EDUCATIONAL DECISIONS UNDER UNCERTAINTY

Dissertation

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Yvonne Oswald
from Aadorf TG, Switzerland

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Prof. Dr. Uschi Backes-Gellner
Prof. Dr. Egon Franck

The Faculty of Economics, Business Administration and Information Technology of the University of Zurich hereby authorizes the printing of this dissertation, without indicating an opinion of the views expressed in the work.

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INTRODUCTION

Some time ago I faced the decision to either start a Ph.D. or to continue working for an international company. After three years of practical work experience, I was clearly aware of the opportunity costs of higher education. However, I faced uncertainty about both short-term effort costs and long-term labor market benefits. The decision about whether or not to return to academia is an illustrative example of what economists call a "human capital investment decision." As in this example, human capital investment decisions are typically made under uncertainty.

This doctoral thesis builds upon a large literature that views educational decisions as human capital investments resembling investments in physical or financial capital. Human capital theory, as pioneered by Becker (1962) and Schultz (1961), states that individuals will invest in human capital only if the expected rate of return exceeds the costs of investment. No matter who makes the educational decision (e.g., students, parents, or employers) and no matter when it is taken, it

remains an intertemporal choice that requires tradeoffs over time: whereas costs typically occur in the short-run, benefits of the human capital investments are generally reaped with a considerable time lag. Given that not only the benefits of the human capital investment but also the short-term costs are imperfectly foreseeable, these investments are subject to considerable uncertainty. This has been acknowledged ever since the theoretical contributions by Levhari and Weiss (1974) and Williams (1979).

There is a wealth of theoretical literature on human capital investment decisions under uncertainty. However, numerous fundamental empirical questions still remain unsolved. In particular, there is a lack of research on human capital investment decisions accounting for individual differences in both preferences and behavior patterns. The aim of this thesis is thus to provide an elaborate empirical examination of whether, and if so, how individual differences in preferences and behavior patterns lead to differences in human capital investment decisions. In doing so, the thesis focuses on two important decision makers, who deal with uncertainty of educational investments in different environments. The first two chapters focus on the human capital investment decisions of students in formal schooling, i.e., in upper secondary vocational education. The third chapter shifts the focus from students to employers who are the main providers of continuing, work-related training—a still formal educational investment, although it does not lead to an official educational degree.

Both students and employers clearly face considerable uncertainty when investing in human capital. Typically, students face uncertainty regarding short-term investment costs (i.e., direct effort and indirect opportunity costs) and deferred investment benefits (i.e., expected advantageous labor market outcomes). A main source of uncertainty lies in their future academic performance and thus their time and effort to be devoted to future learning activities. Like students, employers also experience uncertainty when investing in the continuing training of their workers. A major source of uncertainty is the period in which employers reap the benefits, i.e., workers' future working time volume with the firm—an unknown from an employer's perspective. Examining educational decisions of both students and

employers thus is an important prerequisite for contributing to the understanding of educational investments under uncertainty. Whether, and if so, how heterogeneities in individual preferences and behavior patterns lead to differences in the educational investments of these two decision makers is carefully examined in the following three chapters of this thesis. The next three paragraphs provide a comprehensive overview of the individual research questions addressed, present the data used, and give a brief preview of the results.

Given the considerable heterogeneity in time preferences among students (Bettinger and Slonim, 2007; Castillo et al., 2011), the first chapter explores the relation between students' degrees of patience and their probability of dropping out of education. While schooling costs and benefits are uncertain before the start of an educational program, after enrollment, students not only accumulate human capital but also reduce their uncertainty about costs and benefits of schooling. Incorporating this new information, students reconsider their initial educational investment decision (Manski, 1989; Altonji, 1993). Theoretically, the outcome of the reconsidered decision is determined by students' time preferences: Depending on their degrees of patience, discounted benefits accruing from graduation may or may not outweigh current and near future costs of schooling. This relationship has not yet been empirically examined, most likely because objective measures of students' time preferences are not easily available. To understand the role of time preferences in explaining why students leave an educational program before graduation, we collected a unique data set on students in vocational education and training programs. This specific data set allows us to combine objective, experimental measures of time preferences with real-world observations of student outcomes. Analyzing the data, we find that the degree of patience is a robust predictor of dropout behavior: Patient students, i.e., students with low discount rates, have a lower probability of dropping out of education compared to less patient students.

The first chapter demonstrates the importance to account for time preference heterogeneity in the analysis of dropout behavior. Consequently, in the second chapter, in the analysis of students' school performances, we continue to account for preference heterogeneity. While the results in the first chapter suggest that less

patient students are not sufficiently sensitive to long-term schooling benefits, the second chapter examines whether short-term financial incentives are a means of bridging the gap.

More precisely, the second chapter investigates the effect of financial incentives on student performance and assesses whether, and if so, how the program effect depends on economic preferences. With the provision of short-term financial incentives, part of the investment benefits can be reaped much closer to the investment and with a relatively higher certainty (Levhari and Weiss, 1974; Blinder and Weiss, 1976). Because financial incentives thus particularly target the needs of students who are either less patient or less risk loving, we expect the effect of financial incentives in education to interact with students' time and risk preferences. While a fair amount of studies on the pure effect of financial incentive programs on student performance exist, little is known about these heterogeneous incentive effects. The second chapter contributes to the research on financial incentives in education using the self-collected data set on students in vocational education and training programs. Empirical evidence shows that financial incentives have on average a positive effect on student performance. In particular, the evidence suggests that highly impatient students respond strongly to financial incentives by increasing their student performance more than patient students. Same as the first chapter, thus also the second chapter provides strong evidence for individual preferences being related to how students decide about their human capital investments.

Clearly, individuals not only differ in their preferences but also their behavior patterns. As these types of differences continue to exist in the labor market, the third chapter turns the focus to the examination of how (unobservable) differences in behavior patterns among workers affect employers' decisions about training provision. A major source of uncertainty in employers' decisions about whether or not to provide training to their workers refers to their return period, i.e., workers' future working time volume with the firm. To overcome this uncertainty, employers use observable indicators predicting their return period. As part-time workers typically spend less time in the labor market, part-time employment status is a reliable indicator for a lower return period. Not surprisingly, existing literature on

training persistently finds that training participation is lower for part-time than for full-time workers (for an overview see Blundell et al., 1996). However, how the uncertainty and the usage of such indicators might cause systematic differences in the provision of training for female and male workers in part-time and full-time employment is unknown. This difference, however, is important to be investigated given the highly unequal distribution of part-time participation between female and male workers. To close the research gap on gender differences in the part-time/full-time training gap, the third chapter draws on both human capital and statistical discrimination theory and exploits a rich Swiss data set. The empirical evidence shows that the part-time training gap differs by gender suggesting that the unobservability of behavior patterns among part-time workers affects employers' training decisions differently depending on the gender of their workers.

Drawing an overall conclusion, this thesis clearly shows that in the analysis of educational investment decisions under uncertainty it is necessary to account for heterogeneities in both preferences and behavior patterns among individuals. The following three chapters draw detailed conclusions for each research question. The final chapter highlights the major contributions by summarizing the results and their potential policy implications.

CHAPTER 1:

WHAT DOES EXPERIMENTAL DATA ON TIME PREFERENCES REVEAL ABOUT REAL-WORLD DROPOUT BEHAVIOR?

1.1   Introduction

Given the positive outcomes related to a more highly educated population, the extensive research on dropout behavior is no surprise (see Krueger and Lindahl, 2001). The commonly identified reasons why students discontinue their educational programs are broad, including factors related to both student characteristics and the institutional environment (for an overview and particular examples, see Bound and Turner, 2011 or Rumberger, 2001). Empirical studies recently conducted by economists (Eckstein and Wolpin, 1999; Oreopoulos, 2007) contribute to the understanding of dropout behavior referring to differences in student characteristics.

These scholars[1] suggest that (among the many factors) the underestimation of lifetime benefits from staying in school plays a pivotal role in explaining why students leave an educational program before graduation.

Less well explored is the underlying reason, i.e., the source of this underestimation of schooling benefits and its consequent dropout behavior. The underestimation may stem from students' lack of information about schooling benefits, their inabilities to foresee delayed gratification, or their high time preferences (i.e., their high discount rates). Given that time preferences vary considerably among students (Bettinger and Slonim, 2007; Castillo et al., 2011), time preference heterogeneity is a natural assumption and thus of particular interest for any analysis of dropout behavior. Yet previous studies on schooling outcomes either treat time preference heterogeneity as unobserved (e.g., Eckstein and Wolpin, 1999), assume that other parameters represent initial preferences (e.g., parental income, see Card, 1995), or completely neglect time preference heterogeneity in their analyses. In this study, we have an objective behavioral measure of students' time preferences available and are thus able to examine whether high time preferences may be an underlying reason why students leave an educational program before graduation.

This chapter investigates whether students' degrees of patience predict their dropout behavior. To empirically investigate this relationship we collect a comprehensive data set that is unique in its combination of experimentally elicited data on students' time preferences and real-world data on students' schooling outcomes: First, for the outcome, we observe whether students drop out or continue three to four-year educational programs. Second, using standard decision-making designs, we grasped the rare opportunity to elicit measures of time preferences

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[1] Oreopoulos (2007) studies the effect of compulsory schooling laws on school attainment. His findings demonstrate that the overall benefits accruing from graduation are substantial. Consequently, he assumes that schooling costs on their own are unlikely to cause dropout behavior. He suggests that ignorance or the heavy discounting of substantial lifetime gains generated by additional schooling might explain dropout behavior. Similarly, Eckstein and Wolpin (1999) empirically investigate school persistence, estimating a sequential model (a methodology that treats initial traits as unobserved). Their model provides a number of reasons for why students leave an educational program before graduation; one of them being that dropouts might have lower expectations about the rewards from graduation. Both of these studies thus share the conclusion that "dropouts" differ systematically from "stayers" in how they perceive the rewards of completed education. The underlying reason for this difference in perception of rewards, however, has not yet been investigated.

directly in classrooms when our student sample started their educational programs at an average age of 16. Our student sample takes part in vocational education and training programs—the most attended upper secondary educational program among youths in Switzerland. Although schooling at this stage is no longer compulsory, graduating from upper secondary education is crucially important both for successful entrance into the labor market and for long-run labor market benefits.

By showing that students' degrees of patience significantly determine their probability of dropping out, our empirical results deepen our understanding of the underlying reason for dropout behavior. Patient students, i.e., students with low discount rates, have a lower probability of dropping out of school than relatively less patient students. Because less patient students highly discount deferred schooling outcomes of completed education, i.e., lack the ability (or willingness) to forgo immediate gratification for future consumption, long-term schooling benefits less likely offset their short-term schooling costs. For policy makers who tackle the problem of upper secondary school dropouts, our finding adds a new dimension suggesting that interventions should also factor in the weakness of less patient students to wait for gratification.

The chapter proceeds as follows: Section 1.2 provides the hypothesis. Section 1.3 presents the data, describes the key variables, and gives descriptive statistics. Section 1.4 presents the empirical strategy. Section 1.5 links students' dropout behavior with their behavior in the experiments. Section 1.6 concludes.

1.2   Dropping out: A reconsideration of the schooling decision

The human capital theory (originated by Becker, 1962 and Schultz, 1961) provides a straightforward economic model to analyze educational investment decisions: Individuals only invest in their own education if the expected present discounted value of the benefits is higher than (or at least equal to) the expected present discounted value of the costs of schooling. The original human capital model implicitly assumes that the consequent outcome of a schooling decision is graduation. Learning and thus revising educational decisions is not built into the original model.

Manski (1989) and Altonji (1993) augment the original model by accounting for the option of decision revisions. In their work on schooling investment decisions, students decide about their schooling investments not only before starting a new educational program but also while they are attending it.[2] Differences between these decisions reflect information updates that students receive while attending school. Becoming aware of the real effort costs of learning, gaining a profound insight into a certain occupation and profession, or finding out about the opportunity costs of studying (e.g., wages of unskilled workers) exemplify information updates that students receive while pursuing a particular education. Incorporating this new information, students reconsider their educational investment strategy and thus their decision about whether or not to continue schooling.

Not continuing schooling, i.e., dropping out of an educational program, becomes the optimal strategy whenever the sum of the schooling costs (i.e., current costs plus expected discounted value of the costs of the additional years of schooling) exceeds the sum of the schooling benefits (i.e., current benefits plus expected discounted value of the long-term benefits).[3] Just as the original decision (about whether or not to make a schooling investment), the decision about whether or not to

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[2] Recent empirical evidence confirms this purely theoretical contribution by showing that students sequentially update information and make—and in some cases revise—investment decisions throughout their years of education (Stinebrickner and Stinebrickner, 2012; Zafar, 2011).

[3] From a student perspective, the dropout behavior is reasonable at the time, although, in the long-run (and accounting for long-term labor market benefits of schooling) it is not his or her optimal educational investment strategy.

continue schooling is an intertemporal decision depending on students' degrees of patience (e.g., Card, 1995; Frederick et al., 2002): Reconsidering the schooling investment decision, less patient students (as opposed to patient students) are closer to the margin of dropping out, because less patient students face a lower present value of schooling benefits that less likely outweighs current and near future costs of schooling. Holding the degree of patience constant and assuming that information updates are not conditional on patience, we test the following hypothesis: Patient students—as opposed to relatively less patient students—have a lower probability of dropping out of an educational program.

1.3   The data, key variables, and sample characteristics

To understand the role of time preferences in explaining dropout behavior, we collected a well-suited data set that comprises three key features: (1) two-years observation on our outcome variable, i.e., whether a student dropped out or stayed in school, (2) information on our main independent variable, i.e., students' time preferences, and (3) student characteristics, including their socio-economic background, important ability measures, and information on the students' social environments.[4] We collected this data set in collaboration with the vocational schools and the cantonal (state) office, the "Mittelschul- und Berufsbildungsamt" (MBA) in Zurich.[5]

1.3.1   The sample: Swiss students in upper secondary vocational education

Our basis data set consists of 265 upper secondary students from 14 complete classes in three public, tuition-free vocational schools in Switzerland.[6] Students in our sample are part of a vocational education and training program, meaning that they study part-time at vocational schools and work part-time at host

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[4] We combine laboratory and field data from the same individuals. This combination is to our advantage, because preference parameters reflect the preferences of the student population about which we want to draw an inference.
[5] The same data set is used in Backes-Gellner and Oswald (2012).
[6] These schools are located in the greater region of Zurich, the largest Swiss city, located in the German-speaking part of Switzerland.

companies. As in Switzerland 70% of the graduates of lower-secondary education enroll in vocational education (SCCRE, 2011), our student sample represents the largest part of young adults pursuing an upper secondary educational program.

Sixty percent of the students in our sample participate in training programs in the commercial sector (planning to become commercial employees) and 40% in the technical sector (planning to become either electricians or polytechnicians).[7] The training program for students in the commercial sector lasts three years and includes training in a broad range of skills for carrying out administrative work in various industries. In contrast, the training programs for students in the industry sector last four years and include training in industrial skills. While electricians learn specific skills for setting up, installing, and maintaining complex electrical wiring systems, polytechnicians learn how to fabricate special tools and work pieces required in the production sector, to program and operate machines, and to monitor different types of production.

1.3.2   The key variables

A. Experimental measures of time preferences

We elicited time preference parameters using decision-making experiments that build on standard experiments used for example by Burks et al. (2009), Dohmen et al. (2010), and Meier and Sprenger (2010). The experiments were implemented in students' classrooms right at the beginning of the vocational education and training program.[8] We elicited two time preference parameters: For the first parameter, students chose between payments provided in either 3 or 6 months for each of 20 payoff alternatives. The point at which a student switched from the delayed payment (always 100 CHF) (about 107 USD)[9] to the earlier payment (ranging from 5 to 100 CHF) indicates a student's degree of patience. The higher the value of the switch point, the more patient a student is. We use this continuous measure for our main

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[7] These three training programs are among the top 10 of the 230 training programs offered in Switzerland (OPET, 2011).

[8] For information on the experimental instructions see Appendix A1. For the original tables and instructions see the section "Additional Material" (Section A: Survey 2009, "Studienteil 3").

[9] In 2012, the payout of 1 CHF was equal to 1.07 USD.

analysis investigating whether students' degrees of patience determine their probability of dropping out.

The second time preference measure differs from the first only in the timing of the payments: Students chose between payments provided on the same day or in 3 months. If the switch point of the "today vs. 3 months" setting is lower than the switch point of the "3 vs. 6 months" setting, students have time-inconsistent preferences. These time-inconsistent preferences are also referred to as "hyperbolic" preferences (for an overview of papers on time-inconsistent preferences, see Rabin, 1998 and O'Donoghue and Rabin, 1999) and refer to individuals who are less patient in situations involving the near present (or the immediate present) than in situations solely involving future events. We control for students with hyperbolic (time-inconsistent) preferences in one of our specifications in the empirical analysis.

Relative to the purpose of our study, our time preference elicitation approach has one distinct advantage. Because we elicit students' preferences right at the beginning of their educational program, individual preference parameters are up-to-date without being determined by the educational environment (e.g., influenced by experiences gained while either working for the host company or attending the vocational school) in which we analyze dropout behavior. This advantage, however, does not accrue without compromise. Adopting this elicitation approach, the major concession we make is that preference parameters are only abstracted preferences that may be influenced by the framing of the experiment (for related literature, see Loewenstein and Prelec, 1992). For example the degree of patience might be underestimated, as experimental results suggest that the degree of patience is higher for larger monetary amounts. Our empirical results will show whether these abstracted laboratory preference measures are able to predict real-world dropout behavior.

B. Real-world dropout behavior

We label students "dropouts" if they are not continuing the vocational education and training program that they began in 2009 and we label students "stayers" if they are continuing the program. The outcome variable thus refers to young adults who reversed their schooling decision they have had taken before the start of the educational program (to end up in a situation that might be more or less desirable).

To collect information on our outcome variable (after having collected the baseline variables in August 2009), we follow each student for two consecutive years: In collaboration with the three vocational schools, we conducted follow-up surveys in the years 2010 and 2011 and contacted the students who were not contactable via schools individually by mail (and later reminded them by phone calls). For non-respondents, we complement our data with information from a cantonal (state) office, the "Mittelschul- und Berufsbildungsamt" (MBA) in Zurich. If a student was still living in the greater region of Zurich, the MBA was able to provide relevant information about whether a student dropped out of the training program and, if so, whether the student restarted an upper secondary education.

1.3.3   Descriptive statistics

For the descriptive statistics and empirical investigation, we analyze 240 students. Following the students for two consecutive years, we face two types of limitations that reduce our sample size by 25 students (from 265 to 240): First, we exclude the six students for whom we have no follow-up information as to whether they continued the training program. Second, we drop the 19 students who did not report complete and valid information on our baseline variables of interest (for the list of baseline variables, see table 1.1).[10]

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[10] One might expect that students who continue the training program are less likely to be one of the 19 students excluded from the sample. We estimate a probit model to test whether the probability of being excluded from the sample is determined by the dropout status. We find no significant relationship.

A. Sample composition

Table 1.1 presents descriptive statistics and differences in means between stayers and dropouts. The variables presented in the table are the control variables used in our multivariate analysis.[11] While columns 1 and 2 in Table 1.1 list the means and standard deviations for the entire sample, columns 3 and 4 report the same for the sample of dropouts. We would like to emphasize that we collected all of the control variables, including the time preference measure, as part of our base survey in 2009 when students started the vocational education and training program.

For the dropouts, we find that 20 students (9%) dropped out of the vocational education and training program between August 2009 and August 2011. While nine students (4%) completely dropped out, the other eleven (5%) dropped out but later restarted an upper secondary education. These numbers are consistent with data on apprenticeship contract terminations, i.e., dropout rates, in the vocational education and training program in the canton (state) of Zurich.[12] Our full sample of dropouts can be characterized as follows: First, they are early dropouts, 60% of the students dropped out during their first year. Second, they are almost evenly distributed between the two sectors (9 industry sector students and 11 commercial sector students).

