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From Dreams to Reality: Market Forces and Changes from Occupational Intention to Occupational Choice

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From Dreams to Reality: Market Forces and Changes from Occupational Intention to Occupational Choice

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Abstract

This study empirically investigates whether the relationship between the fraction of filled apprenticeships in a particular occupation in the past and the fraction of prospective apprentices having very early intentions to train in this occupation has an impact on the decision to change the intended choice of occupation. We use a unique dataset from Switzerland containing detailed information on students' early occupational 'dreams' (ages 13-14), before they undergo intensive career counselling, and combine it with information on their ultimate choice of occupation at the end of compulsory schooling (ages 15-16). The estimation results show that although the majority of students revise their initial intentions, those students who dreamed of learning an occupation with more training positions filled in previous years than peers interested in learning this occupation have a significantly higher probability of sticking to their initial dream occupation. Conversely, students who wished to train in an overly popular occupation have a higher probability of delaying the transition to upper-secondary education for at least one year, instead of switching to another occupation. In addition, we find on an aggregated level that a favourable situation on the apprenticeship market ultimately increases the premature contract termination rate due to a person-occupation-mismatch.

Keywords: Occupational choice, educational intentions and decisions, school-to-work transition, upper-secondary education, imbalances on the apprenticeship market

JEL-Codes: D91, I21, J24

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1. Introduction

Dual apprenticeship systems, which combine work-based learning in a company with school-based learning in a vocational school, have recently received a great deal of attention due to their success in integrating young people into the labour market. Two important particularities of these dual apprenticeship systems differentiate them from more school-based systems.

The first particularity of the dual apprenticeship system is that students have to decide at a very early age (14-16) which occupation they would like to train for. Although these decisions are very important, because switching later to a different occupation is costly, surprisingly little is known about the decision-making process and, more precisely, about the factors influencing subsequent changes in the occupational plans of young students (e.g., Bonin, Fitzenberger, and Hillerich 2016). The second particularity is that the market for apprenticeship positions resembles a regular labour market for adults. On the demand side, employers look for apprentices (and therefore offer training positions in specific occupations) and on the supply side, students apply for these positions. As on every market, a complex interplay between supply and demand takes place, so that it is reasonable to assume that the number of training positions offered by employers in some way influences student decisions. However, little is known about whether students react to this market at all, and should they do so, how they react when confronted with an imbalance in supply and demand.

Combining the research gaps that relate to these two particularities, this study asks and answers two questions. The first question is, whether students are more likely to stick to their first occupational aspiration (which we subsequently call 'dream') if the fraction of apprenticeship positions in this occupation was higher in previous years than the fraction of students who dreamed of training in that occupation[1] or whether they have the same probability

[1] There is no statistical information regarding the absolute supply of apprenticeship positions per occupation and there are no statistics concerning the absolute number of applications to apprenticeships in a specific occupation. We therefore construct our own measure of potential imbalance in supply and demand, which we call either a 'potential excess supply' or a 'potential deficit supply' of training positions. We use the term 'potential' for our market proxies to clearly indicate that we constructed these measures and that they do not represent actual imbalances in vacancies and applications for a specific occupation. It is also only a potential excess or deficit supply because firstly, the fraction of filled apprenticeship positions in the past is only a proxy measure for the supply of training positions and secondly, we do not know how many of the students in our survey will eventually apply for the occupation indicated as their future 'dream' occupation. However, it is important to note that occupations with a potential excess supply of training positions are not necessarily equal to the occupations where there are a high number of available positions. The measure we constructed is not correlated with the absolute number of training positions in the respective occupation, which makes us confident that the measure is a proxy for the tightness of the market for training positions and not just an indicator of the absolute number of training positions for a given occupation.

of updating and revising their initial plans as students who are not confronted with an imbalanced situation in supply and demand in the market for apprenticeship training positions.

The second question is whether students confronted with the opposite situation, a potential deficit supply of training positions (i.e. the fraction of apprenticeships in the occupation was lower in previous years than the fraction of students dreaming of training in this occupation), have a higher probability of either changing their occupational intentions or choose to delay their transition into post-compulsory education, with the hope of having better chances later.

To answer our research questions, we collected data from students in Swiss schools to compile a unique dataset containing detailed information on early occupational intentions. Data was collected from an initial survey before the students' actual decision-making process started. We asked students about their educational and occupational intentions at the beginning of the 8th grade, because mandatory, intensive occupational and career counselling at school does not usually begin until later in the 8th grade. Therefore, the intentions we measure reflect 'pure' intentions that have not yet been influenced by counselling activities, labour market realities (e.g., negative responses to applications) or pressure from parents, teachers or peers. Although we ask students about their intentions at a very early stage, the vast majority of them (more than 90%) stated that they had already thought a lot about their future occupation. Therefore, despite the early timing of the first survey, we assume that the students' answers are more than merely unconsidered casual statements. We also conducted a follow-up survey at the end of 9th grade (ages 15-16) to ascertain the ultimate choice of occupation of those students we initially surveyed.

Importantly, we are neither analysing whether students who have already started the application process change to another occupation when confronted with a shortage of training positions offered in their desired occupation nor whether students applying for training positions for which there is an abundant offer of training positions are more likely to accept a training offer in this occupation. Instead, we are interested in the question of whether students are more likely to stick to their very early dreams of their ideal occupation or more likely to abandon these dreams when confronted with a more favourable or unfavourable situation on the apprenticeship market during their search process.

This question is important because all students in our sample undergo mandatory pre-application intensive occupational and career counselling, and therefore we would expect the majority of them to subsequently update or revise their intentions, in the light of the information they receive from teachers, professional counsellors, parents, and employers. Thus, *ex ante* it is not clear whether an imbalance between the fraction of peers with the very early intention of

training in a particular occupation and the fraction of opportunities in previous years on the apprenticeship market for this occupation explains why some students are more or less likely to revise their intentions than others.

