occupations in their capacity of integrating young skilled workers into the labour market and preparing them for their careers. Secondly, international comparative research has shown that institutional dimensions of the education system matter for school-to-work transitions. It is assumed that institutional characteristics of education systems shape learning processes and competence development of students and apprentices, which in turn affect their transitions opportunities and chances. However, the mechanisms explaining differences in labour market outcomes between training occupations are located at the level of national training programs,



and cannot be reliably tested with country comparison. In order to test these mechanisms we have collected data on differences in institutional characteristics between approximately 550 Swiss upper secondary training occupations. In this paper we have describe the transfer of the institutional dimensions to a Swiss VET context, with the aim of going beyond the simple distinctions between education systems. We have focused on the dimensions found to be important in comparative research: standardisation, differentiation and vocational specificity. We have gone beyond existing research by distinguishing different sub-dimension of standardisation, differentiation and vocational specificity. This has been possible due to the operationalization on a national level, which was the prerequisite for a more detailed decomposition. Further, we have demonstrated that the institutional characteristics vary substantially between training occupations in Switzerland. When considering the population of apprentices, which is unevenly distributed across the occupations, some institutional characteristics are well represented, others are less frequent. With this data on differences in institutional characteristics between VET occupations, we can further disentangle the influence of standardisation, differentiation and specificity on individual transition chances and thus get a better picture of the success factors and pitfalls of dual VET. Further research will show to what extend the identified sub-dimensions of standardisation, differentiation and vocational specificity and their measurement are useful in order to explain the pattern and quality of VET learners' labour market entry and early careers.



6 REFERENCES

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