For the degree of patience, descriptive statistics show that students started their vocational education and training with a fairly heterogeneous level of time preferences (see subgroup E, table 1.1): The degree of patience, representing the point at which students switched from the higher (6-months-delayed) to the lower (3-months-delayed) payoff alternative, varies from the lowest to the highest possible option with a mean of 75 CHF and a standard deviation of 20 CHF.

For the composition of our sample, we discuss the control variables using five subgroups (see subgroups A to E, table 1.1). The first subgroup includes personal characteristics (i.e., gender dummy, native speaker dummy, and age):

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[11] Our data set includes a wide range of additional variables. We carefully chose these variables both from existing literature and for their power to explain dropout behavior.

[12] The cantonal office "MBA" reports an overall contract termination rate of 9% of students attending a vocational education and training program in 2008 (Bildungsdirektion Kanton Zürich: MBA, 2009).

Thirty-seven percent of students in our sample are female. Eighty-three percent of the students are native German speakers. Students started their vocational education and training program at the average age of 16.

The second subgroup represents ability proxies (i.e., math grades at the end of lower-secondary education[13], a dummy for whether or not students entered into upper secondary education with delay[14], and a dummy for whether or not mothers have a higher education degree[15]): More than one fifth of the students (22%) completed a voluntary tenth school year, thereby delaying entrance into upper secondary education (and later the labor market). A rather small group of students (17%) have mothers with a higher education.

The third subgroup covers the students' social environment (i.e., a dummy for students' affiliation with deviant peers and a dummy for whether or not a student has parents who are divorced): Almost every third student (30%) reports to be affiliated with deviant peers, i.e., with people (or at least one person) who either are unemployed or work as unskilled workers. More than one fifth of the students (22%) have parents who are divorced. The fourth subgroup constitutes the occupations in which the students are undertaking the training (as described in subsection 1.3.1).

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[13] Students report average math grades received prior to the vocational education, i.e., at the end of lower-secondary education in 2009, on a range from 1 to 6 (with 4 to 6 as passing grades).

[14] Graduates of compulsory lower-secondary education may delay entrance into upper secondary education by enrolling in a voluntary tenth school year. This additional school year does not lead to an additional educational degree and is provided for two purposes in particular: It either offsets what has been missed in compulsory education or supports the decision-making process of young adults who are undecided about the form of upper secondary education they want to attend.

[15] "Mothers with a higher education degree" here means mothers who have at least either a post-vocational education or a university degree.

Table 1.1: Descriptive statistics and differences in means.

	Means and Standard Deviations				Differences in Means	
	All Students		Dropouts		Stayers vs. Dropouts	
	Mean	Std. Dev.	Mean	Std. Dev.	Diff.	Std. Err.
A. Personal characteristics	(1)	(2)	(3)	(4)	(5)	(6)
Female (1/0)	0.367	[0.482]	0.250	[0.444]	0.127	[0.113]
Native speaker (1/0)	0.829	[0.377]	0.800	[0.410]	0.032	[0.088]
Age (at entrance in voc. educ.; 2009)	16.358	[0.912]	16.350	[0.875]	0.009	[0.214]
B. Ability measurements						
Math grade average (1 lowest, 6 highest)	4.833	[0.632]	4.613	[0.564]	0.241	[0.147]
Delayed entrance in voc.educ. (1/0)	0.221	[0.415]	0.400	[0.502]	-0.195 **	[0.096]
Mother: Higher education (1/0)	0.171	[0.377]	0.200	[0.410]	-0.032	[0.088]
C. Social Environment						
Deviant peers (1/0)	0.296	[0.457]	0.450	[0.510]	-0.168	[0.106]
Divorced parents (1/0)	0.221	[0.415]	0.300	[0.470]	-0.086	[0.097]
D. Occupations						
Commercial (1/0)	0.592	[0.492]	0.550	[0.510]	0.045	[0.115]
Electrician (1/0)	0.204	[0.403]	0.350	[0.489]	-0.159 *	[0.094]
Polytechnician (1/0)	0.204	[0.404]	0.100	[0.308]	0.114	[0.094]
E. Economic Preferences						
Degree of patience (0 - 100)	75.125	[19.91]	67.250	[24.68]	8.591 *	[4.626]
Hyperbolic (1/0)	0.463	[0.499]	0.400	[0.502]	0.068	[0.117]
Degree of risk preference (0 - 9)	4.925	[1.682]	4.750	[2.149]	0.191	[0.493]

Notes: (i) The statistic is based on 240 observations, with 220 being "stayers" and 20 being "dropouts." (ii) "Means and Standard Deviations" columns report averages and standard deviations in square brackets. (iii) "Differences in Means" columns report differences in means (from two sample t-tests) and standard errors in square brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.10$ indicate significance levels of the differences in means. (iv) Listed variables are collected at the very beginning of the upper-secondary educational program in 2009.

The fifth subgroup accounts for further economic preferences (i.e., hyperbolic preferences and the degree of risk preferences) besides the previously described degree of patience. Descriptive statistics show that almost half of the students in our sample (46%) are hyperbolic discounters.[16] These students come from both ends of the distribution of the degree of patience, meaning that some of them have a higher and other a lower degree of patience. For students' degrees of risk preferences[17], descriptive statistics indicate that the average switch point is where the expected value of the lottery option turns to be lower than the value of the safe option.

B. Differences in means between stayers and dropouts

We expect dropouts to differ from stayers in the characteristics described. Columns 5 and 6 in Table 1.1 show the differences in means and their standard errors. To evaluate differences in means between stayers and dropouts, we use t-tests. Because we calculate differences in means as the mean score for stayers minus the mean score for dropouts, a positive difference implies higher values for stayers. In general, Table 1.1 shows that students who leave the educational program before graduation have mean characteristics different from the sample of stayers. Primarily, we find significant (or at least marginally significant) differences among the ability measurements. The sample of stayers has on average higher math grades (p=0.103) and is less likely to have had entered into upper secondary education with delay (p=0.044). In addition, stayers are also less likely to be affiliated with deviant peers (p=0.116).

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[16] This percentage corresponds to the quota found by Bettinger and Slonim (2007), where 43% of the children have time preferences consistent with hyperbolic discounting.
[17] For information on the adopted approach to elicit risk preferences, see Appendix A2.

Most interestingly, regarding time preferences, descriptive statistics show that the average degree of patience is 76 CHF for stayers and 67 CHF for dropouts, respectively. This difference in means is significant (p=0.065), indicating that dropouts are on average less patient than stayers.[18] Figure 1.1 provides a preview of our results by plotting the distribution of the degrees of patience for stayers (dashed line) and dropouts (solid line). The figure offers visual evidence for different degrees of patience between students who continue the educational program and students who dropped out. For the dropouts, we observe a shift of the cumulative distribution function to the left indicating that dropouts are less patient than stayers.[19] To further investigate whether dropouts and stayers differ in their degrees of patience, we conduct a probit regression analysis.
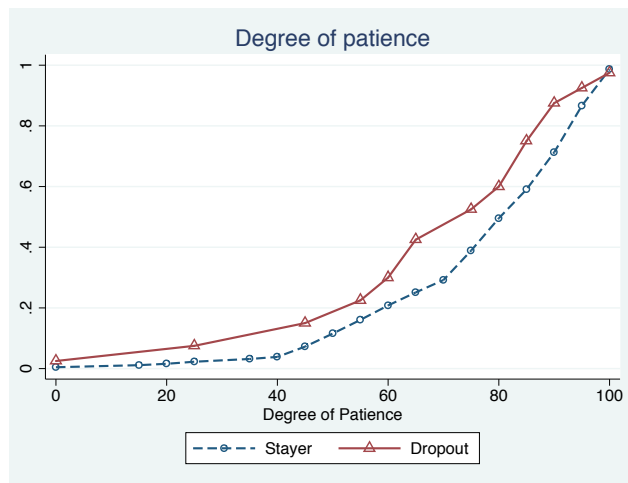
Figure 1.1 CDFs of the degrees of patience.

Notes: The panel plots the cumulative distribution functions of the degrees of patience for both stayers and dropouts. The degree of patience is measured by the switching points from the choices between payoff alternatives in either three or six months.

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[18] Relaxing the normality assumption, we conduct a nonparametric Wilcoxon rank-sum (Mann-Whitney) test on this difference. The result suggests a marginally statistically significant difference (p=0.107) between the underlying distribution of the degree of patience by stayers and dropouts. An increased degree of patience thus shifts the distribution toward stayers.

[19] A formal test of the equality of distribution (i.e., the two-sample Kolmogorov-Smirnov test), however, reveals that the difference between the two distributions is not statistically significant (p=0.298).

1.4 Empirical strategy

We estimate a probit model with the dependent binary variable, *dropout*, which equals one if a student dropped out of the vocational education and training program initially started in 2009 and zero if a student continued the training program. The key independent variable is the *degree of patience*. To reduce unobserved heterogeneity, we include a set of control variables X in the model. We use the following equation to estimate the probability of dropping out for student (*i*):

$$\text{Prob}\left(dropout_i = 1 \middle| x_i\right) = \Phi\left(\beta_0 + \beta_1 \, degree \, of \, patience_i + \sum\nolimits_{k=2}^{n} \beta_k X_{ik}\right), \qquad (1.1)$$

with Φ being the normal cumulative distribution function.

We use five model specifications, in which we gradually include different subgroups of control variables. The inclusion of these subgroups is mainly motivated by existing empirical evidence on dropouts (see, e.g., Stinebrickner and Stinebrickner, 2008; Eckstein und Wolpin, 1999; Maani and Kalb, 2007). The first specification includes just occupation controls. The second specification adds personal characteristics (gender dummy, native speaker dummy, and age). The third specification additionally covers ability measurements (math grades achieved in lower-secondary education, a dummy for whether or not a student entered into upper secondary education with delay, and a dummy for whether or not a mother holds a higher education degree). The fourth specification accounts for students' social environments (including two dummies: affiliation with deviant peers and divorced parents). Finally, the fifth specification covers further economic preferences (hyperbolic dummy, degree of risk preference).

1.5 Results and Discussion

1.5.1 Results

A. Main finding

Table 1.2 shows the coefficients of our probit regressions on the determinants of the probability of dropping out. Our results suggest that a student's degree of patience is an important factor to be considered in the analysis of dropout behavior (row 1, table 1.2). The results show that the more patient a student, the lower his or her probability of dropping out of the vocational education and training program. This result is consistent with the descriptive statistics and confirms our hypothesis. After enrollment, students reconsider their educational investment strategy incorporating information updates. Now that at least part of the schooling costs are real, less patient students face a higher probability of dropping out, because highly discounted future schooling returns are less likely to offset their (updated) schooling costs.

B. Robustness of our finding

In the following, we examine whether the degree of patience is a robust predictor of dropout behavior. We find that the coefficient on the degree of patience remains significant and its sign stable when we gradually include the subgroups of control variables in specifications two to five (table 1.2). Adding further controls reduces unobserved heterogeneity and increases the pseudo R^2 from 0.043 (specification 1) to 0.151 (specification 5).

The signs of the coefficients on the controls are as expected (with the exception of the coefficient on mother's education) and consistent with the findings of existing upper secondary dropout studies (among others, see Petrongolo and San Segundo, 2002; Eckstein and Wolpin, 1999; Rinne and Järvinen, 2011; Maani and Kalb, 2007). At least one coefficient per subgroup (except for the subgroup of further economic preferences) significantly determines the probability of dropping out.

With regard to the robustness of our results, the inclusion of two types of subgroups is of particular interest: first, "ability measurements" and second, "further

economic preferences." Given that recent literature suggests a positive relation of cognitive ability and the degree of patience and a negative relation of the degree of risk aversion and the degree of patience (e.g., Burks et al., 2009; Dohmen et al., 2010), one might expect that, with the inclusion of both ability and risk preference controls, the coefficient on the degree of patience would lose its significance. The stable coefficient on the degree of patience indicates that patience, at least in our analysis, captures, if at all, only part of the variation in ability and risk preferences and is thus an important factor to be considered in the analysis of dropout behavior.[20]

Finally, the coefficient on the degree of patience is also robust to the exclusion of students who might not have understood the instructions for the experimental task. In the experiment, the final payoff alternative involved the choice between 100 CHF in three months (today) over 100 CHF in six months (in three months), respectively. Although the earlier alternative had the same value as the delayed alternative, 8 of the 240 students chose the delayed alternative. As those students might not have fully understood the task of the experiment, but currently are included as highly patient students in our sample, we test the robustness of our results by excluding those students from our analysis. We find that the results remain stable. The significance of the coefficient on the degree of patience even marginally increases. Results are available from the authors upon request.

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[20] Our result matches empirical evidence found by Bettinger and Slonim (2007): Examining inter-temporal choices of 5- to 16-year old children, they find that private schooling and test scores do not significantly correlate with patience. Similarly for risk preferences, Booth and Katic (2012) find that cognitive ability (measured by the Australian percentile ranking) is not related to the risk preferences of young adults aged 20. Same as in our study, these scholars do not use IQ measures to proxy cognitive ability (in contrast to Burks et al., 2009; Dohmen et al., 2010).

Table 1.2: Probit estimates for the probability of dropping out.

	(1)	(2)	(3)	(4)	(5)
Degree of patience (0 - 100)	-0.009 * (0.005)	-0.010 * (0.005)	-0.010 * (0.006)	-0.013 ** (0.006)	-0.012 ** (0.005)
Personal characteristics					
Female (1/0)		-0.449 (0.330)	-0.520 (0.337)	-0.588 * (0.349)	-0.592 * (0.348)
Native speaker (1/0)		0.017 (0.317)	-0.140 (0.338)	-0.126 (0.343)	-0.173 (0.341)
Age (at entrance in voc. educ.; 2009)		0.007 (0.136)	-0.171 (0.213)	-0.287 (0.197)	-0.272 (0.194)
Ability measurements					
Math grade average (1 lowest, 6 highest)			-0.377 * (0.194)	-0.310 (0.198)	-0.315 (0.197)
Delayed entrance in voc.educ. (1/0)			0.730 ** (0.350)	0.795 ** (0.338)	0.815 ** (0.336)
Mother: Higher education (1/0)			0.079 (0.317)	0.067 (0.324)	0.067 (0.322)
Social Environment					
Deviant peers (1/0)				0.476 * (0.249)	0.474 * (0.245)
Divorced parents (1/0)				0.302 (0.283)	0.313 (0.285)
Further Economic Preferences					
Hyperbolic discounter (1/0)					-0.180 (0.247)
Degree of risk preference (0 - 9)					-0.048 (0.068)
Log pseudolikelihood	-65.86	-64.86	-60.74	-58.85	-58.43
Pseudo R-squared	0.043	0.058	0.118	0.145	0.151
Number of observations	240	240	240	240	240

Notes: (i) The table reports binary probit estimates for the probability of dropping out of upper-secondary vocational education. (ii) The key independent variable is the student's *degree of patience* representing the point at which students switch from a "6-months-delayed" payoff to a lower but only "3-months-delayed" payoff. (iii) Further control variables refer to students' personal characteristics, ability proxies, social environments, and further economic preferences. These control variables are conducted at the very beginning of the upper-secondary educational program in 2009. (iv) Robust standard errors are reported in brackets. (v) All specifications include occupation controls. (vi) *** $p<0.01$, ** $p<0.05$, *$p<0.10$ indicate significance levels.

1.5.2   Discussion

Finding a significant and robust relation between the degree of patience and the probability of dropping out does not immediately reveal whether patience increases schooling or schooling increases patience. Some might argue that the degree of patience is endogenous, e.g., determined by education. Our carefully chosen setting, however, allows us to argue that, for our fairly homogeneous sample of students[21], heterogeneity in their degrees of patience may cause dropout behavior. As we measured time preferences at the very beginning of the educational program, over the two years period in which we analyze dropout behavior the educational environment should not determine our preference measure. Our results thus indicate that a higher degree of patience could cause a student's dropout probability to be lower. Of course, as we are not able to control for educational selection, our conclusions may not be generalizable to young people who have never started such a training program.

1.6   Conclusions and Implications

Our study provides first empirical evidence on whether students' degrees of patience, measured by economic experiments, determine students' probabilities of dropping out of education. Analyzing a self-collected data set on students in upper secondary education, we find that patient students have a lower probability of dropping out than relatively less patient students. This finding is robust to the inclusion of covariates and confirms our hypothesis.

After enrollment, while attending a particular educational program, students learn about real costs of schooling and consequently reconsider their educational investment decision (first taken before the start of the educational program). For less patient students who highly discount long-term benefits accruing from graduation, schooling benefits are less likely to offset current and near future schooling costs. Consequently, this group of students faces a higher probability of dropping out.

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[21] Our sample consists only of graduates from lower-secondary education who had chosen exactly the same form of upper secondary education, i.e., a dual-track vocational education and training program.

The finding of this study contributes to two streams of literature: First, given that the degree of patience is one of the various facets of students' noncognitive skills, our result adds to the evidence (on educational outcomes) that investigates the relationship between noncognitive skills and dropout behavior (e.g., Coneus et al., 2010; Heckman et al., 2006). As with our results, these scholars find that increased noncognitive skills (in their case measured by items different from preferences) reduce the probability of dropping out. Second, by showing that abstracted experimental measures of time preferences robustly predict real-world schooling outcomes, the study contributes to the literature that successfully combines laboratory measures of preferences with field behavior (among others, see Castillo et al., 2011; Chabris et al., 2008).

In this study, we use dropping out of vocational education as an example of an upper secondary school environment for students aged 16 and above. Reducing the number of upper secondary school dropouts is among the top educational targets in many OECD countries.[22] Our findings clearly suggest that the degree of patience is an important determinant of the probability of dropping out—a determinant for which both researchers and policy makers have to account not only in the analysis of dropout behavior in education but also in the design and execution of policies that tackle the dropout problem.

Policy makers may tackle the problem at different points in time: First, in upper secondary education, interventions may aim at either decreasing the schooling costs or increasing short-term schooling benefits per se (as a means of bridging the gap of otherwise remote schooling benefits).[23] Second, in lower-secondary education, interventions may contribute to well-founded educational choices

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[22] Reducing the number of dropouts among youths aged 18 to 24 is a major target in the strategic framework for cooperation in education and training in Europe (Official Journal of the European Union, 2011), where EU Member States decided to increase the percentage of school graduates to more than 90% by 2020. This target is comparable to that in Switzerland, which aims at increasing the upper secondary completion rate from 90% to 95%.

[23] Examples of recently evaluated educational interventions are the provision of coaching programs (decreasing schooling costs), see e.g., Bettinger and Baker (2011), or of financial incentives (increasing short-term schooling benefits), see e.g., Angrist and Lavy (2009); Backes-Gellner and Oswald (2012); Dearden et al. (2009).

decreasing the likelihood of information updates in upper secondary education.[24] Third, interventions could tackle the problem even earlier, during childhood, through strengthening students' noncognitive skills (e.g., the ability to delay gratification, see Heckman et al., 2010).[25]

On the one hand, thus many approaches to the issue of dropouts exist, making it hard, on the other hand, for policy makers to identify the most appropriate policy instrument. This is an area where future research should make further contributions and assist policy makers in understanding how students in general—and less patient students in particular—respond to dropout interventions. Most helpful would be future research that carefully and simultaneously evaluates the efficacy of different intervention programs to ensure that their impacts (among less patient students) are comparable.

Whatever the intervention strategy, we are aware that not even the best intervention will be capable of completely eradicating students from dropping out of education. This is not inherently bad since not all dropouts end up in unfavorable situations. Enrollment in a particular training program is voluntary and may be part of a student's search process that leads to discovery of what he or she likes and does not like.