Although almost three quarters of the students eventually deviate from their initial dreams, we find that students confronted with a potential excess supply of apprenticeship positions in a specific occupation are significantly more likely to stick to their dream occupation and that students dreaming of an apprenticeship in an occupation with a potential deficit supply (i.e., a likely shortage of apprenticeship positions) have a higher probability of delaying their educational transition. However, this effect varies by student grades in mathematics, where students with very good grades in mathematics are more likely to stick to their initial dream even when facing a deficit supply. In addition, we show that a potential excess supply in particular has consequences for the stability of the apprenticeship later on. Using aggregated data on premature contract termination (PCT) rates per occupation, we find that a potential excess supply increases the PCT rate due to a student-occupation-mismatch.

2. Related literature

The literature concerning changes in college choice and college major choice is partly related to our paper. The decisions made with regard to changes in college choice and college major choice are insofar comparable to the occupational change decisions in apprenticeship training we are looking at, in that they both concern very important decisions regarding post-compulsory education. Stinebrickner and Stinebrickner (2012; 2014), Wiswall and Zafar (2013), and Zafar (2011) use different methods and data sources to analyse how different events or additional information given to students influences changes from the intended college major choice to final college major choice; they find, despite using different methods, that updating of the initial choices takes place and that this updating has an impact on different short-term outcomes. Regarding the timing of the elicitation of the initial phase of our research, our approach of surveying students as early as possible, before any intervention (i.e. mandatory career counselling) had taken place or the application process had been started, is similar to that used by Bond et al. (2018). They ask students before their final SAT exams which college(s) they plan to apply for and relate this to later changes in the college(s) ultimately chosen for application.[2]

[2] Additionally confirming the appropriateness of our approach regarding the timing of the first survey, Zafar (2011) in his conclusion recommends to survey students as early as possible, preferably when they are still in high school. Stinebrickner and

Bonin et al. (2016) refer to the literature mentioned above, concerning the updating processes in college (major) choices, to point out that those studies only apply to systems that focus on general education (i.e. college), but that comparable research about changes in the context of dual apprenticeship systems, where students have to decide much earlier (age 15-16) than in systems oriented towards general education, would be needed. We fill this gap and add to the literature, firstly, by relating information on potential imbalances on the apprenticeship market to changes from occupational dreams to occupational choices at carefully chosen measurement points and secondly, by analysing the influence of potential imbalances on aggregated premature contract termination (PCT) rates. The context of our study is very different from systems oriented towards general education, insofar that: (a) students have to choose a specific occupation considerably earlier than high school students have to choose college majors, (b) the market represented by the employers plays a key role in the system (because students apply for apprenticeship positions to employers and not to schools), and (c) when we survey students for the first time, the transition decision (entrance to college in most of the studies mentioned before) has not yet been made.

Bonin et al. (2016) hypothesize that, contrary to the neoclassical theory, more choice does not automatically imply better outcomes as individuals might just choose what is easiest for them. Linking this hypothesis to our context, we test in the second part of our analysis, in particular, whether a favourable situation in the market could have negative consequences for the stability of the apprenticeship, measured by PCT rates per occupation. We thereby follow Stinebrickner and Stinebrickner (2012; 2014), among others, in their analysis of drop-out rates, but adapt the outcome to our dual apprenticeship context by analysing PCT rates (see also, e.g., Forsblom et al. 2016). Although not all students who terminate their contract prematurely are automatically drop-outs,[3] PCTs in general have serious consequences. Stalder and Schmid (2008) emphasize that all forms of PCT have negative personal consequences for the affected students, irrespective of additional costs for society and the host company. Therefore, an in depth-analysis of the different determinants which result in PCT is important.

In addition to the existing literature on PCT in apprenticeships, which analyses the different individual characteristics or company-specific factors that influence success or failure

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Stinebrickner (2014) also stress the importance of initial beliefs in determining later choices, but also the difficulties in correctly measuring initial beliefs regarding the wording of the questions and the timing.

[3] According to Stalder and Schmid (2008), a PCT can either be a drop-out, a change of occupation (either an upgrade, downgrade or change on the same level of intellectual demand), or a change of the host company. For a detailed analysis about the different influence factors on the different outcomes, see Bessey and Backes-Gellner (2015).

(for literature overviews on this topic, e.g., Bessey and Backes-Gellner 2015; Forsblom et al. 2016; Gambin and Hogarth 2016), we contribute to this literature by introducing potential occupation-specific imbalances prevailing on the apprenticeship market at the time of choosing a specific training occupation as an additional important influence factor on occupation-specific PCT rates. Other studies have considered the general labour market situation and, in particular, unemployment rates as influence factors for PCT, we – to our knowledge – are the first to investigate whether potential imbalances in the supply of and demand for specific occupations are associated with occupation-specific PCT rates.

3. Institutional setting and data

3.1 The Swiss education system

When compulsory education in Switzerland ends after the 9th grade, students proceed to upper-secondary level education; either in general education or vocational education programmes. Students may also delay transition, to upper-secondary education, for a year or more with what is known as 'an interim solution.'[4] About two thirds choose vocational education, and approximately 90% of this group choose a dual apprenticeship, which is the most common form of vocational education in Switzerland. Dual apprenticeships typically last three or four years and combine practical work-based learning at a company and learning applied theoretical knowledge in a classroom.

However, students can only start a dual apprenticeship if they find an employer who is willing to offer them an apprenticeship. If they find a position, students are then automatically enrolled in a vocational school after conclusion of the contract between the employer and student (or the students' parents if he or she is underage). For very popular apprenticeship positions (popular employer or occupation or both), the application process typically starts 12 to 18 months before compulsory schooling ends. Prospective apprentices usually send their applications to several companies and typically spend a short one-week internship before being offered the opportunity to sign the apprenticeship contract with their future employer.

The student's decision-making process during the 8th and 9th grade typically has the following scenario: Schools begin informing and counselling their students at some point during the 8th grade (mandatory). Even before this counselling starts, students usually already

[4] In Switzerland, such a delay usually entails an additional school year at the lower-secondary level. For a more detailed description, see Jaik and Wolter (2016).

have some rough ideas or dreams about their future occupation; however, these ideas have not yet been influenced by the institutionalised process of occupational counselling, as previously mentioned. As students have approximately 240 occupations from which they can choose, detailed information is crucial for the decision-making process. A student or student's parents cannot possibly have an overview of all available options and also be aware of prior knowledge requirements for each individual occupation in general or about the specific requirements of different employers in any particular occupation.