The following chapter investigates whether heterogeneous preferences lead students to respond differently to an intervention program. The chapter uses financial incentives as an example of an intervention program aiming at the reduction of schooling costs. The financial incentives, however, are offered not for schooling persistence per se but for good school performance. We thus continue to broadly investigate students' educational decisions under uncertainty about future costs and benefits of educational investments.

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[24] A potential instrument is the offer of coaching programs that complement students' noncognitive skills by guiding, reminding, and supporting students to start choosing an appropriate upper secondary educational program early enough (e.g., Colding, 2006).
[25] Eckstein and Wolpin (1999) argue among the same lines and conclude that policies that alter students' noncognitive skills (e.g., preferences) might be successful in preventing students from dropping out.

Appendix

Appendix A1: *Time preference elicitation approach: Experimental Instructions*

In all of the experimental sessions, the experimenter carefully explained not only the various choice options but also how payments would be carried out. First, for choices that involved immediate payments (i.e., today's payment), the experimenter warranted that students would receive payments immediately after the experimental session. Second, for choices that involved future payments, the experimenter promised that students would receive cash payments by certified mails in the respective time in the future. To guarantee this promise, the experimenter explained that students would receive an official letter guaranteeing payments in the future.

Appendix A2: *Risk preference elicitation approach*

We measured students' degrees of risk preferences by using choices between a paid lottery and safe payments in a sequence of 10 binary choices. The lottery was the same for all choices: Students won either 10 CHF or nothing, depending on the coin toss. The safe payments increased in value for each choice from 1 to 10 CHF. We identify students' degrees of risk preferences by the point at which students switch from the lottery (10 CHF with $p=0.5$) to the save option. The lower the value of the save option at the switch point, the more risk averse (or the less risk loving) the student is.

CHAPTER 2:

LEARNING FOR A BONUS: HOW FINANCIAL INCENTIVES INTERACT WITH PREFERENCES[26]

2.1   Introduction

The past decade has seen a major proliferation of school interventions to encourage students to improve their school achievement. As increased human capital accumulation contributes positively to the welfare of and the equality within societies, the underlying aim of these interventions is obvious. Not surprisingly, a growing empirical literature investigates the role of incentives in education in general (see, e.g., Gneezy et al., 2011 for an overview) and the role of financial incentives for student performance in particular (see, e.g., Fryer, 2012 for an

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[26] Backes-Gellner and Oswald (2012) is a working paper version of this chapter.

overview). Quasi-experimental and experimental studies evaluate financial incentive programs designed to improve student performance. These studies typically find small average program effects, if any at all (for secondary and post-secondary education, see, among others, Angrist et al., 2009; Angrist and Lavy, 2009; Fryer, 2011; Leuven et al., 2010). Nonetheless, their findings suggest that while such programs can have positive effects for certain groups of students, they can have no or even negative effects for other groups of students. Thus far, relatively little is known about the reasons for these heterogeneous behavioral responses to financial incentive programs in education.

Whether students increase their school performance in response to a financial incentive program is clearly an intertemporal choice, in which the timing of costs and benefits (of an increased learning investment) are spread over time (Becker, 1962). Therefore, any analysis of how financial incentives in education affect this intertemporal choice should include measures of students' economic preferences (e.g., Frederick et al., 2002; Keren and Roelofsma, 1995; Prelec and Loewenstein, 1991). Preferences vary considerably among students (Castillo et al., 2011; Dave et al., 2010), and recent literature has pointed to non-cognitive abilities (including economic preferences) as being systematically related to school achievement (Cunha and Heckman, 2010; Duckworth and Seligman, 2005; Heckman et al., 2006). That incentive effects in education interact with economic preferences—meaning that differences in preferences might affect students' responses to financial incentives in education—would thus not be surprising.

This chapter analyzes the effect of the existence of financial incentive programs on student performance by considering interactions of the incentive effect with two important economic preferences: students' time and risk preferences. We derive our hypotheses by applying standard human capital theory (Becker, 1962; Bishop, 2006). To empirically investigate the effect of the performance pay program (PPP) on student performance and to assess whether, and if so, how the program effect depends on economic preferences, we collected a unique and comprehensive dataset. It includes information on both student performance (measured by end-of-semester grade point averages) and students' economic preference parameters

(measured by economic experiments when students started their vocational education program). These data are available within a school environment where some of the students are part of school-independent PPPs and some are not. The allocation of these PPPs approximates randomization.

The unique combination of data allows us to contribute in two major ways to the existing body of evidence on financial incentives in education: Most importantly, we examine the link between the effect of financial incentives and students' economic preferences. We thus shed light on some of the fundamentals of students' responses to financial incentives. Moreover, we analyze the program effect in a school environment, i.e., in vocational education, where it has not yet been analyzed.

The chapter provides two main findings. First, results indicate that, on average, the existence of PPPs significantly increases the performance of students in upper secondary vocational education. This average effect is driven by the high responsiveness of students in technical occupations. Second and novel to the literature, the results show that program effects differ across students with heterogeneous preferences. For students' time preferences our findings suggest that highly impatient students increase their performance far more when financial incentives are offered. For students' risk preferences our results are less convincing, leading us to suspect that risk loving students respond less to the PPP than risk averse students.

The remainder of this chapter is structured as follows. Section 2.2 presents the hypotheses. Section 2.3 describes details of the PPP, provides information on the elicitation of economic preferences, and presents the descriptive statistics. Section 2.4 provides the empirical strategy and Section 2.5 presents the results for both the pure program and the interaction effects. Section 2.6 concludes.

2.2 Theoretical background

While attending school, students make decisions about the time and effort they devote to learning activities. According to standard human capital theory (Becker, 1962; Bishop, 2006) they do so by comparing the present discounted value of the benefits (i.e., expected advantageous labor market outcomes, such as higher future earnings or lower unemployment risk) to the present discounted value of the costs (i.e., direct and indirect costs of exerting learning effort).[27] Ceteris paribus, the theory predicts that students raise their school performance when their marginal net benefit increases, i.e., when monetary incentives for better student performance are provided. *This argument translates into the first hypothesis:* The provision of financial incentives to students with good school performance increases their performance (everything else being constant).[28]

Nonetheless, the relationship between financial incentives and student performance is not straightforward. Further applications or complements of theories on human capital investments have strengthened the argument that the decision to invest in human capital depends on individual economic preferences, i.e., on risk and time preferences in particular (for risk preferences, see Brunello, 2002; Levhari and Weiss, 1974; for time preferences, see Blinder and Weiss, 1976; Borghans and Golsteyn, 2006). Considering significant heterogeneity in preferences among individuals (e.g., Harrison et al., 2002; Rabin, 1998) and among students in particular (e.g., Dave et al., 2010) we expect that incentive effects in education interact with economic preferences.

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[27] Like Manski and Wise (1983), we assume that students form their expectation about returns to schooling as a function of the average test scores achieved in school. Empirical studies have shown that not only the schooling degree but also student performance (e.g., grade point averages) positively affect long-term labor market outcomes (e.g., Jones and Jackson, 1990; Roth and Clarke, 1998). In German-speaking countries, where job applications always include academic records, school performance matters for labor market entrance in particular (see Schweri, 2004 for Switzerland).

[28] Nonetheless, other streams of economic (e.g., Frey, 1994) as well as the psychological literature (e.g., Deci, 1971; Deci et al., 1999) could well predict the opposite: Due to the crowding out of intrinsic motivation, the provision of financial incentives may reduce individual performance. It remains mostly an empirical question whether financial incentives have a positive or negative effect on student performance. Thus far studies on financial incentives in education have found no evidence for lower intrinsic motivation of incentivized students (e.g., Fryer, 2011; Kremer et al., 2009). We thus add to this empirical literature on incentives in education and provide evidence on some of the fundamentals of students' responses to financial incentives in education.

Given heterogeneity in time preferences among students (as shown by, e.g., Bettinger and Slonim, 2007; Castillo et al., 2011), not only the expected size but also the timing of the return on investment is crucial for students' decision-making process. Generally, benefits from higher student performance (for example, in the form of higher wages) are derived only in the long-run. Students who overly discount the future, i.e., impatient students, choose to invest too little time and effort in their own education when they highly discount time lagged investment benefits (Becker, 1975).[29] The provision of financial incentives reduces the waiting period for parts of the benefits, thereby boosting discounted marginal benefits from higher student performance. As this benefit increase holds particularly for highly impatient students, short-term incentives most likely encourage this group of students to greatly increase their school performance. In contrast, for patient students, perceived marginal benefits change slightly (if at all), as the size of the short-term incentive is very small relative to the size of discounted long-term labor market benefits. *This argument translates into the second hypothesis:* When students receive short-term rewards, highly impatient students increase their school performance more than relatively patient students.

Just as investors in financial capital, investors in human capital are also concerned about the certainty and risk of the returns of an investment (Brunello, 2002; Krebs, 2003; Levhari and Weiss, 1974). Risk averse students choose to invest less in education when the benefits thereof are uncertain. Long-term benefits of an educational investment have at least two sources of uncertainty (similar arguments are made by Levhari and Weiss, 1974). First, benefits are determined by exogenous factors (such as changes in demand and supply for labor, new developments in technology or structural changes). Second, information about future benefits is limited, because students do not know today whether and, if so, how much a prospective employer will value increased school performance. With the provision of financial incentives, students have the possibility of reaping part of the investment

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[29] Among others, Harrison et al. (2002) provide empirical evidence for this purely theoretical statement finding that individuals with longer investments in education have substantially lower discount rates.

benefits with a relatively higher certainty: First, benefits arise more immediately and are thus not as much exposed to exogenous future shocks. Second, the relationship between increased student performance and the additional monetary benefit is clear and provided by the rules of the incentive program. The provision of comparatively certain rewards thus increases perceived marginal benefits especially for the group of risk averse students who value these certain benefits more than they value the uncertain benefits. Therefore, financial incentives should particularly encourage the group of risk averse students to improve their school performance. *These arguments translate into the third hypothesis:* When students receive short-term rewards, risk loving students increase their student performance less than risk averse students.

2.3   Institutional background, data, and descriptive statistics

To investigate the effects of financial incentives and their interaction with preferences on student performance, we collect data on students who are part-time students and at the same time part-time employees as part of their upper secondary vocational education (a "dual" education). In this educational environment we make use of school-independent PPPs, in which some students participate and others do not. The allocation to these PPPs approximates randomization.

The students in our sample started their dual education program in late summer 2009, at an average age of 16 years. At this point, we collected both experimental and very detailed background survey data (such as date of birth, gender, parental schooling, language at home, and single grades achieved in their previous school, i.e., compulsory lower secondary education).[30] In late summer 2010 and 2011, we conducted follow-up surveys collecting data on first- and second-year (end-of-semester) grade point averages (GPAs), among others, and details on the PPPs. To investigate heterogeneous program effects by student preferences, we combine these field data with experimentally elicited data on student preferences.

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[30] We collected this data for a joint project with Michael Kosfeld, Holger Herz, and Donata Bessey. In this project we investigate the rationality of students' educational decisions. The project is a work in progress.

In the following three subsections, we first outline the PPP (in dual vocational education) that we use in our study. Second, we describe the measurements of economic preferences, and third, we provide key student characteristics of the program and comparison groups.

2.3.1   Performance pay programs under the Swiss dual education

Students in our sample take part in dual education programs in the vocational education and training (VET) system in Switzerland.[31] Students study part-time at school and at the same time work part-time as apprentices in a "host" company to train their practical skills. Some of these host companies have institutionalized a performance pay program (PPP), in which they pay students bonuses for good end-of-semester GPAs achieved in vocational schools.[32] Students who work in a host company offering a PPP thus have the opportunity to earn bonuses for good GPAs, whereas students who work in host companies with no PPP do not earn bonuses for good GPAs. Therefore, the first group can be seen as a treatment group and the second group as a comparison group.

The maximum achievable yearly bonus equals almost an average monthly apprentice wage, which is around 1,100 Swiss Francs (CHF) (about 1,177 USD)[33], in the second year of vocational education.[34] The exact amount that students receive depends on their individual GPAs. In most cases, bonuses are paid twice a year. Compared to the incentives in existing studies (e.g., Angrist et al., 2009; Fryer, 2011; Leuven et al., 2010), incentives in this case are paid over a longer period, i.e., throughout the three to four years that the students remain in the dual education program. As the design of the PPPs differs by company, our estimation results will

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[31] Attending a VET program is the most popular way of gaining a basic education in Switzerland (OPET, 2011). Graduates from a VET program hold qualifications that are highly valued by employers in the Swiss labor market and generally enjoy a low risk of unemployment (OPET, 2010).

[32] Host companies have an interest in incentivizing students' school performance as the school curriculum covers theoretical knowledge that is complementary to the practical work that students carry out at work. Host companies that belong to trade associations determine the school curriculum ensuring that it is up to date and matches the host companies' latest requirements (OPET, 2011).

[33] In 2012, the payout of 1 CHF was equal to 1.07 USD.

[34] The apprentice wage is higher for students in commercial occupations (average category ranges from 1,200 to 1,300 CHF) than for students in technical occupations (average category ranges from 900 to 1,000 CHF).

capture the incentive effect produced by the pure existence of PPPs in host companies, as opposed to the non-existence of PPPs.

Regardless of whether students work for a host company with an established PPP, students attend the same schools, sit in the same classrooms, and attend the same classes. Attendance is mandatory for all classes, with no option for class substitution. Given the nature of this experimental setting, we are able to compare students' academic performance (i.e., end-of-semester GPAs) for both the program and the comparison groups. To draw a causal comparison of student performance between the program and the comparison groups we make two key identifying assumptions: First, we assume that a student's host company choice is not determined by the offer of PPPs. Second, we assume that which companies offer PPPs and which do not is very idiosyncratic, approximating randomization from a student perspective. The rest of this subsection discusses the origin of our identifying assumptions. We not only show that students' host company choices are independent of the offer of PPPs but we also explain that school allocation is governmentally regimented.

In Switzerland, the apprenticeship positions are specifically created for the vocational education and training program, and voluntarily offered by host companies, which thereby ensure a consistent supply of qualified workers. Host companies post their apprenticeship openings in regional newspapers, on their own websites, or on online job websites, just as they do for any other job opening. Those advertisements generally do not include information on whether the company offers a PPP.[35] Students who wish to enter the apprenticeship market apply for these positions in their desired field, i.e., in the occupation they plan to study. Host companies offer the best-matching students an apprenticeship contract, which terminates with the completion of the training program. Once this contract is signed, host companies are required to register the contract at the cantonal (state)

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[35] We checked whether companies actively announce the offer of incentive wages in their ads by searching for apprenticeship job ads on the internet. The search, conducted by a research assistant who was not informed about the purpose of the search, was restricted to occupations analyzed in our study. Of over 100 ads, we found only one that included information on the offer of incentive wage for good school performance (in contrast to the one third of the students in our sample who end up in companies with PPP).

government office, which controls and approves apprenticeship contracts. Following strict governmental regulations, host companies enroll students in vocational schools. School allocation thus simply depends on the regional location of the host company, with no option for choosing a different school.

In sum, we find no reason to worry that students—when they choose their host company—systematically self-select into companies with or without PPP. While we do not observe the selection process of the host companies, we have information on student characteristics for both program and comparison group students and are thus able to test whether these two groups differ from each other. Indeed, our data provides strong evidence that the characteristics of students who work in a host company offering a PPP do not differ from those of the comparison group students (see table 2.1). Therefore, also the empirical evidence supports the assumption that the allocation of PPP approximates randomization (more information is given in section 2.3.3).

2.3.2 Experimental elicitation of economic preference parameters

For the measurement of economic preference parameters, we use standard decision-making experiments, which we implemented in the classroom within a month of the starting date.[36] Our experiments consist of two main parts: In one part we elicit students' time preferences; in the other, we measure students' risk preferences.[37] The section "Additional Material" (Section A: Survey 2009, "Studienteil 3") gives the original tables and instructions.

In the first part of the experiment, we elicited students' time preferences by means of two payoff tables. Each table contained a series of 20 payoff alternatives at different times. For each alternative, students made their choices, starting from the first row at the top of the table: While the delayed payments were always 100 CHF (about 107 USD), the earlier payments ranged from 5 to 100 CHF with increments of 5 CHF moving down the table. For the first table, students chose between payments

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[36] Participation bias appears unlikely, given compulsory schooling attendance.
[37] Notable examples of studies that use a similar approach (i.e., multiple price lists) to measure time preferences, risk preferences, or both are Burks et al. (2009); Dohmen et al. (2010); Harrison et al. (2002); and Meier and Sprenger (2010).

today and payments in 3 months. The second table differs from the first only in the timing of the payments: The students chose between payments in 3 months and payments in 6 months. We identify students' degrees of time preference by the point at which students switch from the delayed payment of 100 CHF to the earlier option. The lower the value of the switch point, the less patient a student is.

In the second part of the experiment, we measured students' risk preferences by using choices between a paid lottery and safe payments in a sequence of 10 binary choices. The lottery was the same for all choices: Students won either 10 CHF (10.70 USD) or nothing, depending on the coin toss. The safe payments increased in value for each choice from 1 to 10 CHF.[38] We identify students' degrees of risk preference by the point at which students switch from the lottery (10 CHF with p=0.5) to the save option. The lower the value of the save option at the switch point, the more risk averse the student is. As the expected value of the lottery is 5 CHF, only risk loving students should favor the lottery options when the safe options are greater than 5 CHF. In contrast, risk averse students should always favor safe options smaller or equal to 5 CHF.

Before the start of the experiments, we incentivized students to express their true individual preferences: The experimenter informed students that after the experiments, their notional chosen payments would turn into real payments if their tables were drawn in a lottery. For the experiment in which we elicited time preferences, we selected two students in each school class for payment at random. For those students who won the lottery, we randomly selected one row on the choice sheet as relevant for the payment. For the experiment in which we measured risk preferences, we randomly selected one row for payment for each student. Additionally, we fostered students' trust in not only the immediate payments but also the future ones: The experimenter carefully explained the payment procedure: (a) for choices that involved immediate payments, students would receive payments immediately after the experimental session; (b) for choices that involved future

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[38] The last row (where the values of both the lottery and the save options are 10 CHF) had no relevance for the measurement of risk aversion; we included it to test that students understood the task.

payments, students would receive an official letter (on university letterhead, with the student's name, signed by the professor, and handed out immediately after the experimental session) guaranteeing future cash payments delivered by certified mail at the respective future time.

According to recent evidence for temporal stability of preferences (see Meier and Sprenger, 2010 for time preferences; see Andersen et al., 2008 for risk preferences), we assume that student preferences remain static at least for the two-years period of our analysis.

2.3.3   Descriptive statistics and covariate balance

Our baseline sample (collected in 2009) includes information on 265 students from 14 complete school classes in three public vocational schools. Students in our sample are trained for three to four years in either commercial (i.e., business assistants) or technical occupations (i.e., electricians or polytechnicians).[39] Students in technical occupations learn specific skills for technical production (e.g., how to set up complex electrical wiring systems or how to fabricate work pieces and tools required in the production industry), whereas students in commercial occupations learn a broad knowledge of skills for carrying out administrative work in various fields and industries.

In 2010, 90% of the students in our baseline sample (245 of 265) completed the first follow-up survey. In this chapter, we discuss data only for students who reported complete information on both the first-year GPA variable and the control variables of interest. This adjusted sample, which we call the "first-year sample", includes 200 students,[40] one third (N = 65) of whom work for a host company with an established PPP. In 2011, 84% of the students in our first-year sample (167 of 200) completed the second follow-up survey, reporting complete information on both the second-year GPA variable and the control variables of interest. Twenty-eight

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[39] These three occupations are among the top 10 of the 230 occupations where training programs in Switzerland are offered (OPET, 2011).
[40] Students that did not understand the task of the economic experiments (14/265) are also excluded from the sample.

percent of the students in the second-year sample (N = 46) report receiving performance pay in both the first and second years of vocational education.

One might expect that program group students are more likely to be part of the second-year sample. We deal with this concern at the bottom of Table 2.1: Statistics indicate that the selection of students in the second-year sample is independent of the treatment status. Additionally, we tested whether the participation in the second-year sample is determined by students' economic preferences. We find no connection between a student's second-year sample status and her or his economic preferences.

Table 2.1 presents student characteristics sorted by four subgroups. The first subgroup covers personal characteristics: age, gender, and a native speaker dummy. The second subgroup covers ability measurements: a dummy for whether or not mothers hold a higher education degree, math grade at the end of lower secondary education, and a dummy for ever having repeated a grade.[41] The third subgroup covers the company characteristic. "Number of employees" is the only variable available in our data for describing company characteristics. The variable is a dummy indicating whether or not a student is working for a host company with 100 employees or more. The fourth subgroup covers students' economic preference parameters. The dummy "risk loving" (as opposed to being risk averse or risk neutral) indicates whether a student is willing to take risk or not. Risk loving students still prefer the lottery options when the expected value of the lottery option is smaller than the value of the safe option. In contrast to the unequivocal identification of risk loving students, there is no such clear-cut way of defining the group of impatient (or patient) students. We create dummies of extreme characteristics of time preferences to increase statistical power when we include those dummies in our regression analysis. The "impatient" dummies refer to the 10th or 25th percentile of students who are always impatient, i.e., who are impatient either at the 10th or 25th percentile in

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[41] Our data set includes further ability measurements; however, either these measurements do not help explain the variance in GPA, or their inclusion would further reduce our sample size.

both choice sets. Impatient students prefer a small amount of money today (in three months) than 100 CHF in three months (six months).[42]

One way of testing our identifying assumptions is by comparing student characteristics of program and comparison groups. We thus report both means for the comparison group and differences in means for the program group for the variables within the four described subgroups (columns 1 and 2 in table 2.1). Differences in means are reported as coefficients. Those coefficients are the results of regressions of each of the students' characteristics (e.g., age or gender) against the treatment status controlling for school and school classes.[43] Displayed figures are in accordance with our identifying assumptions: Overall, the program and comparison groups appear balanced along observable dimensions. None of the reported differences in student characteristics—neither the variables themselves nor the variables as a subgroup—are statistically significant.

Program group differences for our first subgroup, personal characteristics, are not statistically significant. Descriptive statistics show that students entered the vocational program at an average age of 16, the traditional age for starting the program. A smaller fraction of students is female (40%), a percentage driven by the male-dominated technical occupations. A large proportion of students are native-German speaking (83%). Within the second subgroup, program group differences for each of the ability measurement are positive but also not statistically significant, indicating comparable ability levels among the program and comparison groups. Likewise for the third subgroup, the company size dummy, the difference between the program and comparison groups is not statistically significant. The same is true for the fourth subgroup, i.e., the economic preference dummies. Descriptive statistics show that, on average, 36% of the students have risk preferences consistent with

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[42] Whereas the 10th percentile of highly impatient students prefers 45 CHF or less today (in three months) over 100 CHF in three months (and six months, respectively); the 25th percentile of highly impatient students prefers 50 CHF or less today (and 60 CHF or less in three months) over 100 CHF in three months (and six months, respectively).

[43] As the apprenticeship for business assistants is very different from that for electricians and polytechnicians, we control for the different occupational groups by using the school the students attend as the identifying variable. Moreover, class controls are necessary for accounting for differences in class environments (e.g., teacher or peer differences), differences that may vary within one school/occupational environment.

being risk loving (as opposed to being risk neutral or risk averse). The fraction of risk loving students is rather high, given that individuals are generally found to be risk averse (e.g., Dohmen et al., 2010). In our experiment, however, offered stakes were relatively low in size, possibly causing students to make risky decisions with a higher probability (Harrison et al., 2005; Holt and Laury, 2002). For time preferences, only 16% (9%) of the students match our description of being highly impatient defined as the 25th (10th) percentile of students who are impatient in both choice sets.

We further test the balance between the program and comparison groups by plotting students' math grades in lower secondary education, i.e., before students had the opportunity to participate in a performance pay program. Panel 2.A in Fig. 2.1 shows the distribution of math grades for the program group, along with the distribution of math grades for the comparison group. For comparison, we normalized grades so that they are distributed with a mean of 0 and standard deviation of 1. The plot indicates that the distribution of math grades before the start of the program is similar for both groups. As our descriptive statistics already indicate, before students begin the training program (before participation in PPP), the two groups appear balanced in terms of their ability level.

Panel 2.B and 2.C in Fig. 2.1 provide a preview of our results by plotting the distributions of standardized first- and second-year GPAs. The GPA variables are the averages of the grades achieved in each class attended during a school semester.[44] In Panel 2.B, we plot the distribution of standardized first-year GPAs for the program group, along with the distribution of first-year GPAs for the comparison group. The plot offers first evidence for different student achievement between those two groups within the first year: For the program group we observe a clear shift of first-year GPAs to the right. The shift indicates that students in the program group have higher first-year GPAs than students in the comparison group.

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[44] Students reported their exact first- and second-year GPAs on a range from 1 to 6, with 4 to 6 as passing grades. Because the purpose of the study (investigating the effects of PPP) was never shared with the students, the teachers, or the school principals, we can exclude with certainty the possibility that students in the PPP reported higher grades merely to exhibit the desirable behavior.

Table 2.1: Covariate balance.

	Comparison Group Mean (1)	PPP Group Difference (2)
Personal characteristics		
Age	16.333	-0.049
(at entrance in voc. educ.; 2009)	[0.961]	(0.174)
Female	0.519	-0.033
	[0.501]	(0.070)
Native speaker	0.874	-0.072
	[0.333]	(0.070)
F-test for joint significance (F-value)		0.470
		{0.705}
Ability measurements		
Mother - higher education	0.163	0.023
	[0.370]	(0.074)
Math grade average	-0.073	0.050
(2009, standardized)	[1.047]	(0.192)
Ever repeated grade	0.156	0.083
(2009)	[0.363]	(0.071)
F-test for joint significance (F-value)		0.500
		{0.681}
Company characteristic		
Number of employees	0.467	0.131
(dummy equals 1 if the number of employees >= 100)	[0.500]	(0.093)
Economic preference parameters		
Risk-loving	0.326	0.127
(2009)	[0.470]	(0.094)
Impatient (25th percentile)	0.141	-0.001
(2009)	[0.349]	(0.068)
Impatient (10th percentile)	0.067	0.002
(2009)	[0.250]	(0.052)
F-test for joint significance (F-value)		0.620
		{0.602}
Second-year sample		
Being in the second-year sample	0.822	-0.023
	[0.383]	(0.071)

Notes: (i) The statistics are based on 200 student observations, with 135 being in the comparison group and 65 in the PPP group. (ii) "Comparison group mean" column reports averages and standard deviations in square brackets. (iii) "PPP Group Difference" column reports coefficients and robust standard errors in parentheses. These coefficients are the results of regressions of each variable on the treatment dummy including school and class controls. Within these subgroups of variables we present F-tests for joint significance of all treatment differences. P-values for F-tests are in curly brackets. (iv) *** $p<0.01$, ** $p<0.05$, *$p<0.10$ indicate significance levels.

In Panel 2.C, where we plot second-year GPAs, the shift of the program group's GPA is strongest in the lower and middle part of the distribution. This shift suggests that, on average, program group students improve their GPA also in the second year of vocational education. By running multiple regressions, we test the robustness of this descriptive result.
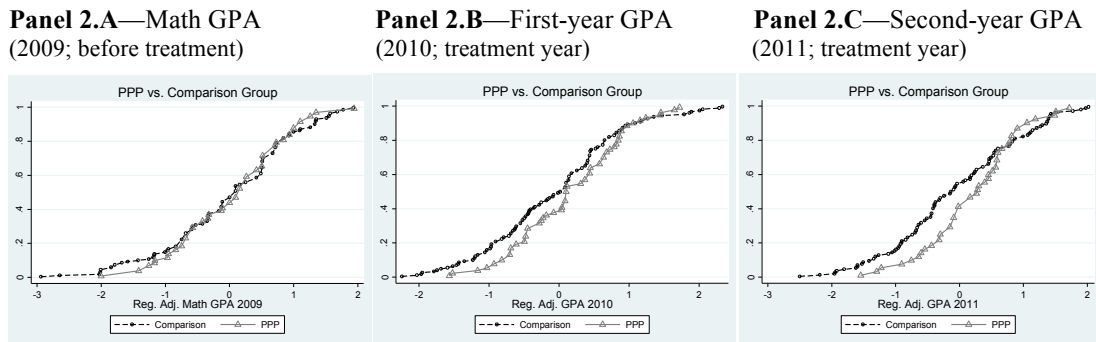
Panel 2.A—Math GPA (2009; before treatment) **Panel 2.B**—First-year GPA (2010; treatment year) **Panel 2.C**—Second-year GPA (2011; treatment year)

Figure 2.1 Regression-adjusted cumulative distribution functions of GPA residuals.

Notes: Residuals are computed using a regression including school and class controls. While Panel 2.A plots math GPAs achieved at the end of lower secondary education (before participation in PPP), Panels 2.B and 2.C plot average GPAs from the end of the first and second year of vocational education, respectively.

2.4   Empirical strategy

To empirically investigate whether students respond to the PPP and, if so, whether their response depends on their individual economic preferences, we estimate the following OLS model:

$$GPA_i = \beta_0 + \beta_1 PPP_i + \beta_2 ECONPREF_i + \beta_3 \left(PPP_i * ECONPREF_i \right) + \beta_4 X_i + u_i. \qquad (2.1)$$

GPA_i is the standardized, first-year (second-year) GPA for student i. The main explanatory variables in the model are dummies: PPP_i is the performance pay program indicator with the coefficient β_1, which captures the program effect. $ECONPREF_i$ indicates a student's economic preference (i.e., degree of risk or time preference). ($PPP_i * ECONPREF_i$) is the interaction term between those dummies with coefficient β_3, which captures the interaction effect. Significant interaction

effects indicate heterogeneous program effects for students with different preferences. X_i comprises school and class controls as well as control variables covering the three subgroups (personal characteristics, ability measurements and company characteristic) as described and displayed in section 2.3 (table 2.1). We gradually include these subgroup controls to investigate the sensitivity of our results and to redress any potential imbalance between the program and comparison groups. Our control variables are similar to those used in comparable studies on student achievement (e.g., Angrist and Lavy, 2009; Bettinger, 2012). Finally, we include u_i, an individual specific error term. For our estimations, we use robust standard errors.

In the first section of the results, we run estimations to investigate the pure PPP effect, thus excluding the variable $ECONPREF_i$ and the interaction (PPP_i * $ECONPREF_i$) from model (2.1). In the second section of the results, to examine whether the program effect depends on student preferences, we run the full model. We examine interactions for each economic preference separately.

2.5   Results

2.5.1   *The pure effects of the incentive program on first- and second-year GPA*

We start our analysis of program effects by looking at students' GPAs in the second and fourth semesters, i.e., at the end of the first and second year of vocational education. As only part of the students in the first-year sample submitted the survey in the following year, the second-year sample is lower (by 16%). However, descriptive statistics (at the bottom of table 2.1) indicate that participation in the second-year sample is not related to participation in the PPP. We report four specifications. The first specification includes only schools and school classes. We augment this specification by gradually including control variables that refer to the same set of subgroups as described in Table 2.1—student characteristics (specification 2), ability measurements (specification 3), and company size (specification 4).

In sum, we find a statistically significant and positive effect of the existence of PPPs on students' first- and second-year GPAs. Carrying out separate analyses by

the two occupational subgroups, we find that program effects differ between students in technical and commercial occupations. For students in technical occupations, our results indicate a statistically significant and highly positive program effect on student performance. In contrast, for students in commercial occupations, the program effect is non-significant and almost zero. As the actual participation in a PPP is low for students in the commercial subgroup (14 of 116 students), we do not have enough power to draw a reliable conclusion from our results for the commercial subgroup. The rest of this subsection examines these results in more detail.

Estimation results for the full first- (and second-) year sample (table 2.2; columns 1 to 4) indicate that students in the program and comparison groups differ in their school performance. Controlling for school and school classes only, we find that the treatment group's GPA is on average 0.349 (0.386) standard deviations higher than the comparison group's GPA (table 2.2, column 1). This difference is statistically significant ($p<0.05$). After we control for student characteristics and ability measurements, the program coefficient increases marginally in size. The significance of the coefficient remains robust across these specifications (table 2.2, columns 2 and 3). With the inclusion of the variable "company size" in column 4, the size of the coefficient decreases and its standard error increases. Nevertheless, the difference in student performance between the two groups remains significant ($p<0.05$ for the first-year sample; $p<0.10$ for the second-year sample). These results indicate that, on average, program group students have significantly higher GPAs than comparison group students.

However, separate analyses by occupational subgroups show fundamental differences in program effects between students in technical occupations (table 2.2, columns 5 to 8) and students in commercial occupations (table 2.2, columns 9 to 12). Whereas we find a strong and significant program effect on student performance in technical occupations, the program effect on student performance in commercial occupations is non-significant and almost zero (in most cases, slightly negative). For students in commercial occupations we cannot reject the hypothesis that there is no program effect: Unfortunately, data are inconclusive in this case because only 14 of the 116 students participate in a PPP (in the first-year sample). Therefore, a larger

sample size would be needed to provide conclusive evidence on program effects for students in commercial occupations.

PPPs are more prevalent in technical occupations (51 of 84 students participate in a PPP in the first-year sample) for which we find a largely positive and significant program effect: When we control only for school and school classes (table 2.2, column 5), the estimated first-year (second-year) GPA is 0.642 (0.614) standard deviations higher for students in the program than for students in the comparison group (table 2.2, column 8). The size of the coefficient remains fairly robust across specifications with the largest decrease in specification four to an effect size of 0.545 (0.529) standard deviations. The coefficient is statistically significant across specifications ($p < 0.01$ for the first-year sample and $p < 0.05$ for the second-year sample).

The highly positive program effect on student performance in technical occupations is both interesting and surprising. The positive sign of the coefficient meets the expectations drawn from standard human capital theory. With the provision of additional benefits, the investment in human capital increases (holding other factors fixed). But, given the low responsiveness reported in the literature on student incentives, the question remains as to why students in technical occupations respond extremely strongly to the PPP.

Assuming that the differences between technical and commercial occupations are real, we can think of three explanations.[45] First, our data indicates that students in technical occupations place generally a higher value on pecuniary rewards (as compared to students in commercial occupations, the only available reference group). Students in technical occupations not only attach greater importance to their potential wage after graduation but also appear less satisfied with their current apprentice wage (in both the first and second year of vocational education). Therefore, students in technical occupations might place a high value on gaining the offered reward.

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[45] Differences reported in this section are statistically significant (at least at $p < 0.10$).

Table 2.2: Program impact on standardized first- and second-year GPAs.

	Full Sample				Technical Occupations				Commercial Occupations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: First-year GPA												
Performance Pay Program	0.349**	0.376**	0.380**	0.356**	0.642***	0.651***	0.630***	0.545***	-0.047	-0.013	0.035	-0.013
	[0.155]	[0.153]	[0.147]	[0.157]	[0.178]	[0.176]	[0.182]	[0.191]	[0.249]	[0.256]	[0.223]	[0.265]
School and class dummies	x	x	x	x	x	x	x	x	x	x	x	x
Student characteristics		x	x	x		x	x	x		x	x	x
Ability measurements			x	x			x	x			x	x
Company characteristic				x				x				x
R-squared	0.212	0.259	0.334	0.361	0.444	0.460	0.482	0.521	0.062	0.160	0.291	0.350
Number of observations		200				84				116		
PPP participation		33%				61%				12%		
Panel B: Second-year GPA												
Performance Pay Program	0.386**	0.407**	0.414**	0.358*	0.614**	0.625**	0.648***	0.529**	-0.029	-0.012	-0.045	-0.088
	[0.184]	[0.187]	[0.187]	[0.197]	[0.237]	[0.240]	[0.242]	[0.262]	[0.276]	[0.283]	[0.238]	[0.288]
School and class dummies	x	x	x	x	x	x	x	x	x	x	x	x
Student characteristics		x	x	x		x	x	x		x	x	x
Ability measurements			x	x			x	x			x	x
Company characteristic				x				x				x
R-squared	0.141	0.159	0.191	0.215	0.162	0.172	0.176	0.260	0.116	0.155	0.256	0.289
Number of observations		167				72				95		
PPP participation		28%				50%				11%		

Notes: (i) The table reports OLS estimates of the program effect on grade point averages (GPA) from the end of the first (2010) and second year (2011) of vocational education, respectively. (ii) GPAs are standardized. (iii) Robust standard errors are reported in brackets. (iv) *** p<0.01, ** p<0.05, *p<0.10 indicate significance levels.

Second, our data suggests that students in technical occupations (as opposed to commercial occupations) are significantly less interested in continuing their career in the occupation for which they are currently investing the training. As the human capital investment in the current occupation might not be directly linked with labor market benefits in a different occupation, students in technical occupations might place a low value on the long-term labor market benefits of better student performance but a relatively high value on the short-term reward offered by the PPP.

Third, students in technical occupations have relatively high discount rates compared to students in commercial occupations: We find that students in technical occupations are significantly more likely to be highly impatient than those in commercial occupations. The following subsection will now analyze whether highly impatient students—students with a lower willingness or ability to postpone the acquisition of rewards—respond more strongly to the PPP.

2.5.2 *Heterogeneous program effects by time preferences*

In this section, we assess the significance of students' time preferences by investigating whether the effect of the PPP on student performance interacts with students' time preferences. In Table 2.3, we present estimates of equation (2.1), replacing $ECONPREF_i$ by time preference dummies that take the value 1 if a student is highly impatient and 0 otherwise. We report results for the two impatience dummies: While the first impatience dummy refers to students who are impatient at the 10th percentile in both choice sets, the second impatience dummy is broader, referring to students who are impatient at the 25th percentile in both choice sets (see descriptive section for more details). As for the results on the pure program effect, we again report regression results for the first- and second-year sample, using specifications identical to those reported in Table 2.2.

We begin by describing results for the program and the interaction effect on the first-year GPA (table 2.3, panel A). Controlling for the 10th percentile impatience dummy, we find that relatively patient students (as opposed to students who are less patient) who work for a host company with a PPP increase their first-year GPA by about 0.244 standard deviations (table 2.3, column 1). This effect is marginally

significant (p=.122). The coefficient remains marginally significant for specifications 2 and 3 (p=.111 and p=.102, respectively). If we instead include the 25th percentile impatience dummy, the program effect increases marginally in size in each of the specification (table 2.3, columns 5 to 8). Significance levels remain the same as for the 10th percentile impatience dummy. In sum, the program effect for relatively patient students is, if at all, only marginally significant.

A look at the program effect for highly impatient students shows that the coefficient of greatest interest—the interaction term between being part of the PPP and being impatient—is positive, indicating that highly impatient students respond more strongly to the program than relatively patient students (table 2.3, panel A, row 3). The coefficient is significant at the 1% level (table 2.3, columns 2 and 4), controlling for the 10th percentile impatience dummy and significant at the 10% level (table 2.3, columns 7 and 8), controlling for the 25th percentile impatience dummy. The effect size of the interaction is high and varies between 0.585 and 1.271 standard deviations (table 2.3, columns 1 to 8).

For the second-year sample the performance pay effect increases in both size and significance for patient students, especially when controlling for the broader 25th percentile impatience dummy (table 2.3, panel B, row 1). The interaction effect remains significant (although at lower significance levels than for the first year sample) for the 10th percentile impatience dummy but is no longer significant for the 25th percentile impatience dummy (table 2.3, row 3).