Occupational or career counselling measures come in the form of school careers lessons, counselling from external career counsellors (all Swiss cantons[5] have dedicated career counselling offices), visits to job and career fairs and short-term internships in various occupations. These measures should enable students to make an informed choice. During the decision-making process—which can take a year or more—students sometimes change their ideas more than once. Thus, how initial dreams relate to the students' ultimate decisions is not *ex ante* clear.

3.2 Data

We use a unique dataset from the German-speaking part of the Canton of Bern, where we surveyed 1,514 students at the beginning of the 8th grade, from all three ability tracks (low, middle and academic) in 87 classes from 28 different schools. At the end of the 9th grade we were able to contact 1,446 of them again (response rate of 96%) to gather information on their ultimate educational and occupational choice. Non-response was mainly due to students repeating classes or moving away from the place where they had lived at the time of the first survey. The computer-based questionnaire from the first survey was used for administering laboratory experiments eliciting a number of non-cognitive skills (Buser et al., 2017a, 2017b; Jaik and Wolter, 2016) and for collecting a rich set of student and family background information as well as student grades.

Estimation sample, outcome variable, and descriptive statistics

Our sample contains only students who indicated at the beginning of the 8th grade that they wanted to start an apprenticeship immediately after finishing compulsory education.[6] We then

[5] A Swiss canton is similar to a German Bundesland or an U.S. state.

[6] We exclude students who at the beginning of the 8th grade plan to go to academic education after the 9th grade, as they are not affected by labor market influences at this stage of their educational decision-making process.

combine the information on the 'dream' occupation collected in the first survey with the ultimate choice from the follow-up survey and construct a categorical outcome variable with three values. Of the 633 students for whom we have sufficient information[7], 27.81% chose their 'dream' occupation, 53.55% switched to another occupation and 18.64% delayed their transition. As we have a categorical outcome variable without natural ranking and with three different values, we follow Heywood et al. (2017) and use a multinomial probit model for our statistical analyses.

Potential excess and deficit supply

To construct our two supply proxies, we combine administrative data[8] on filled apprenticeship positions two years[9] before our cohort finishes compulsory education and immediately before they actively started looking for an apprenticeship with the occupational dreams of the students in our dataset. We compare the fraction of filled apprenticeships in a specific occupation[10] with the fraction of students intending to look for an apprenticeship in this occupation in our sample. We then use the resulting differences of these two fractions to build two continuous variables. We label all values above zero as 'potential excess supply' and all values below zero as 'potential deficit supply'. A potential excess supply occurs in 35.23% of the cases and a potential deficit supply in 64.77% of the cases.

In an alternative specification, we construct two dummy variables. As most observations are concentrated between -2 and +2 percentage points (p.p.) (see figure A1 in the

[7] In total, 724 students (50.81% of the full sample) planned to start an apprenticeship at the beginning of 8th grade. We exclude a small number of students who do not provide valid information on their dream occupation (35) or do not plan to do an apprenticeship after the delay (18). We further exclude students who ultimately change the type of education and transition immediately to general education (38), because this change is a valid option for only the 20% highest-achieving students and is unlikely to be driven by market forces.

[8] We use publicly available statistics (Swiss Federal Statistical Office) on the number of new apprentices per occupation in the Canton of Bern in 2013. As all apprenticeship contracts must be registered at the Cantonal Office for Vocational Education and Training, we have the exact number of apprenticeship positions filled per occupation.

[9] Comparing the fractions of filled positions per occupation from several years before and after our point of analysis confirms that, typically, the fractions do not vary much over time. Even if parents or students were aware of these fractions, they would not know whether a high or a low fraction indicates an excess supply or a deficit supply because they would have no or incomplete information as to the intentions of student peers. Indeed, high or low percentages do not correlate with the dummies of excess supply or deficit supply in our data.

[10] No data is available on the precise number of apprenticeships offered per occupation. Nonetheless, using the difference in fractions between filled positions in previous years and current intentions gives a good indication of excess supply or deficit supply for each of the occupations involved.

Appendix), we specify a potential excess supply if the fraction of filled apprenticeships is at least 2 p.p. higher than the fraction of intentions and a potential deficit supply if the difference is smaller than -2 p.p. For the dummy variables, a potential excess supply occurs in 17.06% of the cases and a potential deficit supply in 16.9% of the cases. All results for this alternative specification with the dummy variables are qualitatively similar and shown in the Appendix (Tables A1-A3). The main specification with the continuous variables represents the most conservative estimates.

4. Results

4.1 Main results: Market variables and students' occupational-change behaviour

In Table 1, column 1, we regress the outcome variable on our two supply variables and add controls in column 2. Adding controls increases the effect sizes of our variables of interest. We find that a 1 p.p. increase in the potential excess supply variable increases the probability of choosing the same occupation as initially intended by 4.21 p.p. and decreases the probability of changing to another occupation by 4.68 p.p. The potential deficit supply correlates significantly and positively with delaying the transition into an apprenticeship, and negatively with changing the initial intention (dream).[11]

[11] For more than 10 years now, the total number of available apprenticeship places always exceeded the number of students looking for an apprenticeship (see, https://www.sbfi.admin.ch/sbfi/de/home/bildung/berufliche-grundbildung/lehrstellenbarometer/archiv-lehrstellenbarometer.html). Therefore, we can assume that the overall effect of undersupply is not driven by an insufficient number of apprenticeship places in general.

Table 1: Multinomial Probit Regression - Same Occupation (27.81%), Changed Occupation (53.55%), Delayed Transition (18.64%)

	(1) Without controls			(2) With controls		
	No change	Change	Delay	No change	Change	Delay
Potential Excess Supply	0.0308***	-0.0456***	0.0148**	0.0421***	-0.0468***	0.00474
	(0.00724)	(0.00733)	(0.00685)	(0.00740)	(0.00738)	(0.00666)
Potential Deficit Supply	0.00741	-0.0400**	0.0326***	0.00768	-0.0492***	0.0415***
	(0.0151)	(0.0158)	(0.0126)	(0.0141)	(0.0161)	(0.0117)
Grades & School track	NO	NO	NO	YES	YES	YES
Non-cognitive skills	NO	NO	NO	YES	YES	YES
Parents' Education & Occupation	NO	NO	NO	YES	YES	YES
Socioeconomic Background	NO	NO	NO	YES	YES	YES
Observations	633			633		

Note: The table shows average marginal effects from a multinomial probit. 'Grades and school track' contains grades in mathematics, German, French, and English, and controls for lowest and highest ability track. 'Non-cognitive skills' contain locus of control, risk attitudes, confidence in mathematics, competitiveness, and time considering future occupation. 'Parents' Education and occupation' contains a dummy for parents having tertiary education, and a dummy if students' chosen occupation is similar to that of their parent(s). 'Socioeconomic background' contains controls for age in months, gender, single parent, number of books at home, number of bathrooms at home, only child, immigrant, child of immigrants, and distance in minutes to closest academic school as a proxy for supply of alternative educational options to an apprenticeship. Standard errors in parentheses are clustered at the classroom level.