Overall, we find that highly impatient students increase their GPA more than patient students, especially in their first year of education. This result supports our hypothesis. First, short-term financial incentives boost perceived marginal benefits from increased student performance, especially for highly impatient students who greatly discount long-term benefits from increased learning effort. Second, the relative value of the financial incentives shrinks when real, relatively high labor market benefits approach. The second argument might explain why the difference in response to the incentive between highly impatient and relatively patient students is less pronounced in the second year. We cannot, however, rule out the possibility that other mechanisms (such as positive spillover effects) might also play a role.

Our findings thus suggest that incentive programs constitute an effective tool, particularly for increasing the performance of impatient students who are less willing (or less able) to postpone the acquisition of a reward. If impatient students are more likely to respond to financial incentives, offering short-term rewards at the very beginning of an educational program, when long-term benefits of increased student performance are discounted over a higher amount of years, would be most appropriate.

Table 2.3: Heterogeneous program effect by time preferences.

	Impatient defined at the 10th percentiles				Impatient defined at the 25th percentiles			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: First-year GPA								
Performance Pay Program	0.244+	0.249+	0.245+	0.226	0.248+	0.269+	0.258+	0.247
(dummy)	[0.157]	[0.156]	[0.149]	[0.162]	[0.167]	[0.165]	[0.160]	[0.175]
Impatient	-0.169	-0.304	-0.416+	-0.427+	0.066	0.023	-0.060	-0.065
(dummy)	[0.315]	[0.312]	[0.264]	[0.263]	[0.244]	[0.244]	[0.229]	[0.216]
PPP * Impatient	0.978**	1.163***	1.271***	1.202***	0.585+	0.608+	0.709*	0.646*
(interaction)	[0.399]	[0.405]	[0.360]	[0.379]	[0.365]	[0.374]	[0.360]	[0.361]
School and class dummies	x	x	x	x	x	x	x	x
Student characteristics		x	x	x		x	x	x
Ability measurements			x	x			x	x
Company characteristic				x				x
R-squared	0.233	0.284	0.362	0.384	0.229	0.274	0.350	0.373
Number of observations			200				200	
Panel B: Second-year GPA								
Performance Pay Program	0.304+	0.313+	0.310+	0.256	0.398**	0.420**	0.418**	0.363*
(dummy)	[0.192]	[0.194]	[0.194]	[0.209]	[0.197]	[0.201]	[0.201]	[0.212]
Impatient	-0.224	-0.266	-0.287	-0.342	0.131	0.140	0.103	0.058
(dummy)	[0.334]	[0.327]	[0.304]	[0.324]	[0.268]	[0.275]	[0.267]	[0.263]
PPP * Impatient	0.722+	0.813*	0.890**	0.865*	-0.047	-0.063	-0.008	-0.013
(interaction)	[0.452]	[0.450]	[0.440]	[0.469]	[0.426]	[0.428]	[0.438]	[0.432]
School and class dummies	x	x	x	x	x	x	x	x
Student characteristics		x	x	x		x	x	x
Ability measurements			x	x			x	x
Company characteristic				x				x
R-squared	0.151	0.171	0.205	0.228	0.143	0.161	0.193	0.216
Number of observations			167				167	

Notes: (i) The table reports OLS estimates of the program effect on grade point averages (GPA) from the end of first (2010) and second year (2011) of vocational education, respectively. (ii) GPAs are standardized. (iii) The first (second) impatient dummy refers to students who are impatient at the 10th (25th) percentile in both choice sets. (iv) Robust standard errors are reported in brackets. (v) *** $p<0.01$, ** $p<0.05$, * $p<0.10$, + $p<0.15$ indicate significance levels.

2.5.3   *Heterogeneous program effects by risk preferences*

In this section, we explore the importance of students' risk preferences by analyzing whether risk loving students (as opposed to risk averse and risk neutral students) respond differently to the PPP. Table 2.4 presents estimation results of equation (2.1), in which we include the risk loving dummy representing a student's economic preference ($ECONPREF_i$). Risk loving equals 1 if a student prefers the lottery option even though its expected value is lower than the certainty equivalent and 0 otherwise. The interaction effect of receiving performance pay and being risk loving provides a measure of whether the program effect depends on students' risk preferences.

For risk averse and risk neutral students, we find a significant average program effect on first-year (second-year) GPA of 0.524 (0.535) standard deviations when we control only for school and school classes (table 2.4, columns 1 and 5). This effect remains statistically significant and high in size for all specifications, indicating that risk averse and risk neutral students respond positively to financial incentives.

The interaction term between being part of the PPP and being risk loving is negative for both the first- and second-year samples (among all specifications, see table 2.4, row 3). The negative interaction term suggests that risk loving students respond less well to the PPP than risk averse and risk neutral students. The size of the interaction term changes only marginally across the specifications from -0.394 standard deviations for the first-year sample to -0.329 for the second-year sample (table 2.4, columns 4 and 8). However, the statistical significance of the interaction term is either nonexistent or very weak. Whereas we find slightly significant results for the first-year sample ($.103 < p < .142$), the interaction term is not significant for the second-year sample.

Although we do not find statistically significant interaction effects (with $p < 0.10$), the high reduction in response to the incentive might indicate lower program effects among risk loving students. Overall, however, the results for risk preferences are not as conclusive as the results for time preferences. We can thus

only speculate about whether students' differences in their degrees of risk preferences cause heterogeneous program effects.

Table 2.4: Heterogeneous program effect by risk preferences.

	Dep. Var.: First-year GPA				Dep. Var.: Second-year GPA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Performance Pay Program	0.524***	0.571***	0.543***	0.525***	0.535**	0.569**	0.560**	0.498**
(dummy)	[0.192]	[0.186]	[0.180]	[0.193]	[0.230]	[0.227]	[0.222]	[0.235]
Risk-loving	0.026	0.113	0.117	0.127	0.052	0.099	0.073	0.050
(dummy)	[0.180]	[0.184]	[0.177]	[0.179]	[0.207]	[0.212]	[0.210]	[0.206]
PPP * Risk-loving	-0.389	-0.453+	-0.381+	-0.394+	-0.349	-0.391	-0.351	-0.329
(interaction)	[0.271]	[0.277]	[0.258]	[0.262]	[0.325]	[0.332]	[0.326]	[0.338]
School and class dummies	x	x	x	x	x	x	x	x
Student characteristics		x	x	x		x	x	x
Ability measurements			x	x			x	x
Company characteristic				x				x
R-squared	0.222	0.269	0.341	0.368	0.147	0.166	0.197	0.220
Number of observations			200				167	

Notes: (i) The table reports OLS estimates of the program effect on grade point averages (GPA) from the end of first (2010) and second year (2011) of vocational education, respectively. (ii) GPAs are standardized. (iii) Risk-loving is a dummy that equals 1 if a student prefers the lottery option although its expected value is lower than the certainty equivalent and 0 otherwise. (iv) Robust standard errors are reported in brackets. (v) *** $p<0.01$, ** $p<0.05$, * $p<0.10$, + $p<0.15$ indicate significance levels.

2.6   Conclusions

The purpose of this study has been twofold. First, we aimed at learning more about the potential effects of performance pay programs offered in upper secondary vocational education. Second, we investigated systematic differences in program effects among students with different degrees of time and risk preferences. To conduct the research empirically, we introduced a unique dataset combining educational data, which includes real labor market incentive programs, with data from standard economic experiments. To test the robustness of our results and to redress any potential imbalance between program and comparison groups, we ran different model specifications.

First, we find that the existence of the PPPs has on average a positive and significant effect on students' first- and second-year GPAs. This positive program effect is driven by a statistically significant and high effect for the subgroup of students in technical occupations. Conversely, for the subgroup of students in

commercial occupations, the program effect is almost zero. As only a very small fraction of students in the latter subgroup is actually part of a PPP, our data does not allow us to reject the hypothesis that there is no program effect for students in commercial occupations.

Second, we find that the responsiveness to the program depends on differences in student preferences. For time preferences, the results show that highly impatient students in particular respond strongly to the incentive program by increasing their GPA more than relatively patient students. For risk preferences, the results are less conclusive: We can only speculate that risk loving students might respond less well to the incentive than risk averse students.

We are the first to systematically show that financial incentives in education particularly target highly impatient students. This finding gives us a hint of when providing financial incentives might be most effective. As graduation approaches, the perceived value of real labor market benefits increases and the perceived added value of financial incentives decreases. Therefore, we suggest that the provision of financial incentives might be most effective at the beginning of an educational program.

Clearly, the presented evidence is based on a small sample of students and results might be specific to the underlying performance pay programs. Therefore, drawing a more general conclusion from our findings calls for further research in both the same and different educational environments. Identifying students who most likely respond to financial incentives will not only help target incentives to a tighter range of students but also provide them at the right time—both of which would increase the cost effectiveness of performance pay programs in education.

Summing up the first two chapters, the findings provide strong evidence that differences in students' degrees of patience shape the educational investment patterns of students in upper secondary education. Given the preference heterogeneity among individuals, the third chapter changes the focus to employers' decision about the provision of training to their workers when workers' individual preferences (for staying with the firm) are unobservable.

CHAPTER 3:

NEW INSIGHTS ON THE PART-TIME TRAINING GAP: HOW DIFFERENT ARE WOMEN AND MEN?[46]

3.1   Introduction

Existing literature on training persistently finds that participation in training is generally lower for part-time than for full-time workers (for an overview see Blundell et al., 1996; for employer-provided training in particular, see Bassanini et al., 2007 or Hoque and Bacon, 2008). Studies show that the lower the number of working hours, the lower the probability of training participation (cf. e.g., Oosterbeek, 1998)—a finding consistent with standard human capital theory. The shorter return period discourages both employers and workers from investing in training. Although in almost any labor market outcome there are substantial

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[46] Backes-Gellner et al. (2011) is a working paper version of this chapter.

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differences between female and male workers, training-related studies have thus far focused on the part-time training gap in general and neglected whether this training gap is different for female and male part-time workers.

Indeed, recent literature on *earnings* finds significant differences in earnings between women and men in part-time and full-time employment. Hirsch (2005), using U.S. panel data, and Mumford and Smith (2009), using British survey data, find the residual part-time/full-time earnings gap to be essentially zero for women but substantially negative for men. We therefore assume that part-timers are not a homogeneous group of workers and transfer the idea of gender differences in the part-time/full-time earnings gap to the analysis of gender differences in the part-time/full-time *training* gap.[47] Investigating this difference in detail is important given the highly unequal distribution of part-time participation between women and men.

This chapter analyzes whether the part-time/full-time training gap, in short the "part-time training gap", is different for female and male workers. We use a rich data set, the Swiss Labor Force Survey (SLFS), which allows us to focus on employer-provided training. This focus is important because employers not only provide by far the largest share of work-related training (Almeida-Santos and Mumford, 2005; Leuven and Oosterbeek, 1999; Loewenstein and Spletzer, 1999), but also play a pivotal role in shaping training patterns with their investment motives.[48]

To analyze the part-time training gap separately for female and male workers, we draw on both human capital theory and statistical discrimination theory. The combination of these theories is innovative and allows us to account for the fact that employers take training decisions under uncertainty. We argue that a worker's expected future working time volume with the current firm, in short a worker's

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[47] An interesting side result of a study focusing on labor market flexibility and its relation to work-related training already indicates a difference between part-time women and part-time men in terms of training participation (Arulampalam and Booth, 1998). However, the authors have not further addressed this empirical pattern.

[48] Theoretically, we expect firms to provide little or no support in workers' general training. Empirically, by contrast, we observe a wide engagement of firms in workers' training participation, even if that engagement is general (e.g., Loewenstein and Spletzer, 1999 show that most employer-provided training is general, not specific).

"future firm attachment", is one of the most important characteristics affecting employers' training decisions. Women and men in part-time and full-time employment can be expected to differ in their firm attachment and, as a result, in their access to employer-provided training. Drawing on standard human capital theory (Becker, 1964), a higher future firm attachment should be positively correlated with a higher training probability.

As workers' future firm attachment is obviously not observable, we also draw on statistical discrimination theory (Aigner and Cain, 1977; Altonji and Blank, 1999; Phelps, 1972) to explain how this uncertainty might cause systematic differences in access to employer-provided training for different groups of workers. In line with the model of statistical discrimination theory, we suggest that part-time employment status is one potential indicator for future firm attachment, and we expect it to cause systematic differences in training participation by gender. We argue that while for male workers, part-time employment status is a predictive indicator for a lower future firm attachment; this is not the case for female workers, leading to an economically significant part-time training gap for male workers but not for female workers.

The study contributes to our understanding of differences in labor market outcomes induced by part-time employment and gender. The findings emphasize that women and men working part-time, as opposed to full-time, are treated quite differently on the labor market. Our results show that being female and working part-time has a significant positive joint effect on the probability of receiving employer-provided training, counteracting the generally negative effect of part-time employment. The part-time training gap thus differs by gender: For women, working part-time instead of full-time constitutes only a minor difference; for men, however, working part-time constitutes a serious disadvantage in access to employer-provided training.[49]

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[49] An across gender comparison, however, makes clear that women in full-time employment have a lower training probability than men. Both, the female training disadvantage in full-time employment and the gender difference in the training disadvantage in part-time employment are consistent with our adapted model of statistical discrimination theory where employers take training decisions under uncertainty about workers' future firm attachment.

The chapter proceeds as follows: Section 3.2 provides the theoretical framework. Section 3.3 describes the data and presents the descriptive analyses. Section 3.4 provides and discusses the probit estimates and predicted probabilities for employer-provided training. Section 3.5 concludes.

3.2   Theoretical framework

3.2.1   A model of the employer's decision to provide training under uncertainty

We analyze the employer's decision to provide training as an investment decision. Human capital theory, as pioneered by Becker (1964), states that employers will invest in workers' human capital only if the expected rate of return exceeds the costs of investment. The theory thereby predicts that the return period is one of the crucial factors for employers' training decisions. In our model, we specify the expected return period in detail by introducing worker's firm attachment. We define a worker's future firm attachment as the expected future working time volume, i.e., the length of time a worker will stay with the current firm (expected tenure) times the worker's future contracted number of weekly working hours. In line with standard human capital theory, we assume that the higher the expected firm attachment the higher the returns on training and thus the more likely employers invest in training (e.g., Becker, 1964; Lazear and Rosen, 1990). Future firm attachment is thus a highly training-related but obviously at the same time an unobservable characteristic.

The underlying implicit assumption of standard human capital theory is that employers, when deciding on training investments, are fully informed about workers' future firm attachment. However, this assumption on full information is critical because employers may have not only limited information as to a worker's intention to remain with the current firm but also as to a worker's future weekly working hours. Therefore, employers have to take their training decisions under uncertainty.

To analyze such decisions in a situation of uncertainty about workers' future firm attachment, we suggest adding theoretical considerations from statistical discrimination theory (Aigner and Cain, 1977; Phelps, 1972), which provides a framework for investigating decisions under uncertainty. Statistical discrimination

theory has been used for analyzing hiring decisions when employers have limited information about job applicants. The theory's main idea is that employers use observable characteristics of applicants as indicators for workers' unobservable characteristics, e.g., future productivity. Uncertainty about workers' future productivity can work against groups with less reliable indicators, because in the case of less reliable indicators previous statistical experience related to workers' group identity (e.g., gender) increases in importance.

We extend the approach of Aigner and Cain (1977) by adapting their model to employers' training decisions in which the important role of unobservable characteristics is similar to that in hiring decisions. While in the original model workers' innate productivity is the unobservable characteristic (relevant for hiring decisions), in our adaption of the model the workers' future firm attachment is the unobservable characteristic (relevant for training decisions).

3.2.2   Statistical discrimination theory and employer-provided training

Applying statistical discrimination theory to employers' training decisions, we assume that employers base their training decisions on observable individual indicators for future firm attachment (e.g., part-time employment status). If, however, individual indicators are not reliable enough to predict future firm attachment, employers base their training decisions on previous statistical experience for a related group identity (e.g., gender). In our adaptation of the model presented in statistical discrimination theory, employers rely on the one hand on individual indicators i to make assumptions about a worker's future firm attachment f. The relation between i and f is:

$$i = f + u$$
$$(3.1)$$

where u is assumed to be a normally distributed error term, with zero mean and constant variance; f is also assumed to be normally distributed with a mean equal to

α.[50] On the other hand, employers rely on previous statistical experience utilizing a self-assessed group mean of future firm attachment α to predict an individual worker's future firm attachment.

Taken together, given the indicator variable and the group mean, the expected value of future firm attachment $\hat{f}$ is:

$$\hat{f} = E\left(f|i\right) = \left[(1-\gamma)\cdot\alpha + \gamma\cdot i\right]. \tag{3.2}$$

The factor γ is the weight of the individual effect i. It also determines the weight of the group effect, whereby the group effect is $(1 - \gamma)$ α. The less reliable the individual indicator (low γ), the more the weight of the group effect increases. Thus when individual-specific information on workers is limited, employers cannot accurately predict future firm attachment for individual workers. Employers then turn to group identification as a predictor for future firm attachment.

Suppose that gender, as the group identification, is observed along with potential individual indicators for firm attachment. Assuming that the reliability of the indicators (and thus the available information) differs for female (w) and male (m) workers, employers use different weights and different gender-specific measurement equations to predict workers' future firm attachment:

$$\hat{f}_w = \left[(1-\gamma_w)\cdot\alpha_w + \gamma_w\cdot i_w\right] \tag{3.3}$$

$$\hat{f}_m = \left[(1-\gamma_m)\cdot\alpha_m + \gamma_m\cdot i_m\right]. \tag{3.4}$$

We assume that employers, when deciding about training provision, look for indicators that accurately predict future firm attachment. Employment status, i.e., working part-time instead of full-time, is an indicator available on the labor market and is easily at an employer's disposal.

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[50] Following Aigner and Cain (1977), we assume that firms' assessment of workers' average future firm attachment is on average without bias, i.e., the realized average firm attachment equals the predicted average firm attachment.

3.2.3   *Employment status as a potential indicator for future firm attachment*

We assume that employment status is an indicator whose reliability in predicting future firm attachment differs for female and male workers. In the following, we argue that the part-time indicator is more reliable for male workers than for female workers. Consequently, employers will weigh the part-time indicator more heavily for male than for female workers when predicting their future firm attachment, i.e., factor γ is higher in eq. (3.4) predicting the future firm attachment for male workers than in eq. (3.3) for female workers:

$$\gamma_w < \gamma_m \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (3.5)$$

As a result, for male workers, employers' weighting will put male part-timers at a disadvantage compared to male full-timers (given male part-timers' lower expected firm attachment). For female workers, in contrast, employers will put more weight on the group indicator, i.e., on previous statistical experience on female workers' firm attachment, than for male workers. This weighting will induce that women's probability of participating in training will not change when they work part-time instead of full-time. In general, however, women will face lower training probabilities merely by virtue of being female.

An explanation for the gender-specific differences in the reliability of the individual indicator is the variation in the degree of heterogeneity within the female and male workforce. We now show why we can reasonably assume that part-time employment status serves as a reliable (negative) indicator of future firm attachment for male workers but is significantly less reliable for female workers—adding no meaningful information in a situation of uncertainty about future firm attachment.[51]

The part-time indicator for female workers i_w is unsuited to predict future firm attachment due to the large unobserved heterogeneity among the female workforce. This heterogeneity—ranging from women working full-time for their entire work lives to those working part-time for a period of time to those working full-time until they give birth to their first child and leaving the labor market

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[51] In 1986, Cain has already noticed that, in general, female workers might have difficulty signaling their long-term labor market commitment. Neumark (1999) added empirical support by showing that poorer labor market information about female workers is partly responsible for wage differentials.

altogether—may stem from women's still carrying the main responsibility for family work, from their being (traditionally) considered secondary wage earners, or both. Therefore, we argue that future firm attachment does not differ systematically between female part-timers and full-timers. Predicting future firm attachment based on current employment status (part-time or full-time) results in a large measurement error for female workers for two reasons: First, current employment status does not reliably predict how long a woman will remain with a firm. Second, the relationship between current and future employment status does not vary systematically by current employment status. Given the low reliability of part-time employment status as an individual indicator for women's future firm attachment (low γ_w), our model suggests that employers give increased weight to the group mean α_w—and thus to women's average future firm attachment—to properly appraise their future firm attachment. Consequently, we derive our first hypothesis: Employers provide similar training opportunities to women in part-time and full-time employment (all else being equal).

By contrast, we argue that for men the individual part-time indicator i_m reveals reliable information on men's future firm attachment, because for men future firm attachment varies systematically between male part-timers and full-timers. Men are typically more likely to be employed part-time —as opposed to full-time—when they bear a higher responsibility outside the employment relationship or when they willingly spend large amounts of time on leisure activities, limiting their mobility and thus their labor market availability and flexibility (e.g., Hardoy and Schøne, 2006). In addition, empirical evidence suggests that years of tenure are typically lower for male part-timers than for male full-timers (cf. e.g., O'Dorchai et al., 2007). The current employment status (part-time or full-time) is thus a reliable indicator to predict men's future firm attachment for two reasons: First, the current part-time status indicates fewer years of expected tenure and thus a lower firm attachment. Second, male workers who are currently employed part-time are more likely to also be employed part-time in the future than those currently employed full-time. Given this higher reliability of part-time status as an individual negative indicator for men's

future firm attachment (high γ_m), we derive our second hypothesis: Employers provide male full-timers more training than male part-timers (all else being equal).

Because we predict the weight of the part-time indicator to vary substantially between women and men, we empirically expect a positive interaction term between female gender and part-time employment. A significant positive interaction term would indicate that part-time employment is not as disadvantageous for female workers as for male workers in employers' training decisions.

3.3 Data, descriptive analysis, and empirical model

Analyzing the training probabilities of women and men in part-time and full-time employment requires data containing rich information on specific training facets, including information on whether training is work-related or employer-provided. Moreover, the analysis requires information on the number of working hours. Ideally, workers should report a number of firm and job characteristics, together with details on a variety of features describing their personal situation and household structure. The Swiss Labor Force Survey (SLFS), a nationally representative data set of private households in Switzerland, is a perfect match to investigate this research question.

The SLFS provides information on the structure of the labor force and employment behavior patterns. The data allows us to predict training probabilities, controlling for the usual variables in studies on training participation (e.g., Bassanini et al., 2007). As the SLFS adheres to international definitions, it makes Swiss data comparable with OECD data. The survey collects detailed information on training every three to four years, with the survey on training being enhanced since 2006. To investigate our hypotheses, we use data from the 2009 wave and test our results for consistency with data from the 2006 wave.

We focus our estimation on individuals, aged 25 to 64, in part-time and full-time employment, who reported valid information on all variables of interest. We restrict our sample to workers who work one day or more per week, as we assume that those working less are a very specific, unrepresentative group of workers not

receiving much training, if any. We further exclude self-employed individuals and workers in public administration and education, as their access to training is differently organized. The sample selection results in a data set with 17,120 observations.

3.3.1   *Employer-provided training and the main explanatory variables*

The survey defines "training", our dependent variable of interest, as a learning activity that does not end in an educational degree and is thus not part of the institutionalized educational system. Respondents report whether they participated in such a learning activity in the previous 12 months. Affirmative answers are followed by the question of whether they participated for private or work-related reasons. Further, we have information on whether training is employer-provided, defined as including training that employers (at least partly) finance, that (at least partly) occurs during working hours, or both. Focusing on employer-provided work-related training, the variable covers courses, seminars, congresses, lectures, conferences, and private lessons. Training takes the value 1 if a worker received any employer-provided work-related training in the previous year and 0 otherwise.

Female gender and part-time employment are our two main explanatory variables. We rely on the SLFS definition of part-time status, which is considered the common definition of part-time employment in Switzerland: less than 37 contracted hours (corresponding to a four-and-a-half-day working week or less). Although this definition differs from the more common definition of 30 working hours or less (e.g., Arulampalam and Booth, 1998), sensitivity analysis for the choice of cut-off points show that our results remain robust for either definition (results are available from the authors upon request). We therefore stay with the local official definition, which we assume to be the most reliable information that local employers also use.

3.3.2   Descriptive analysis

Our sample includes 12,537 full-time and 4,583 part-time workers, i.e., every fourth employee in our sample works part-time. Whereas in our sample more than 50% of the female labor force works part-time, only 6% of male workers are part-time employed. Among OECD countries, on average 25% of the female and 10% of the male labor force is part-time employed. Part-time employment is thus less prevalent and female and male part-time shares are closer. However, countries such as the United Kingdom have also substantially higher part-time shares, which are also dominated by female workers (OECD, 2010). In our sample, employers provide their workers almost 80% of the training, either by (partly) financing it, by (partly) providing working hours, or both. This share of employer-provided training is consistent with data analyzed in other training-related studies (e.g., Leuven and Oosterbeek, 1999).

Table 3.1 presents the means and differences in means for employer-provided training and selected individual characteristics broken down by gender and part-time/full-time status. Row 1 in Table 3.1 indicates that men in full-time employment participate the most in work-related training (42%), followed by women in full-time employment (39%). Female and male part-timers have equally low training participation rates of 33%, both with a considerable part-time training gap for men (9 percentage points) and women (6 percentage points). Both differences in means are highly statistically significant.

To acquire a first insight into whether the gender-specific differences in the reliability of the part-time indicator are borne out in our data, we give more detailed descriptive background and analyze by gender whether part-timers and full-timers differ in other characteristics that determine training participation rates. Our data indicates that women are more likely to work part-time when married or raising children (table 3.1, rows 2 and 3). Women thus work part-time mainly for family reasons, whereas for men family reasons matter, but to a significantly lesser degree (i.e., 63% and 38% of part-time working women and men have children, respectively). Table 3.1 also shows for both, female and male part-time workers, that the older cohort (aged 41 to 64) is over-represented, suggesting that part-time work

might also be a bridge to retirement, more likely for male workers than for female. Given the underlying data, men's reasons for working part-time are less obvious. Therefore, employers face a high uncertainty when predicting male part-timers' future firm attachment.

In the theory section, we suggest that the part-time indicator is reliable for men but not for women in predicting individual future firm attachment. One reason for this suggestion is that for men, working part-time versus full-time correlates with the length of the return period (i.e., expected tenure), whereas for women there is no such systematic relationship. Descriptive statistics confirm this suggestion: Female workers do not significantly differ in their average tenure, whether they are working part-time or full-time (table 3.1, row 7). Men, in contrast, stay with an employer 1.4 years longer, on average, when working full-time. Moreover, when examining switches from part-time to full-time work status (or *vice versa*), we find women to switch their work status more than twice as often as men, measured relative to those continuing in either employment status. Taken together, these patterns suggest that working part-time correlates with a lower average future firm attachment for men but not for women. Since our raw figures clearly show a different relationship between part-time employment and future firm attachment based on gender (table 3.1, row 7), according to hypothesis 1 and 2 we expect an economically significant part-time training gap for men but not for women.

Table 3.1: Descriptive statistics for men and women in full-time and part-time employment.

	Male workers					Female workers				
	Full-time N = 8,819		Part-time N = 603		Equality of means	Full-time N = 3,718		Part-time N = 3,980		Equality of means
	Mean	Std. Dev.	Mean	Std. Dev.	t-test	Mean	Std. Dev.	Mean	Std. Dev.	t-test
(1) Training	0.423	0.494	0.327	0.469	4.87***	0.395	0.489	0.326	0.469	6.28***
(2) Married	0.668	0.471	0.546	0.498	5.85***	0.391	0.488	0.671	0.470	-25.56***
(3) Children	0.508	0.500	0.385	0.487	6.02***	0.311	0.463	0.631	0.483	-29.63***
(4) Aged 25-40	0.440	0.496	0.353	0.478	4.29***	0.501	0.500	0.396	0.489	9.31***
(5) Aged 41-64	0.560	0.496	0.647	0.478	-4.29***	0.499	0.500	0.604	0.489	-9.31***
(6) Highly educated	0.401	0.490	0.423	0.494	-1.04	0.349	0.477	0.265	0.442	7.93***
(7) Tenure	9.874	9.560	8.518	9.620	3.35***	8.334	8.599	8.211	7.819	0.65

DATA SOURCE*:* SLFS 2009 (restricted sample). Own calculations.
NOTES: Asterisks denote statistically significant differences in means. *** p<0.01, ** p<0.05, and *p<0.10 indicate significance levels.

3.3.3   *The empirical model*

To test our hypotheses, we estimate a probit model identifying the joint effect of being female and part-time employed on the probability of participating in employer-provided training. Our regression model is based on the assumption that workers receive training if employers expect training benefits B to be higher than training costs C, i.e., if net benefits NB are positive:

$$NB > 0 \ (\text{or} \ B > C). \tag{3.6}$$

The problem is that net benefits are unobservable. However, we can observe whether workers participate in employer-provided training or not and can thus use an underlying latent variable model of training as follows:

$$NB_i^* = X_i'\beta + u_i, \ y = I\left[NB^* > 0\right]. \tag{3.7}$$

NB_i^* refers to the net benefits that are unobserved for the researcher. X_i' is a vector of variables potentially determining net benefits of training. The indicator function I takes the value 1 if $NB^* > 0$. Thus:

$$y = 1 \ \text{if} \ NB^* > 0$$

$$y = 0 \ \text{if} \ NB^* \leq 0. \tag{3.8}$$

If net benefits are positive, workers receive employer-provided training, whereas if net benefits are negative (or zero), they do not.

As our dependent variable y is a binary variable and we assume u to have a standard normal distribution, we use a probit model to estimate training probabilities. The equations that are estimated are versions of:

$$\text{Prob}(y_i = 1) = \Phi\left(\beta_1\, x_1 + \beta_2\, x_2 + \beta_P\,(x_1 * x_2) + \sum_{i=3}^{k} \beta_i Z_i\right),\tag{3.9}$$

with Φ being a standard normal density function. $\text{Prob}(y_i{=}1)$ measures the individual's probability of participating in employer-provided training. Workers either participate in employer-provided work-related training ($y_i{=}1$) or not ($y_i{=}0$). The independent variables on which we focus are binary and indicate part-time employment (x_1) and female gender (x_2). We include an interaction term ($x_1 * x_2$) to investigate whether working part-time interacts with female gender in influencing the probability of receiving employer-provided work-related training. Z_i stands for the constant term and a set of control variables.

To investigate the sensitivity of our results, we gradually include four groups of control variables. These groups and the corresponding variables are similar to those used in classic studies of training, e.g., by Bassanini et al. (2007, chap. 10.5) and Oosterbeek (1998). The first group relates to personal characteristics (marital status, children dummy, regional dummies, urban dummy, and age dummies); the second describes human capital variables (educational dummies, tenure, and tenure squared); and the third relates to firm attributes (flexible working time[52], fixed-term work contract, firm size dummies, and industry dummies). The fourth group covers job attributes (occupational dummies and different leadership positions)[53].

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[52] The dummy "flexible working time" refers to employees who have the freedom to start and end their working days flexibly.

[53] To control for occupational segregation, we include narrow occupational categories, i.e., eight occupational dummies classified according to the International Standard Classification of Occupation (ISCO). To account for different professional status, we include two dummies that describe different leadership positions within a company (i.e., a dummy for whether or not an employee has a position in management and a dummy for whether or not an employee is a team leader).

3.4   Results

3.4.1   Gender differences in the part-time/full-time training gap

Table 3.2 presents the estimation results for the probit model given by eq. (3.9). We estimate five different model specifications. For specification 1 we include our main independent variables (working part-time, being female, and the interaction term); for specification 2 to specification 5 we gradually include control variables according to the 4 groups (personal characteristics, human capital variables, firm attributes and job attributes) described in section 3.3.

The coefficient of greatest interest—the interaction term between part-time employment status and female gender—positively determines the probability of participating in training (table 3.2, row 3). The interaction term is statistically significant for all specifications except the first, i.e., without considering any explanatory variables other than employment status and gender. We thus find the part-time training gap to significantly vary by gender. While the coefficient on the part-time employment status shows a significant negative effect throughout all specifications (see table 3.2, row 1), we find that the coefficient on the interaction is significantly positive indicating that the negative impact of part-time employment is significantly less pronounced for female workers. Male workers, in contrast, face a considerably lower training probability as a consequence of part-time employment.

These results are in line with the theoretical predictions we derived from statistical discrimination theory, i.e., that employers weigh the part-time indicator differently for male and female workers (see eq. (3.5) in the theoretical section). While for male workers part-time employment is a reliable indicator for (lower) future firm attachment, for female workers the indicator does not add meaningful information on the top of being female.

The second row of Table 3.2 shows that being female significantly negatively determines the probability of participating in work-related training. However, with the introduction of human capital attributes (tenure and dummies for different educational levels) in specification 3, the significant female effect disappears. We explain this result with the (on average) lower educational level of

the female labor force and the considerably high impact of education on training participation. Nevertheless, with the inclusion of firm attributes and industry dummies in specification 4 and occupational and leadership dummies in specification 5, the female coefficient is again highly statistically significant. The female workforce thus appears disadvantaged in access to employer-provided training even after controlling for the level of human capital, firm attributes and industries, and occupations. This finding is in line with empirical studies from other countries, finding negative effects for women on the probability of receiving work-related (employer-provided) training (e.g., Dieckhoff and Steiber, 2011 for workers across European countries; Hoque and Bacon, 2008 for British workers; Lynch, 1992 for U.S. workers).[54]

Table 3.2: Probit results for the probability of participating in employer-provided training.

	Specification 1 Coef. [Std. Err.]	Specification 2 Coef. [Std. Err.]	Specification 3 Coef. [Std. Err.]	Specification 4 Coef. [Std. Err.]	Specification 5 Coef. [Std. Err.]
Part-time	-0.256*** [0.055]	-0.282*** [0.055]	-0.302*** [0.057]	-0.363*** [0.059]	-0.266*** [0.061]
Female	-0.074*** [0.025]	-0.113*** [0.026]	-0.021 [0.027]	-0.142*** [0.029]	-0.112*** [0.030]
Part-time * Female	0.072 [0.062]	0.158** [0.063]	0.156** [0.066]	0.193*** [0.068]	0.161** [0.069]
Personal Characteristics [a]		yes	yes	yes	yes
Human Capital [b]			yes	yes	yes
Firm attributes & Industry [c]				yes	yes
Occupation & Leadership [d]					yes
LR chi^2	121.74***	358.00***	2302.01***	3432.15***	4054.74***
Observations	17,120	17,120	17,120	17,120	17,120

DATA SOURCE: SLFS 2009 (restricted sample). Own calculations.
NOTES: (i) *** $p<0.01$, ** $p<0.05$, and *$p<0.10$ indicate significance levels. (ii) The dependent variable is employer-provided work-related training. (iii) The four groups of control variables include: (a) marital status, children dummy, regional dummies, urban dummy and age dummies (i.e. aged 25-39, aged 40-54, aged 55-64); (b) seven educational dummies, tenure and tenure squared; (c) dummies for both flexible working time and fixed-term work contract, firm size dummies (i.e. size < 10, size 10-49, size 50-249) and nine industry dummies; (d) eight occupational dummies and two leadership position dummies.

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[54] At this point, the distinction among different types of training is crucial. When it comes to broader training definitions (not employer-provided training in particular), recent empirical studies point to training advantages for female workers (e.g., Bassanini et al., 2007).

The negative effect for female workers supports the theoretical prediction we draw from our adaption of the model on statistical discrimination on employers' training decisions under uncertainty: As the female workforce is highly heterogeneous, employers gain no additional information on women's future firm attachment from the individual part-time indicator. Given the lower reliability of women's individual indicator, employers increase the weight towards women's group effect—women's average future firm attachment. Because of women's high discontinuity in their labor market attachment (as argued previously), women's firm attachment is on average lower than men's (according to empirical evidence, e.g., Light and Ureta, 1992; Royalty, 1996; Sicherman, 1996). Therefore, employers offer women on average less training opportunities than men. Given that women's indicators for future firm attachment are less reliable, this uncertainty thus works against women.

The significance and signs of the coefficients of the control variables support the theoretical predictions and confirm the findings of previous studies (for an overview see Blundell et al., 1996). Moreover, the different model specifications support the robustness of our results. The estimates also appear stable and consistent across SLFS wave 2006, suggesting that the interaction term plays a significant role in determining access to employer-provided training. Results are available from the authors upon request.

To determine the magnitude of the effects, we calculate predicted probabilities of training participation for female and male part-timers and full-timers.[55] Table 3.3 summarizes these predicted probabilities. Male full-timers participate in training with a probability of 42%, whereas this probability significantly and sharply decreases (by 8 percentage points) for male part-timers. In contrast, female full-timers have a 38% probability of participating in training, a probability considerably lower than that for their male counterparts. However, women's part-time training gap (3 percentage points) is low compared to the gap for men (8 percentage points). We thus find that men have a considerably higher

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[55] We base the calculation of the average predicted probabilities on specification 5 in Table 3.2. The average predicted probabilities depend on the actual values of the covariates for which we control.

reduction in training probabilities when working part-time than comparably situated women.[56] All of these differences are highly statistically significant.

Table 3.3: Average predicted probabilities of employer-provided training.

	Male workers			Female workers			
	Full-time (1)	Part-time (2)	Difference (1) - (2)	Full-time (3)	Part-time (4)	Difference (3) - (4)	Difference ((1) - (2)) - ((3) - (4))
Training	42%	33%	8%***	38%	35%	3%***	5%***

DATA SOURCE: SLFS 2009 (restricted sample). Own calculations.
NOTES: (i) Asterisks denote statistically significant differences in predicted probabilities. *** p<0.01, ** p<0.05, and *p<0.10 indicate significance levels. (ii) Average predicted probabilities are calculated based on specification 5 in Table 3.2.

To summarize, our results show that working part-time instead of full-time constitutes a serious training disadvantage for male workers. For female workers, however, the training provision does not vary substantially by their employment status. Hirsch (2005) and Mumford and Smith (2009) find similar results for the part-time earnings gap: The part-time earnings gap is negative for male workers, but it is basically zero for female workers. Finding comparable result patterns for the part-time training and the part-time earnings gap is not surprising, considering existing empirical studies that find a positive relationship between past trainings investments and workers' wages (e.g., Bassanini et al., 2007 for Europe; Frazis and Loewenstein, 2005 for employer-provided training in the U.S.; Lee, 2009 for federally funded job training in the U.S.).

3.4.2   Further discussion and robustness checks

To assess the robustness of our results, in this section we run estimations for different sub-groups of individuals that might differ in their firm attachment and thus in their training probabilities. For each sub-group, Table 3.4 shows the effects of working part-time, being female, and the interaction effect (part-time * female) on the probability of participating in employer-provided training. Table 3.5 presents

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[56] Part-timers partly substitute the lower probability of participating in employer-provided training by higher self-investments especially when they have a high learning motivation and a clear vision of their future development (Nelen and de Grip, 2009).

average predicted training probabilities for these sub-groups. The results remain stable across the different sub-groups and confirm our two hypotheses.

First, we examine whether the results differ between part-timers currently working 20-49% and part-timers working 50-90% of full-time working hours. We find that the results for the interaction term remain consistent for these two groups of part-time workers (table 3.4, estimations 1 and 2). However, a comparison of predicted training probabilities shows systematic differences between these two groups of part-time workers: We observe that reducing the working hours to 50-90% of full-time working hours constitutes a non-significant training difference for women, but a significant and high training difference for men (table 3.5, row 2). The training disadvantage for male part-timers is even more prevalent when working hours are reduced to 20-49% of full-time working hours (table 3.5, row 1). Therefore, for male workers any reduction in the number of working hours (compared to working full-time) is associated with a training disadvantage. In contrast, for female workers we only find a part-time training gap for a substantial reduction in working hours (i.e., for working 20-49% of full-time working hours).