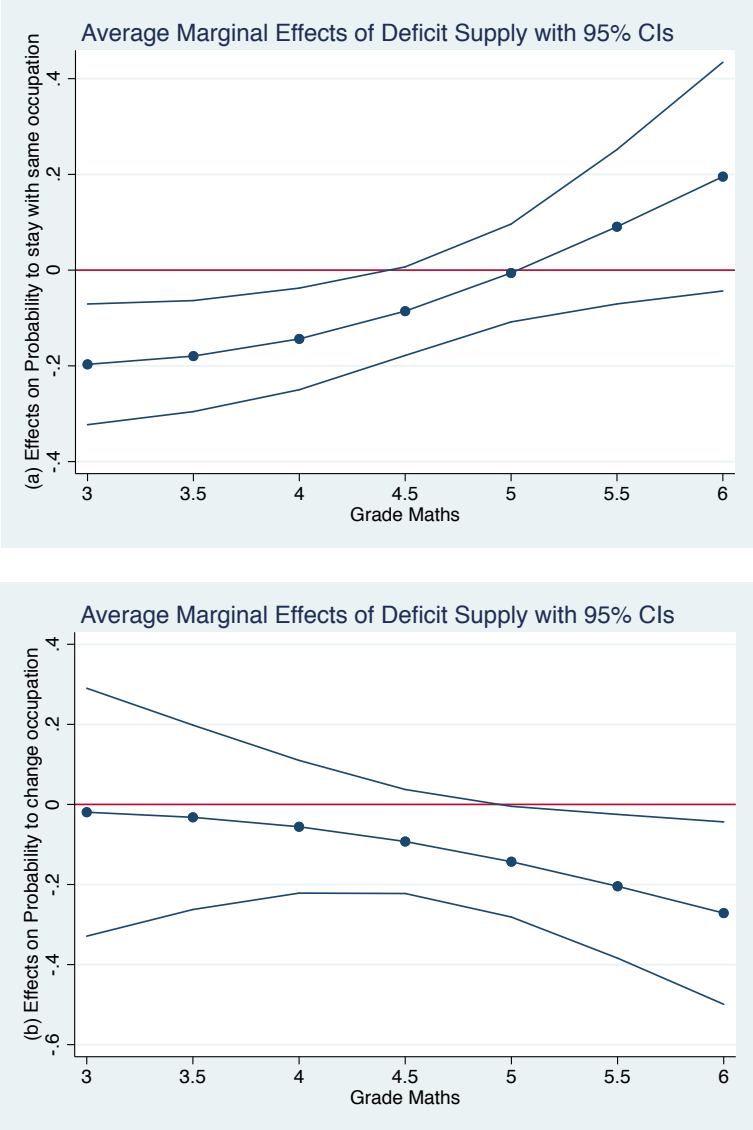
Observable (as well as unobservable) proxies for ability, such as grades and ability track, are important selection criteria for employers who are recruiting apprentices and also influence the probability of an immediate, smooth transition to vocational training and education (Mueller and Wolter, 2014). While we can assume that in a situation of potential excess supply in an occupation the ability of a student plays a less important role in securing a position in the 'dream' occupation, we expect that in a situation of a potential deficit supply only the best will be able to realise their initial dreams. To test whether this expectation holds, we interact the dummy[12] for potential deficit supply with one part of our ability information that is most relevant for this question. More precisely, we use the mathematics grade, because the occupations that have a potential deficit supply all require very good mathematics skills

[12] For a more intuitive interpretation of the results, we use the dummy variable specification of the potential supply variables for the marginsplots. The results for the specification with the continuous potential supply variables are comparable.

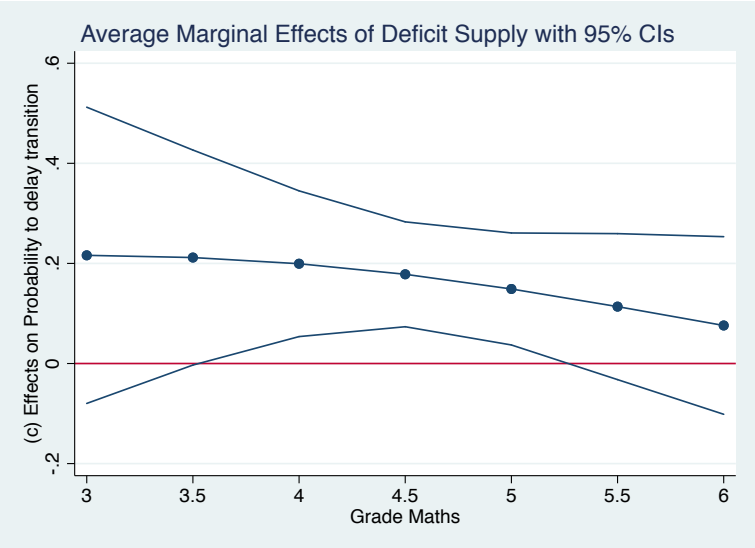
relative to the average of all occupations (60 points on a scale from 1 to 100 compared to an average of 43 points)[13].

Figure 1 shows the relationship between the mathematics grade and the probability of the students' (a) sticking to the early intention, (b) changing the occupation or (c) delaying the transition, when confronted with a deficit supply in the preferred occupation.