According to human capital theory, we would, however, expect that any reduction in the number of working hours is associated with a lower training probability. The persisting part-time training gap between women and men indicates that employers use part-time employment at present as an indicator for future firm attachment and that they use this indicator differently for women and men when investing in workers' human capital. These results support our theoretical considerations on training decisions under uncertainty.

Second, as we confine the focus to women and men with significant firm attachments, we restrict the sample to those with a minimum of three years of tenure. Within this sub-group we exclude training with the sole function of introductory job training. We find that the results remain consistent for this sub-group of workers with more than three years tenure (see table 3.4, estimation 3). The part-time training gap remains thus significantly different for women and men (7 percentage points) (table 3.5, row 3).

Table 3.4: Probit results for the probability of participating in employer-provided training for different sub-groups.

Sub-Groups (1) - (3)	(1)	(2)	(3)	
	Part-timers 20%-49%	Part-timers 50%-90%	Tenure >= 3 years	
	Coef. *[Std. Err.]*	Coef. *[Std. Err.]*	Coef. *[Std. Err.]*	
Part-time	-0.403***	-0.222***	-0.283***	
	[0.110]	*[0.064]*	*[0.075]*	
Female	-0.102***	-0.106***	-0.128***	
	[0.031]	*[0.030]*	*[0.037]*	
Part-time * Female	0.230**	0.175**	0.219***	
	[0.117]	*[0.073]*	*[0.085]*	
LR chi^2	3577.24***	3741.11***	2812.77***	
Observations	14,588	15,843	11,662	
Sub-Groups (4) - (7)	(4)	(5)	(6)	(7)
	Higher education	Lower education	Part-time occupations	Non-part-time occupations
	Coef. *[Std. Err.]*	Coef. *[Std. Err.]*	Coef. *[Std. Err.]*	Coef. *[Std. Err.]*
Part-time	-0.239***	-0.312***	-0.262**	-0.271***
	[0.086]	*[0.086]*	*[0.105]*	*[0.074]*
Female	-0.0436	-0.162***	-0.102**	-0.129***
	[0.046]	*[0.040]*	*[0.047]*	*[0.039]*
Part-time * Female	0.0407	0.254***	0.137	0.168*
	[0.102]	*[0.095]*	*[0.115]*	*[0.087]*
LR chi^2	661.09***	2101.92***	1241.9***	2872.93***
Observations	6,146	10,974	6,029	11,091

DATA SOURCE: SLFS 2009 (restricted sample). Own calculations.
NOTES: (i) *** $p<0.01$, ** $p<0.05$, and *$p<0.10$ indicate significance levels. (ii) The dependent variable is employer-provided work-related training and estimations are based on specification 5 in Table 3.2. (iii) The sub-groups refer to: (1) part-timers working 20-49% and (2) part-timers working 50-90% of full-time working hours; (3) workers with a minimum of three years tenure; (4) highly educated workers (including workers with a higher vocational education or a university degree) and (5) non-highly educated workers; (6) occupations favored by part-time workers and (7) occupations less favored by part-time workers.

Table 3.5: Average predicted probabilities of employer-provided training for different sub-groups.

	Male workers			Female workers			Difference
	Full-time (1)	Part-time (2)	Difference (1) - (2)	Full-time (3)	Part-time (4)	Difference (3) - (4)	((1) - (2)) - ((3) - (4))
(1) Part-timers 20%-49%	41%	29%	12***	38%	32%	5***	7**
(2) Part-timers 50%-90%	42%	35%	7***	39%	37%	2	5**
(3) Tenure > = 3 years	42%	33%	9***	38%	36%	2	7***
(4) Higher education	60%	51%	9***	58%	51%	7***	2
(5) Lower education	32%	23%	9***	27%	25%	2	7***
(6) Part-time occup.	46%	38%	9**	43%	39%	4**	5
(7) Non-part-time occup.	39%	31%	8***	35%	32%	3**	5**

DATA SOURCE: SLFS 2009 (restricted sample). Own calculations.

NOTES: (i) Asterisks denote statistically significant differences in predicted probabilities. *** $p<0.01$, ** $p<0.05$, and *$p<0.10$ indicate significance levels. (ii) The dependent variable is employer-provided work-related training and estimations are based on specification 5 in Table 3.2. (iii) See notes under Table 3.4 for descriptions of sub-groups (1) to (7).

Third, as better-educated workers are generally more likely to receive employer-provided training (e.g., Arulampalam et al., 2004), we further analyze whether the interaction term remains significant for workers with different educational backgrounds. We run separate regressions for highly educated workers (including workers with a higher vocational education or a university degree) and low-educated workers. Whereas our results remain robust for low-educated workers, we find that women and men with a higher education have comparable training probabilities independent of their employment status. The female effect on the training probability is not statistically significant, nor is the interaction effect (table 3.4, estimation 4). Moreover, predicted probabilities of training in Table 3.5 (row 4) show that highly educated women and men have the highest average training probability in full-time employment—at least compared to the other presented specifications—at 58% and 60%, respectively. This result indicates that women with higher educational degrees may be less exposed to gender discrimination, a result consistent with the finding of existing studies in which scholars investigated wage discrimination in labor markets (e.g., Montgomery and Powell, 2003).

However, both highly educated female and male part-timers suffer from a substantial drawback, as their training probability decreases by 7 and 9 percentage points, respectively, when working part-time. We suggest that a higher education

might also be an individual indicator that firms use in conjunction with the part-time indicator to predict workers' firm attachment. While the reliability of part-time employment strongly varies by gender for low-educated workers, firms seem to infer no different information for part-time employment status of highly educated workers regardless of workers' gender. Assuming that highly educated part-timers do differ in their working hours but not in their expected tenure from their full-time counterparts, the finding is consistent with human capital theory. For highly educated part-timers there are less working hours to recoup the training investment than for similar full-timers.

The last robustness check deals with the finding of wage-related studies, that the part-time/full-time earnings gap is a result of occupational downgrading (e.g., Connolly and Gregory, 2009). We analyze whether the results for occupations favored by part-time workers (i.e., part-time occupations) differ from the results for occupations less favored by part-time workers (i.e., non-part-time occupations). Table 3.4 (estimations 6 and 7) shows that the results remain consistent for non-part-time occupations. In contrast, the interaction effect is not statistically significant for part-time occupations. We suggest that female and male part-timers are equally more likely to remain part-time employed in part-time occupations, because working part-time in part-time occupations (where part-timers are less in competition with full-time workers) might constitute less of a disadvantage.

Taken together, the interaction term is—where theoretically expected—statistically significant. Our results remain thus stable across the different sub-samples (table 3.4). Whereas all training differences between male part-timers and full-timers are significant and high in size (ranging from 7 to 12 percentage points) (table 3.5), the training differences between female part-timers and full-timers are rather small (ranging from non-significant differences to significant differences of 3 to 7 percentage points) (table 3.5). In sum, we find that the difference-in-difference, i.e., the part-time/full-time training gap between female and male workers is significant and ranges from 5 to 7 percentage points. Therefore, part-time employment is in general much less favorable for male than for female workers, at least for the probability of participating in employer-provided training.

3.5   Conclusions

This chapter demonstrates that men in part-time employment receive much less training than men in full-time employment. This gap becomes even more prevalent when men in part-time employment considerably reduce their working hours (i.e., to less than 50% of full-time working hours). For women, however, working part-time or full-time makes a minor difference, if any at all, in training participation. In particular, we find no training disadvantage for women with only a slight reduction in the number of working hours as compared to their full-time counterparts.

These results are consistent with our theoretical predictions from both human capital theory and statistical discrimination theory and support our model of employers' training decisions under uncertainty. We assume that employers use part-time employment status as an observable indicator to predict workers' future firm attachment, which is an unobservable characteristic relevant in employers' training decisions. Our adapted model of statistical discrimination theory suggests that employers weigh the part-time indicator differently by gender. While for men part-time employment status is a reliable indicator for a lower future firm attachment, the part-time indicator adds no reliable information for women (on top of being female). For women, employers therefore rely on previous statistical experience, i.e., women's average firm attachment, which is markedly lower than men's. Women, on average, thus have a lower probability of receiving employer-provided training than men.

The described model of employers' training decisions under uncertainty can be generalized and can, for example, be applied to investigate other potential indicators relevant for training decisions, such as parental leave in general or mandatory paternity leave in particular. The main objective for employers is to find reliable individual indicators that reduce their uncertainty about returns on training induced by differences in workers' future firm attachment. In addition, the model may be applied to investigate the effect of part-time status as an indicator on labor market outcomes other than training participation, such as career opportunities or job assignments.

The finding that part-time employment for women is not necessarily related to unfavorable labor market outcomes (i.e., lower earnings and less employer-provided training) indicates that part-time (as opposed to full-time) employment is more attractive for women than for men. Women "pay the price" merely by virtue of being female. Inequality arises for individual female workers who do not fit the stereotype of women (i.e., who do not generally have a low firm attachment). Given this result, the challenge for policymakers is to find a way of ensuring that employers do not restrict training access for women in general.

At the same time, the finding that the part-time training gap is significantly negative for male workers indicates that part-time employment places men at a disadvantage relative to their full-time counterparts. The lower probability of employer-provided training makes part-time employment unattractive for men with regard to career prospects. More equal (training) opportunities will only evolve if a much larger number of men works part-time (for whatever reason). Only then would male part-timers become a more heterogeneous group of workers, in turn making the part-time indicator less reliable and reducing their part-time/full-time training gap. Therefore, policy measures that support male part-timers would become self-sustainable because they would reduce the training or career disadvantages associated with part-time work.

CHAPTER 4:

FINAL REMARKS

This doctoral thesis aimed at contributing to research on educational investments under uncertainty by carrying out thorough empirical studies from two different angles: (1) students' decision making about educational investments in upper secondary education and (2) employers' decision making about the provision of training to their workers. Standard human capital theory has shown that both students and employers only invest in education if their investments pay off. Both decision makers, however, face uncertainty when investing in education: While students face uncertainty about costs and benefits of schooling, employers deal mainly with uncertainty about workers' future firm attachment that determines their investment benefits to a large amount. While both theoretical and empirical literature acknowledged the existence of uncertainty in educational investments, many empirical studies on this topic neglect to account for heterogeneities among individuals.

This doctoral thesis shows in a series of empirical investigations that heterogeneities in individual preferences and behavior patterns lead to different investment strategies among both students and employers. The thesis makes two major contributions. The first substantial research progress is achieved through the empirical investigations conducted in the first two chapters. The presented evidence clearly shows that differences in the degrees of patience among students lead to different educational investment decisions in the vocational education and training programs. Whereas in chapter one, the results show that students' degrees of patience determine whether or not they leave an educational program before graduation, in chapter two, the findings suggest that students' degrees of patience determine how they respond to financial incentives. The second substantial research progress is achieved through the empirical investigation conducted in the third chapter. The presented results show that unobservable heterogeneity in behavioral patterns among part-time workers leads employers—when deciding about training provision—to use the part-time indicator differently for female and male workers. As a result, female and male (part-time) workers are treated differently on the labor market, at least for the probability of participating in employer-provided training. Overall, given our findings, heterogeneities among individuals clearly deserve attention in the analysis of human capital investment decisions in general and in the evaluation of intervention programs in particular.

The first chapter contributes to the research on dropout behavior by shedding light on how students' degrees of patience determine their probability of dropping out of education. We find that patient students have a lower probability of dropping out of the vocational training program than less patient students. This finding is consistent with a human capital investment model (Manski, 1989 and Altonji, 1993) in which students sequentially reconsider their schooling investment decisions while attending school: Incorporating new information about schooling costs and benefits, less patient students are more likely to leave an educational program before graduation as a result of their unfavorable cost-benefit ratio. The finding calls for interventions that, among others, specifically address the shortcomings of students with lower degrees of patience. Interventions may aim at

reducing the probability of information updates (by contributing to well-founded educational choices), decreasing perceived short-term schooling costs, or increasing short-term schooling benefits. Whether particularly short-term financial incentives are a means of bridging the gap is examined in the second chapter of this thesis.

The second chapter makes a significant contribution to research on financial incentives in education. Existing studies on this subject typically find that financial incentives can have either positive effects, no effects, or even negative effects (see, among others, Angrist et al., 2009; Angrist and Lavy, 2009; Fryer, 2011; Leuven et al., 2010). The presented analysis deepens the understanding of systematic differences in the responsiveness to incentives by showing that highly impatient students respond more strongly to the incentives by increasing their student performance more than patient students. This result is in line with our hypothesis derived from human capital theory (see Becker, 1962; Blinder and Weiss, 1976; Borghans and Golsteyn, 2006): While students generally raise their student performance when marginal benefits increase, less patient students respond more strongly to short-term financial incentives because at least part of the investment benefits can be derived much closer to the investment. This finding particularly deserves attention when evaluating the efficacy of schooling intervention programs. Finding zero average program effects is by no means the end of the story. Moreover, the presented finding may assist policy makers in the design of interventions suggesting that the provision of financial incentives might be most effective at the beginning of educational programs when real labor market benefits are discounted the most.

Finally, the third chapter contributes to the research on employer-provided training both by providing an innovative model on employers' training decisions under uncertainty and by empirically examining whether the part-time/full-time training gap differs by gender. Empirical research on employer-provided training has thus far focused on the average part-time/full-time training gap in general and has thereby neglected that part-timers are a heterogeneous group of workers. Indeed, our findings suggest that there are systematic gender differences in the access to employer-provided training: For men, working part-time instead of full-time

constitutes a serious disadvantage in access to employer-provided training; for women, however, working part-time instead of full-time constitutes only a minor difference. This finding is consistent with the presented model on employers' training decisions under uncertainty. Employers, when deciding about training provision, use observable indicators (such as the part-time employment status) to predict workers' future firm attachment. Given the gender-dependent reliability of the part-time indicator, employers use different investment strategies for female and male part-time workers. As for female workers the part-time indicator does not add any meaningful information on the top of being female, part-time employment is as attractive as full-time employment for female workers. However, women "pay the price" merely by virtue of being female. Male workers, in contrast, face considerably lower training probabilities as a consequence of part-time employment. Given these results, the challenge is to find a way of ensuring that employers do not restrict training access for women in general and for men in part-time employment.

The empirical findings and their possible policy implications described in this thesis point toward (at least) three avenues for future research. First, whereas the results of the first chapter indicate that less patient students have a higher probability of dropping out of upper secondary education, less is known about appropriate dropout interventions that particularly target the needs of less patient students. Future research may contribute by investigating students' responsiveness to dropout interventions. Most helpful would be investigations that simultaneously evaluate the efficacy of different dropout interventions to ensure that their impacts (among less patient students) are comparable.

Second, while the results of the second chapter indicate that highly impatient students respond more strongly to financial incentives by increasing their student performance more than patient students, less is known about the most cost-effective features of such incentive programs. Future research may add to existing literature on financial incentive programs by investigating the optimal design of such interventions ensuring to maximize the responsiveness of students.

Third, whereas the result of the third chapter suggests that employers use observable indicators to predict workers' future firm attachment and thus to reduce

their uncertainty when investing in training, less is known about how workers who do not fit certain stereotypes can believably signal their future firm attachment. Further research may close this gap both by examining the relative reliability of observable indicators and by investigating how different groups of workers can efficiently use these indicators to signal their future firm attachment. Reducing the uncertainty of employers' training decisions would reduce training (and thus career) disadvantages for both men in part-time employment and women in the labor market in general.

Finally, returning to the example of whether or not to return to academia, I have updated information and learned throughout my Ph.D. that not only the opportunity costs but even more so the time, effort, and dedication devoted to pursuing a Ph.D. are tremendous. Facing still uncertainty about the labor market benefits of higher education, the thesis clearly shows that higher noncognitive skills (such as being considerably patient) are definitely to one's advantage if one is to successfully complete a Ph.D. (over entering the labor market with a master's degree). Just as important, however, is that the Ph.D. experience entails much more than the costs of merely doing work in a specific field of research—it is fun.

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ADDITIONAL MATERIAL

FOR CHAPTER 1 AND CHAPTER 2

A   Survey 2009

Studienteil 1

Bitte beantworten Sie die folgenden Fragen zu Schulbildung, Freundeskreis, Freizeitverhalten und Familie. Bei den meisten Fragen genügt es, die Antworten anzukreuzen. **Bitte antworten Sie offen und ehrlich – die Befragung ist komplett anonym.** Weder Eltern noch Lehrer erfahren von ihren persönlichen Ergebnissen.
Für die Teilnahme an der Studie erhält jeder von Ihnen ein Startgeld von 10 CHF. In späteren Studienteilen können Sie weiteres Geld hinzuverdienen.

Vielen Dank für Ihre Unterstützung!

Fragen zur Schulbildung:

Welche Schule haben Sie unmittelbar vor Beginn Ihrer Lehre abgeschlossen?
o   Sekundarschule
   ●   Sekundarschule A   ☐
   ●   Sekundarschule B   ☐
   ●   Sekundarschule C   ☐
   ●   Stammklasse E   ☐
   ●   Stammklasse G   ☐
o   Ein Brückenangebot, nämlich:
   ●   10. Schuljahr   ☐
   ●   Berufswahlschule   ☐
   ●   Werkjahr   ☐
   ●   Anderes, nämlich:_____
o   Gymnasium/Maturität   ☐
o   Sonderschule   ☐
o   Anderes, nämlich:

Unterscheidet sich Ihr höchster Schulabschluss hiervon?
Ja   ☐   Nein   ☐

Falls Ja, was ist Ihr höchster Schulabschluss? _____

Welche Noten hatten Sie in Ihrem höchsten Schulabschlusszeugnis in den folgenden Fächern?
Deutsch: _____
Mathematik: _____
Englisch: _____

Wie viele Bewerbungen haben Sie für Ihre Lehrstelle geschrieben?_____

Wie sicher sind Sie, dass Sie Ihre Lehre abschliessen werden?

sehr sicher	ziemlich sicher	unentschieden	eher unsicher	sehr unsicher
☐	☐	☐	☐	☐

Haben Sie während Ihrer Schulzeit ein Schuljahr wiederholt?

Ja ☐ Nein ☐

Haben Sie den Kindergarten besucht?

Ja ☐ Nein ☐ **Falls ja, wie lange?_____** Jahre

Fragen zum Freundeskreis:

Wie viele Freunde bzw. Freundinnen haben Sie?

Bis zu 10 ☐
10 bis 20 ☐
Mehr als 20 ☐

Was machen Ihre 5 besten Kolleginnen oder Kollegen zurzeit?

Tätigkeit	Anzahl
In der Lehre	_____
In der Schule	_____
Arbeiten nach abgeschlossener Lehre	_____
Arbeiten ungelernt	_____
Arbeitslos	_____
Anderes, nämlich:_____	_____

Fragen zum Freizeitverhalten:

Welche Hobbys betreiben Sie? _____

Wie viele Stunden verwenden Sie wöchentlich für Ihre Hobbies? _____ Stunden

Rauchen Sie?

Ja ☐ Nein ☐

Falls ja, seit wie vielen Jahren rauchen Sie? Seit _____ Jahren

Falls ja, wie viel rauchen Sie?

Selten: ca.1x pro Monat ☐
Gelegentlich: ca. 1x pro Woche ☐
Täglich bis 5 Zigaretten ☐
Täglich 5-10 Zigaretten ☐
Täglich 10-20 Zigaretten ☐
Täglich mehr als 20 Zigaretten ☐

Trinken Sie Alkohol?