Figure 1: Heterogeneous Effects of Deficit Supply by Mathematics Grade



[13] Our information about the requirements in mathematics of an apprenticeship come from the official measure of the Swiss Conference of Cantonal Ministers of Education (EDK) and the Swiss Trade Association (Schweizerischer Gewerbeverband sgv). In addition to the level of intellectual demand in mathematics, this measure contains information on requirements in the mother tongue, in foreign languages, and in science on a scale from 1 to 100. The closer the value comes to 100, the higher the intellectual demand of the apprenticeship. The ranking can be accessed under http://www.anforderungsprofile.ch/.



The results show that given a deficit supply in the preferred occupation, the effects differ by mathematics grade. Students with poor grades[14] in mathematics are less likely to realise their occupational dream, whereas students with very good grades in mathematics are less likely to switch to another occupation. For the group that delays the transition, the results of a deficit supply interacted with the mathematics grade are more homogeneous and only significant (at least at the 5% level) for average students i.e., faced with a deficit supply, only students with average grades are statistically significantly more likely to delay their transition.

4.2 Consequences of a potential excess supply for later stability of apprenticeships

The findings presented in subsection 4.1 raise an important question about the consequences resulting from market variables that influence the students' occupational-change behaviour. If students who face a favourable situation on the apprenticeship market (potential excess supply) stick with a potentially unfavourable early occupational dream, the match between student and ultimate occupational choice may be less efficient compared to the match of peers who face a potential shortage of training positions, and who therefore need to update their initial dream with information about alternative occupations or other educational options.

[14] Grading in Switzerland ranges from 1 (lowest) to 6 (highest), with 4 as the passing grade. In Figure 1, grade '3' contains all grades from 1-3 (fail).

To test this possibility, we analyse the premature contract termination (PCT) rates in the occupations that students in our sample dreamed of and have ultimately chosen.[15] Although we did not follow the students after compulsory school ended, we obtained aggregated data on the PCT rates per occupation for the whole cohort of Bernese students who started an apprenticeship in August 2015—the same year as our cohort—from the Department of Education of the Canton of Bern. We merge the information about the supply proxies we constructed with a very detailed, although aggregated, dataset with the PCT rates by reason for early contract termination and per occupation from the Department of Education.

There are some limitations to our results. With the data we obtained, we can, at the moment, only look at the PCT rates in the first and second year of the apprenticeship. However, the duration of an apprenticeship is 3 or 4 years. Therefore, we have to interpret our results as preliminary. Nevertheless, the PCT rates by the end of the 2nd year are very informative, as most PCTs (on average 84% in 2017) happen in the first and second year (Bundesamt für Statistik BFS 2017). In addition, if a PCT occurs due to a mismatch between the student and the occupation (or the company), the mismatch will likely be evident very early in the training period.

In this aggregated dataset, we are able to distinguish between eight different reasons for PCT – in order of importance: (1) mismatch between student and occupation or company[16] (0.0511306), (2) performance of the apprentice (0.0438745), (3) conflicts between apprentice and employer (0.0254809), (4) health related issues (0.0163685), (5) breach of duty (0.0129936), (6) economic and structural problems in the host company (0.0124873), (7) reasons in private environment of the apprentice (0.0092811) and (8) other reasons (0.0011812). All these reasons together account for the overall average PCT rate (0.1727978). These rates are weighted by the size of the occupation, as each occupation differs considerably in the number of students who learn a particular occupation; there are very small occupations with only one apprentice in the whole Canton, as for example musical instrument makers, and very large occupations, particularly commercial apprentices, who make up one quarter of all apprentices in our sample.

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[15] Of the 82 different occupations that the students dreamed of at the beginning of the 8th grade, 78 were ultimately chosen in our dataset. One additional desired and chosen occupation in our dataset was not listed in the aggregated dataset of the Department of Education of the Canton of Bern, as this occupation is only offered outside the Canton of Bern. The vocational school for this occupation is in another Canton and the students choosing this occupation most likely travel to another Canton (there are regularly open positions for this occupation in the neighboring Canton of Valais). Considering all the above, this finally leads to a reduced figure of 77 observations.

[16] For simplification, we refer to this reason as 'student-occupation-mismatch'.

Not only the large popularity of the commercial apprenticeship, but also two other particularities make it a special case that is different from other occupations. Firstly, while other occupations are typically attached to one particular industry, the commercial apprenticeship is available in twenty-one different industries. Secondly, and partly resulting from the broad structure, the commercial apprenticeship qualifies for a large variety of later careers in different fields, whereas most other apprenticeships prepare students for more clearly defined jobs (Buser, Peter, and Wolter 2017b; SDBB 2018). Due to the special role and size of this apprenticeship occupation, we control for those particularities by using a dummy variable for the commercial apprenticeship, as this might otherwise drive our results. With the data we obtained, we are additionally able to control for the shares of boys and immigrants in any particular occupation, and the overall level of intellectual demand of the apprenticeship occupation.[17]

As our expectation is that the student-occupation-match for students who were confronted with a potential excess supply on the apprenticeship market is less stable compared to students not confronted with such a situation, our main outcome variable of interest is the PCT rate due to a student-occupation-mismatch. The results for the PCT rate and the other seven reasons can be found in Table A3 in the Appendix.[18] We only expect an influence on the PCT rate that is a result of a student-occupation-mismatch, because it is the only reason among the eight reasons that is closely linked to the student's occupational decision and could potentially have been avoided in advance by more intensive search activity of the student and more targeted career counselling. The other reasons for PCT are not directly linked to occupational choice or the problems which could occur, were not foreseeable or beyond the student's control, so we should not expect an influence of the market variables on those other PCT rates.

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[17] We use the overall levels of intellectual demand as described in footnote 13. We have imputed missing values of the level of intellectual demand for 14 occupations by using older and less detailed levels of intellectual demand for these occupations (Stalder 2011). Stalder (2011) collected levels of intellectual demand for 101 occupations rated by experts on a scale from 1 to 6. We divided the detailed overall levels of intellectual demand we use for the main analysis (scale from 1 to 100) into 6 equal parts, took the respective mean of the 6 parts, and allocated those means corresponding to the rank of the occupation in the Stalder (2011) measure. Running a robustness check with Stalders' levels of intellectual demand which are available for all occupations in our sample; although older and less precise results prove qualitatively to be the same. The results are available from the authors upon request.

[18] All results are as expected. As the PCT rate due to student-occupation-mismatch is the only outcome we expect an influence for, the non-significant results in column 1 for the overall PCT rate are in line with our expectations.

In Table 2, in columns 1 and 2, we regress the PCT rate due to student-occupation-mismatch on the supply proxies, add controls for the share of immigrants and boys in columns 3 and 4 and controls for the level of intellectual demand of the occupations in columns 5 and 6. Additionally, in columns 2, 4 and 6 we control for the particularities of the commercial apprenticeship with a dummy variable. The results indicate that a potential excess supply in an occupation is associated with a higher PCT rate due to a student-occupation-mismatch when we control separately for the commercial apprenticeship. In column 6, a 1 p.p. increase in a potential excess supply is associated with a 0.8 p.p. higher PCT rate due to a student-occupation-mismatch. Although this number might seem small at first glance, it means that if the potential excess supply for an occupation increases by 1 p.p., PCT in this occupation would increase by around 4.6%.

Table 2: OLS - Dependent variable: PCT rate per occupation due to student-occupation-mismatch (mean: 0.0511306; std: .0370768)

	(1) Without controls	(2) Without controls + dummy for commercial apprenticeship	(3) With controls: share of immigrants and boys per occupation	(4) With controls: share of immigrants and boys per occupation + dummy for commercial apprenticeship	(5) With controls: share of immigrants and boys per occupation + Overall level of intellectual demand	(6) With controls: share of immigrants and boys per occupation + Overall level of intellectual demand + dummy for commercial apprenticeship
Potential Excess Supply	0.000106	0.00657**	0.000148	0.00789***	0.00116	0.00810***
	(0.00158)	(0.00262)	(0.00169)	(0.00293)	(0.00203)	(0.00301)
Potential Deficit Supply	-0.00897**	-0.00684	-0.00910*	-0.00775*	-0.00720	-0.00705
	(0.00446)	(0.00429)	(0.00458)	(0.00434)	(0.00504)	(0.00478)
Commerce apprenticeship dummy		-0.0510***		-0.0561***		-0.0548***
		(0.0169)		(0.0178)		(0.0183)
Share of immigrants in occupation	NO	NO	YES	YES	YES	YES
Share of boys in occupation	NO	NO	YES	YES	YES	YES
Overall level of intellectual demand of occupation	NO	NO	NO	NO	YES	YES
Constant	0.0552***	0.0496***	0.0402***	0.0341***	0.0625**	0.0427
	(0.00669)	(0.00662)	(0.0135)	(0.0129)	(0.0281)	(0.0274)
R-squared	0.064	0.167	0.085	0.197	0.095	0.198
Observations	77	77	77	77	77	77

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A possible and likely explanation for our finding is that career counselling does not have the same impact on students who are confronted with an excess supply as it does on other students. Although all students receive the same mandatory career counselling as described in section 3.1, students who are confronted with an abundance of training positions seem to cut short their search process at a very early stage, which leads to higher PCT rates later on, due to student-occupation-mismatches. It is probable, that these mismatches could have been avoided with a different career counselling strategy.

5. Conclusions

Using a unique dataset from Switzerland containing information about students' occupational dreams prior to them actively searching for an apprenticeship and making their ultimate choices at the end of compulsory school, we show that although most students report having thought a great deal about their future occupation, most deviate in their actual choice from their initial dream. This high proportion of deviation is not surprising, given that all the students received intensive career counselling and were provided with information regarding the almost 240 different occupations offering dual apprenticeships after we had surveyed them. What is surprising, however, is that students who dreamed of an occupation in which the fraction of apprenticeship positions filled in the past was much larger than the fraction of their peers dreaming of training in this occupation are significantly more likely to stick to their initial dream, despite the intensive career counselling following our survey. Furthermore, we find that students facing the opposite situation, in which the fraction of peers with the same dream occupation is larger than that of apprenticeship positions filled in the past, are significantly more likely to delay their transition into upper-secondary education.

In addition, using an aggregated dataset from the Department of Education of the Canton of Bern, we show that a potential excess supply occupation has negative consequences at least in the medium-term, because it increases the PCT rate due to a person-occupation-mismatch. This finding confirms the hypothesis of Bonin et al. (2016), that contrary to standard economic literature, students do not necessarily choose what maximizes their expected utility (see, e.g., Altonji 1993), but some students just choose what is easiest for them (i.e. training positions in potential excess supply occupations).

If potential excess supply biases students, in their decision-making, towards sticking to an unfavourable early dream, then the intensive and mandatory career counselling (during the 8th and 9th grade) in its current form comes into question; as it appears that for some students, at least, the career counselling does not have much effect on their career choice decision-making process. To avoid student-occupation-mismatches that arise from the influence of a potential excess supply (among other influence factors), career counselling should ensure that students look into different alternatives, e.g., by completing short-term internships in more than one occupation and with more than one company. This is in line with Furlong and Biggert (1999), who call for a broadening of student occupational horizons at a very early age. An additional claim by Bessey and Backes-Gellner (2015) also applies to our findings: career counselling should inform students in more detail about the potential consequences of insufficient preparation, such as PCT or even drop-out, before they make a career choice.

A question that we have to leave open for future research is the following: Recent research results have shown that on average delaying the transition to upper-secondary education, compared to immediately entering, does not improve the students' success in upper-secondary education (Sacchi and Meyer 2016; Mueller 2016). Thus, the question arises as to whether a student delaying his or her transition purely because of a deficit supply of apprenticeship positions is advisable, or whether teachers, career counsellors and parents should try to convince these students to switch to another occupation, especially in cases where the student ability-occupation-match is in doubt.

For future research, it would also be interesting to study if the market proxies we constructed or the changes that are influenced by the market variables also have a more long-term impact on subsequent wage levels or other labour market outcomes.

References

Altonji, Joseph G. 1993. “The Demand for and Return to Education When Education Outcomes Are Uncertain.” *Journal of Labor Economics* 11 (1): 48–83.

Bessey, Donata, and Uschi Backes-Gellner. 2015. “Staying within or Leaving the Apprenticeship System? Revisions of Educational Choices in Apprenticeship Training.” *Jahrbücher für Nationalökonomie und Statistik* 235 (6): 539–52.

Bond, Timothy, George Bulman, Xiaoxiao Li, and Jonathan Smith. 2018. “Updating Human Capital Decisions: Evidence from SAT Score Shocks and College Applications.” *Journal of Labor Economics* 36 (3). doi:10.2139/ssrn.2738204.

Bonin, Holger, Bernd Fitzenberger, and Annette Hillerich. 2016. “Schule – Berufsausbildung – Arbeitsmarkt. Herausforderungen Und Potenziale Der Ökonomischen Berufsbildungsforschung.” *Perspektiven der Wirtschaftspolitik* 17 (3): 208–31. doi:10.1515/pwp-2016-0019.

Bundesamt für Statistik BFS. 2017. “Lehrvertragsauflösung, Wiedereinstieg, Zertikikationsstatus - Resultate der Dualen Beruflichen Grundbildung (EBA Und EFZ), 2017.” Neuchâtel.

Buser, Thomas, Noemi Peter, and Stefan C. Wolter. 2017a. “Gender, Competitiveness, and Study Choices in High School: Evidence from Switzerland.” *American Economic Review: Papers & Proceedings* 107 (5): 125–30. doi:10.1257/aer.p20171017.

Buser, Thomas, Noemi Peter, and Stefan C. Wolter . 2017b. “Gender, Willingness to Compete and Career Choices along the Whole Ability Distribution Gender.” *IZA Discussion Paper No. 10976*. Bonn.

Forsblom, Lara, Lucio Negrini, Jean Luc Gurtner, and Stephan Schumann. 2016. “Dropouts in Swiss Vocational Education and the Effect of Training Companies’ Trainee Selection Methods.” *Journal of Vocational Education and Training* 68 (4). Routledge: 399–415. doi:10.1080/13636820.2016.1222596.

Furlong, Andy, and Andy Biggart. 1999. “Framing ‘Choices’: A Longitudinal Study of Occupational Aspirations among 13- to 16-year-olds.” *Journal of Education and Work* 12 (1): 21–35. doi:10.1080/1363908990120102.

Gambin, Lynn, and Terence Hogarth. 2016. “Factors Affecting Completion of Apprenticeship Training in England.” *Journal of Education and Work* 29 (4). Routledge: 470–93. doi:10.1080/13639080.2014.997679.

Heywood, John S., Uwe Jirjahn, and Cornelia Struewing. 2017. “Locus of Control and Performance Appraisal.” *Journal of Economic Behavior & Organization* 142: 205–25. doi:10.1016/j.jebo.2017.06.011.

Jaik, Katharina, and Stefan C. Wolter. 2016. “Lost in Transition: The Influence of Locus of Control on Delaying Educational Decisions.” *IZA Discussion Paper No. 10191*.

Mueller, Barbara. 2016. “Four Essays on the Economics of Vocational Education and Training.” University of Bern.

Mueller, Barbara, and Stefan C. Wolter. 2014. “The Role of Hard-to-Obtain Information on Ability for the School-to-Work Transition.” *Empirical Economics* 46 (4): 1447–71. doi:10.1007/s00181-013-0709-2.

Sacchi, Stefan, and Thomas Meyer. 2016. “Übergangslösungen Beim Eintritt in Die Schweizer Berufsbildung: Brückenschlag Oder Sackgasse?” *Swiss Journal of Sociology* 42 (1): 9–39. doi:10.1515/sjs-2016-0002.

SDBB. 2018. “Kaufmann/-Frau EFZ.” https://www.berufsberatung.ch/dyn/show/1900?lang=de&idx=30&id=3104.

Stalder, Barbara E. 2011. “Das Intellektuelle Anforderungsniveau Beruflicher Grundbildungen in der Schweiz Ratings der Jahre 1999-2005.” Basel: Institut für Soziologie der Universität Basel/TREE.

Stalder, Barbara E, and Evi Schmid. 2008. “Warum Jugendliche Den Lehrberuf Wechseln.” *PANORAMA*.

Stinebrickner, Ralph, and Todd R. Stinebrickner. 2014. “A Major in Science? Initial Beliefs and Final Outcomes for College Major and Dropout.” *Review of Economic Studies* 81 (1): 426–72. doi:10.1093/restud/rdt025.

Stinebrickner, Todd, and Ralph Stinebrickner. 2012. “Learning about Academic Ability and the College Dropout Decision.” *Journal of Labor Economics* 30 (4): 707–48. doi:10.1086/666525.

Wiswall, Matthew, and Basit Zafar. 2013. “Determinants of College Major Choice: Identification Using an Information Experiment.” *Review of Economic Studies* 82 (2): 791–824. doi:10.1093/restud/rdu044.

Zafar, Basit. 2011. “How Do College Students Form Expectations?” *Journal of Labor Economics* 29 (2): 301–48. doi:10.1086/658091.

Appendix

Figure A1: P.p. Difference per Occupation Between Fractions of Filled Apprenticeships and Students' Dreams

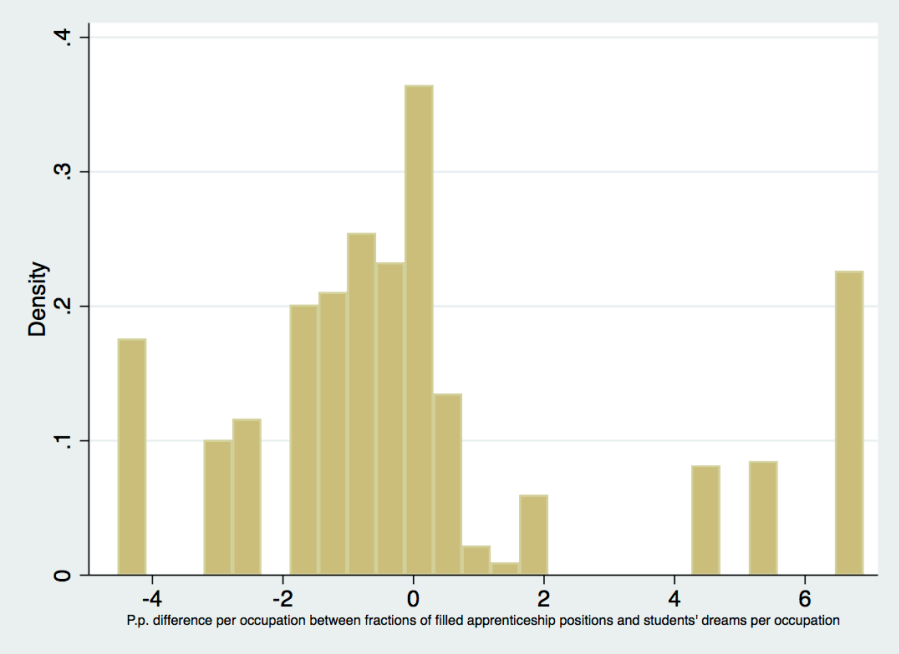

Table A1: Alternative specification with supply proxies as dummy variables (explanation see section 2.2) instead of continuous variables - Multinomial Probit Regression - Same Occupation (27.81%), Changed Occupation (53.55%), Delayed Transition (18.64%)

	(1) Without controls			(2) With controls		
	No change	Change	Delay	No change	Change	Delay
Excess supply	0.156***	-0.216***	0.0605	0.235***	-0.226***	-0.00942
	(0.0493)	(0.0440)	(0.0402)	(0.0525)	(0.0451)	(0.0352)
Deficit supply	-0.0369	-0.0910	0.128***	-0.0412	-0.121*	0.162***
	(0.0463)	(0.0598)	(0.0478)	(0.0439)	(0.0635)	(0.0510)
Grades & School track	NO	NO	NO	YES	YES	YES
Non-cognitive skills	NO	NO	NO	YES	YES	YES
Parents' Education & Occupation	NO	NO	NO	YES	YES	YES
Socioeconomic Background	NO	NO	NO	YES	YES	YES
Observations	633			633		

Note: The table shows average marginal effects from a multinomial probit. 'Grades and school track' contains grades in mathematics, German, French, and English, and controls for lowest and highest ability track. 'Non-cognitive skills' contain locus of control, risk attitudes, confidence in mathematics, competitiveness, and time considering future occupation. 'Parents' Education and occupation' contains a dummy for parents having tertiary education, and a dummy if students' chosen occupation is similar to that of their parent(s). 'Socioeconomic background' contains controls for age in months, gender, single parent, number of books at home, number of bathrooms at home, only child, immigrant, child of immigrants, and distance in minutes to closest academic school as a proxy for supply of alternative educational options to an apprenticeship. Standard errors in parentheses are clustered at the classroom level.

Table A2: Alternative specification with supply proxies as dummy variables (explanation see section 2.2) instead of continuous variables - OLS - Dependent variable: PCT rate per occupation due to student-occupation-mismatch (mean: 0.0511306; std: .0370768)

	(1) Without controls	(2) Without controls + dummy for commerce apprenticeship	(3) With controls: share of immigrants and boys per occupation	(4) With controls: share of immigrants and boys per occupation + dummy for commerce apprenticeship	(5) With controls: share of immigrants and boys per occupation + Overall level of intellectual demand	(6) With controls: share of immigrants and boys per occupation + Overall level of intellectual demand + dummy for commerce apprenticeship
Potential Excess Supply	0.00877	0.0321***	0.00984	0.0395***	0.0189	0.0423***
	(0.00885)	(0.0119)	(0.0102)	(0.0139)	(0.0117)	(0.0143)
Potential Deficit Supply	-0.0229	-0.0229	-0.0264	-0.0283*	-0.0181	-0.0236
	(0.0162)	(0.0155)	(0.0164)	(0.0156)	(0.0172)	(0.0166)
Commerce apprenticeship dummy		-0.0377***		-0.0414***		-0.0383***
		(0.0135)		(0.0139)		(0.0144)
Share of immigrants in occupation	NO	NO	YES	YES	YES	YES
Share of boys in occupation	NO	NO	YES	YES	YES	YES
Overall level of intellectual demand of occupation	NO	NO	NO	NO	YES	YES
Constant	0.0496***	0.0496***	0.0316**	0.0293**	0.0691**	0.0501*
	(0.00563)	(0.00538)	(0.0133)	(0.0126)	(0.0282)	(0.0280)
R-squared	0.049	0.141	0.078	0.181	0.107	0.189
Observations	77	77	77	77	77	77

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A3: OLS - Dependent variable: Drop-out rates per occupation - overall and individual reasons

	(1) Overall PCT rate	(2) PCT performance	(3) PCT conflict	(4) PCT health	(5) PCT breach of duty	(6) PCT economic problems company	(7) PCT private problems	(8) PCT other reasons
Means:	.1727978	.0438745	.0254809	.0163685	.0129936	.0124873	.0092811	.0011812
Potential Excess Supply	0.00207	0.000883	-0.00824***	0.00121	0.00203*	-0.000960	-0.000962	1.35e-05
	(0.00545)	(0.00285)	(0.00244)	(0.00115)	(0.00111)	(0.00128)	(0.00103)	(0.000288)
Potential Deficit Supply	-0.00346	0.00141	0.00121	-0.000945	-0.00108	0.00324	1.70e-05	-0.000262
	(0.00866)	(0.00452)	(0.00388)	(0.00183)	(0.00177)	(0.00203)	(0.00163)	(0.000458)
Commerce apprentice-ship dummy	-0.0721**	-0.0187	0.0291*	-0.00904	-0.0180***	-0.00224	0.00314	-0.00161
	(0.0331)	(0.0173)	(0.0148)	(0.00701)	(0.00677)	(0.00775)	(0.00623)	(0.00175)
Share of migrants in occupation	YES	YES	YES	YES	YES	YES	YES	YES
Share of boys in occupation	YES	YES	YES	YES	YES	YES	YES	YES
Overall level of intellectual demand of occupation	YES	YES	YES	YES	YES	YES	YES	YES
Constant	0.316***	0.0812***	0.103***	0.0401***	0.0223**	0.00531	0.0225**	-0.00145
	(0.0496)	(0.0259)	(0.0222)	(0.0105)	(0.0101)	(0.0116)	(0.00934)	(0.00262)
R-squared	0.442	0.276	0.333	0.192	0.304	0.155	0.149	0.136
Observations	77	77	77	77	77	77	77	77

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1