Ja   ☐   Nein   ☐

Falls ja, seit wie vielen Jahren trinken Sie Alkohol? Seit _____ Jahren

Falls ja, wie oft trinken Sie Alkohol?

Selten: ca.1x pro Monat oder seltener   ☐

Gelegentlich: ca. 1x pro Woche   ☐

Mehrmals pro Woche   ☐

Täglich   ☐

Falls ja, wie oft haben Sie im letzten Jahr 8 Gläser (Männer) bzw. 6 Gläser (Frauen) Bier, Wein, Schnaps oder anderen Alkohol bei derselben Gelegenheit getrunken?

Nie   ☐

Selten: ca. 1x pro Monat oder seltener   ☐

Gelegentlich: ca. 1x pro Woche   ☐

Jeden Tag oder fast jeden Tag   ☐

Fragen zur Familie:

Welches ist der höchste Bildungsabschluss, den Ihre Eltern erworben haben?

	Mutter:	Vater:
Kein Schulabschluss	☐	☐
Obligatorische Schule	☐	☐
Berufsausbildung	☐	☐
Höhere Berufsprüfung (z.B. Meister)	☐	☐
Fachschule	☐	☐
Maturität	☐	☐
Hochschule	☐	☐
Anderes, nämlich:	_____	_____

Gehen Ihre Eltern einem regelmässigen Job nach (angestellt oder selbstständig)?

Mutter: **Vater:**

Ja   ☐   Nein   ☐   Ja   ☐   Nein   ☐

Leben Ihre leiblichen Eltern getrennt?

Ja   ☐   Nein   ☐

Falls ja, seit wie vielen Jahren leben sie getrennt? Seit _____ Jahren

Welche Sprache sprechen Sie mit Ihren Eltern?

Deutsch ☐

Französisch ☐

Italienisch ☐

Anderes, nämlich:_____

Wie viele Geschwister haben Sie? _____ Geschwister

Als wievieltes Kind wurden Sie geboren? Als _____ Kind

Wo wohnen Sie zur Zeit?

Zu Hause bei den Eltern ☐

Gemeinsame Wohnung mit Freund/Freundin ☐

Bei Verwandten ☐

In einer Wohngemeinschaft ☐

Lehrlingswohnheim ☐

Anderes, nämlich:_____

Wie schwierig ist es für Sie, spontan 100 CHF aufzubringen?

sehr schwierig				Sehr leicht
1	2	3	4	5
O	O	O	O	O

Fragen zu Ihnen:

In welchem Jahr sind Sie geboren? 19__

Und in welchem Monat? _____

In welchem Land sind Sie geboren?

Schweiz ☐   Anderes, nämlich:_____

Falls Sie nicht in der Schweiz geboren sind, seit wie vielen Jahren leben Sie in der Schweiz?

Seit _____ Jahren

Ihr Geschlecht?

Männlich ☐   Weiblich ☐

Wie lautet die Postleitzahl Ihres Wohnortes? _____

Bitte kreuzen Sie bei den folgenden Aussagen an, wie sehr diese auf Sie zutreffen.
Bitte beantworten Sie die Fragen ehrlich – es gibt keine richtigen oder falschen Antworten!
Wahrscheinlich werden einige Aussagen auf Sie persönlich voll zutreffen und andere überhaupt
nicht. Bei wieder anderen sind Sie vielleicht eher unentschieden. Kreuzen Sie bitte so an, wie es auf
Sie persönlich zutrifft.

	Trifft gar nicht auf mich zu			Trifft voll auf mich zu	
Bei allem, was ich mache, will ich der oder die Beste sein.	☐	☐	☐	☐	☐
Ich habe Rückschläge überwunden, um eine wichtige Herausforderung zu bewältigen.	☐	☐	☐	☐	☐
Neue Ideen und Projekte lenken mich manchmal von alten Ideen und Projekten ab.	☐	☐	☐	☐	☐
Ich bin ehrgeizig.	☐	☐	☐	☐	☐
Meine Interessen ändern sich von Jahr zu Jahr.	☐	☐	☐	☐	☐
Rückschläge entmutigen mich nicht.	☐	☐	☐	☐	☐
Ich war kurzfristig von einer Idee oder einem Projekt besessen, habe aber später das Interesse daran verloren.	☐	☐	☐	☐	☐
Ich arbeite hart.	☐	☐	☐	☐	☐
Ich setze mir oft ein Ziel und beschließe dann später, ein anderes Ziel zu verfolgen.	☐	☐	☐	☐	☐
Ich habe Schwierigkeiten, mich auf Projekte zu konzentrieren, die länger als ein paar Monate bis zum Abschluss benötigen.	☐	☐	☐	☐	☐
Ich bringe zu Ende, was auch immer ich angefangen habe.	☐	☐	☐	☐	☐
Es ist das höchste Ziel im Leben, etwas von bleibender Bedeutung zu erreichen.	☐	☐	☐	☐	☐
Ich denke, dass Erfolg überbewertet wird.	☐	☐	☐	☐	☐
Ich habe schon einmal ein Ziel erreicht, das jahrelange Arbeit erfordert hat.	☐	☐	☐	☐	☐
Ich bin von Erfolgswillen getrieben.	☐	☐	☐	☐	☐
Ich interessiere mich alle paar Monate für neue Ziele.	☐	☐	☐	☐	☐
Ich bin fleissig.	☐	☐	☐	☐	☐

Hier sind wieder unterschiedliche Eigenschaften aufgeführt, die eine Person haben kann.
Bitte kreuzen Sie bei jeder Aussage an, wie sehr diese auf Sie zutrifft.

Ich bin jemand, der …	Trifft überhaupt nicht zu						Trifft voll zu
gründlich arbeitet.	☐	☐	☐	☐	☐	☐	☐
kommunikativ, gesprächig ist.	☐	☐	☐	☐	☐	☐	☐
manchmal etwas grob zu anderen ist.	☐	☐	☐	☐	☐	☐	☐
originell ist, neue Ideen einbringt.	☐	☐	☐	☐	☐	☐	☐
sich oft Sorgen macht.	☐	☐	☐	☐	☐	☐	☐
eher faul ist.	☐	☐	☐	☐	☐	☐	☐
aus sich herausgehen kann, gesellig ist.	☐	☐	☐	☐	☐	☐	☐
künstlerische, ästhetische Erfahrungen schätzt.	☐	☐	☐	☐	☐	☐	☐
leicht nervös wird.	☐	☐	☐	☐	☐	☐	☐
Aufgaben wirksam und effizient erledigt.	☐	☐	☐	☐	☐	☐	☐
zurückhaltend ist.	☐	☐	☐	☐	☐	☐	☐
rücksichtsvoll und freundlich mit anderen umgeht.	☐	☐	☐	☐	☐	☐	☐
eine lebhafte Phantasie, Vorstellungen hat.	☐	☐	☐	☐	☐	☐	☐
entspannt ist, mit Stress gut umgehen kann.	☐	☐	☐	☐	☐	☐	☐
wissbegierig ist.	☐	☐	☐	☐	☐	☐	☐

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Bitte beantworten Sie die folgenden drei Fragen:

    i.   Ein Hockeyschläger und ein Puck kosten zusammen 11 CHF. Der Schläger kostet 10 CHF mehr als der Puck. Wieviel CHF kostet der Puck? _____

    ii.   Wenn 5 Maschinen 5 Minuten brauchen, um 5 Teile herzustellen, wie lange brauchen dann 100 Maschinen, um 100 Teile herzustellen? _____

    iii.   Auf einem Teich gibt es einen Seerosen-Teppich. Jeden Tag verdoppelt der Teppich seine Grösse. Wenn es 48 Tage braucht, bis der Teppich den ganzen Teich bedeckt, wie lange dauert es dann, bis er den halben Teich bedeckt? ___

Danke für Ihre Mitarbeit. Bitte wenden Sie sich nun an den Studienleiter. Sobald alle Teilnehmer den Fragebogen komplett ausgefüllt haben, beginnt der zweite Teil der Studie.

ID-NR.:_____

Studienteil 2

1	2	3	4	5	6	7	8	9
—	⊥	⊐	L	⊔	○	∧	✕	=
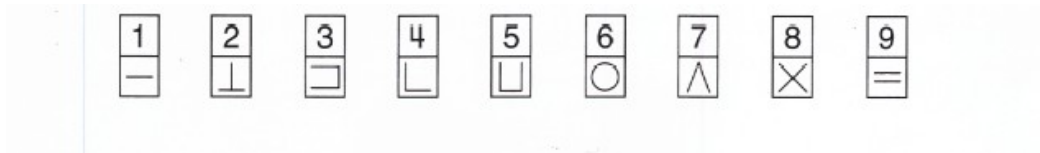
2	1	3	2	1	4	2	3	5	2	3	1	4								

5	6	3	1	4	1	5	4	2	7	6	3	5	7	2	8	5	4	6	3

7	2	8	1	9	5	8	4	7	3	6	2	5	1	9	2	8	3	7	4

6	5	9	4	8	3	7	2	6	1	5	4	6	3	7	9	2	8	1	7

9	4	6	8	5	9	7	1	8	5	2	9	4	8	6	3	7	9	8	6

2	7	3	6	5	1	9	8	4	5	7	3	1	4	8	7	9	1	4	5

7	1	8	2	9	3	6	7	2	8	5	2	3	1	4	8	4	2	7	6

ID-NR.:_____

Studienteil 3

In diesem letzten Teil der Studie werden Sie Entscheidungen treffen, bei denen Sie zu Ihrem Startgeld von 10 CHF weiteres Geld hinzu verdienen können. Lesen Sie also die Ausführungen und Erklärungen sorgfältig durch, um informierte Entscheidungen treffen zu können. Bei Fragen zu den Entscheidungssituationen oder zum Ausfüllen der Entscheidungsbögen können Sie sich jederzeit an die Studienleiter wenden.

Wichtig:
Bei diesem Teil der Studie gibt es keine richtigen oder falschen Antworten. Für uns ist es nur wichtig, dass Sie Ihre Entscheidungen vollständig und sorgfältig treffen.

Es ist weiterhin sehr wichtig, dass Sie Ihre Entscheidungen alleine treffen und sich nicht mit Ihrem Sitznachbarn absprechen.

Entscheidungssituation 1:

Zunächst müssen Sie sich entscheiden, ob Sie lieber einen sicheren Geldbetrag erhalten möchten, oder ob Sie eine Münze werfen möchten, bei der Sie bei „Kopf" 10 CHF erhalten und bei „Zahl" nichts erhalten.

In der untenstehenden Tabelle sind mehrere Entscheidungen zwischen dem Münzwurf und verschiedenen sicheren Auszahlungen aufgeführt. Beim Münzwurf können Sie jeweils bei „Kopf" 10 CHF verdienen. Wieviel Sie anstelle des Münzwurfs als sichere Auszahlung angeboten bekommen, variiert jedoch von Entscheidung zu Entscheidung.

Bitte treffen Sie in der untenstehenden Tabelle in jeder Zeile eine Entscheidung darüber, ob Sie den Münzwurf oder lieber den sicheren Geldbetrag annehmen wollen.

Am Ende der Studie wird eine Zeile zufällig ausgelost. Entsprechend Ihrer Entscheidung in dieser Zeile erhalten Sie entweder die sichere Auszahlung, oder es wird die Münze geworfen und Sie erhalten abhängig vom Ergebnis entweder 10 oder 0 CHF.

Beispiele zum Ausfüllen:

1. Angenommen, Sie kreuzen in den Zeilen 1 bis 8 den Münzwurf an und in den Zeilen 9 und 10 die sichere Auszahlung. Dies bedeutet, dass Sie 9 resp. 10 CHF für sicher lieber haben als den Münzwurf, bei dem Sie bei „Kopf" 10 CHF gewinnen könnten. Sobald Ihnen allerdings 8 CHF oder weniger anstelle des Münzwurfs geboten werden, nehmen Sie lieber den Münzwurf.

2. Angenommen Sie kreuzen nur in Zeile 1 und 2 an, dass Sie den Münzwurf annehmen, und in den Zeilen 3 bis 10 die sichere Auszahlung. Dies bedeutet, dass Sie ab einem sicheren Betrag von 3 CHF auf den Münzwurf verzichten, bei dem Sie 10 CHF gewinnen könnten.

Bitte treffen Sie in jeder Zeile der Tabelle eine Entscheidung.

	Münzwurf: Kopf = 10 CHF, Zahl = 0 CHF	*Sichere Auszahlung von X CHF*
1.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 1 CHF.
2.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 2 CHF.
3	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 3 CHF.
4.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 4 CHF.
5.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 5 CHF.
6.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 6 CHF.
7.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 7 CHF.
8.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 8 CHF.
9.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 9 CHF.
10.	☐ Ich nehme den Münzwurf an.	☐ Ich möchte eine sichere Auszahlung von 10 CHF.

Entscheidungssituation 2:

Sie müssen sich wiederum entscheiden, ob Sie einen Münzwurf annehmen möchten oder nicht. **Dieses Mal können Sie jedoch beim Münzwurf Geld gewinnen oder verlieren. Eventuelle Verluste müssen Sie durch das von uns zur Verfügung gestellte Startkapital (10 CHF) ausgleichen. Falls Sie den Münzwurf nicht annehmen, passiert in diesem Studienteil nichts weiter, Sie gewinnen kein Geld und Sie verlieren kein Geld.**

Falls Sie sich für den Münzwurf entscheiden, wirft der Studienleiter am Ende der Studie eine Münze, und je nach Ausgang des Wurfs sind die Auszahlungen an Sie wie folgt:

- Kopf: Sie erhalten 6 CHF
- Zahl: Sie verlieren X CHF

Der Betrag, den Sie bei „Zahl" potentiell verlieren können, variiert von Zeile zu Zeile. **Bitte treffen Sie in der untenstehenden Tabelle in jeder Zeile eine Entscheidung, ob sie den Münzwurf annehmen möchten, oder lieber nicht am Münzwurf teilnehmen möchten.** Wenn Sie den Münzwurf annehmen, und es fällt „Kopf", so erhalten Sie 6 CHF. Wenn „Zahl" fällt, so wird Ihnen am Ende der Studie der entsprechende Betrag von Ihrem Gesamteinkommen abgezogen.

Am Ende der Studie wird wiederum eine Zeile zufällig ausgelost, und entsprechend Ihrer Entscheidung in dieser Zeile passiert entweder nichts, oder es wird die Münze geworfen.

Bitte treffen Sie in jeder Zeile der Tabelle eine Entscheidung:

		*Ich **lehne** den Münzwurf **ab**.*	*Ich **nehme** den Münzwurf **an**.*
1.	Wenn die Münze Zahl zeigt, **verlieren Sie 2 CHF.** Wenn die Münze Kopf zeigt, **gewinnen Sie 6 CHF.**	☐	☐
2.	Wenn die Münze Zahl zeigt, **verlieren Sie 3 CHF.** Wenn die Münze Kopf zeigt, **gewinnen Sie 6 CHF.**	☐	☐
3	Wenn die Münze Zahl zeigt, **verlieren Sie 4 CHF.** Wenn die Münze Kopf zeigt, **gewinnen Sie 6 CHF.**	☐	☐
4.	Wenn die Münze Zahl zeigt, **verlieren Sie 5 CHF.** Wenn die Münze Kopf zeigt, **gewinnen Sie 6 CHF.**	☐	☐
5.	Wenn die Münze Zahl zeigt, **verlieren Sie 6 CHF.** Wenn die Münze Kopf zeigt, **gewinnen Sie 6 CHF.**	☐	☐
6.	Wenn die Münze Zahl zeigt, **verlieren Sie 7 CHF.** Wenn die Münze Kopf zeigt, **gewinnen Sie 6 CHF.**	☐	☐

Entscheidungssituation 3:

In dieser Entscheidungssituation müssen Sie sich zwischen zwei Geldbeträgen (Option A und Option B) entscheiden, die Sie zu unterschiedlichen Zeitpunkten erhalten können.

- Eine frühe Option A: Wenn Sie sich für diese Möglichkeit entscheiden, erhalten Sie einen bestimmten Betrag **heute**.
- Eine spätere Option B: Sie erhalten in **3 Monaten** 100 CHF von uns ausbezahlt. Hierfür erhalten Sie heute ein Garantieschreiben der Universität, dass Ihnen der entsprechende Geldbetrag in drei Monaten bar per Einschreiben zugestellt wird.

In der folgenden Tabelle sind mehrere Entscheidungen zwischen diesen beiden Optionen aufgeführt. Eine Alternative ist jeweils die frühe Option A, die andere Alternative ist die spätere Option B.

Am Ende der Studie wird wiederum ausgelost, welche Zeile der Tabelle für Ihre Auszahlung relevant ist. Sollte Ihre ID Nummer für diese Entscheidungssituation gezogen worden sein, so wird Ihnen der in dieser Zeile gewählte Betrag zum angegebenen Zeitpunkt ausbezahlt.

Entscheiden Sie bitte in jeder Reihe, ob Sie die frühe Option A wählen möchten, oder die spätere Option B:

	Option A	*Option B*
1.	☐ 5 CHF heute	☐ 100 CHF in 3 Monaten
2.	☐ 10 CHF heute	☐ 100 CHF in 3 Monaten
3.	☐ 15 CHF heute	☐ 100 CHF in 3 Monaten
4.	☐ 20 CHF heute	☐ 100 CHF in 3 Monaten
5.	☐ 25 CHF heute	☐ 100 CHF in 3 Monaten
6.	☐ 30 CHF heute	☐ 100 CHF in 3 Monaten
7.	☐ 35 CHF heute	☐ 100 CHF in 3 Monaten
8.	☐ 40 CHF heute	☐ 100 CHF in 3 Monaten
9.	☐ 45 CHF heute	☐ 100 CHF in 3 Monaten
10.	☐ 50 CHF heute	☐ 100 CHF in 3 Monaten
11.	☐ 55 CHF heute	☐ 100 CHF in 3 Monaten
12.	☐ 60 CHF heute	☐ 100 CHF in 3 Monaten
13.	☐ 65 CHF heute	☐ 100 CHF in 3 Monaten
14.	☐ 70 CHF heute	☐ 100 CHF in 3 Monaten
15.	☐ 75 CHF heute	☐ 100 CHF in 3 Monaten
16.	☐ 80 CHF heute	☐ 100 CHF in 3 Monaten
17.	☐ 85 CHF heute	☐ 100 CHF in 3 Monaten
18.	☐ 90 CHF heute	☐ 100 CHF in 3 Monaten
19.	☐ 95 CHF heute	☐ 100 CHF in 3 Monaten
20.	☐ 100 CHF heute	☐ 100 CHF in 3 Monaten

Entscheidungssituation 4:

Nun haben Sie wiederum die Wahl zwischen zwei Geldbeträgen, die Sie zu zwei unterschiedlichen Zeitpunkten erhalten können:

- Eine frühe Option A: Wenn Sie sich für diese Möglichkeit entscheiden, erhalten Sie einen bestimmten Betrag **in drei Monaten**. Sie erhalten hierfür ein Garantieschreiben der Universität, dass Ihnen der entsprechende Geldbetrag in drei Monaten bar per Einschreiben zugestellt wird.

- Eine spätere Option B: Sie erhalten in **6 Monaten** 100 CHF von uns ausbezahlt. Sie erhalten hierfür ein Garantieschreiben der Universität, dass Ihnen der entsprechende Geldbetrag in sechs Monaten bar per Einschreiben zugestellt wird.

Am Ende der Studie wird wiederum ausgelost, welche Zeile der Tabelle für Ihre Auszahlung relevant ist. Sollte Ihre ID Nummer für diese Entscheidungssituation gezogen worden sein, so wird Ihnen der in dieser Zeile gewählte Betrag zum angegebenen Zeitpunkt ausbezahlt.

Entscheiden Sie bitte in jeder Reihe, ob Sie die frühe Option A oder die spätere Option B wählen möchten:

	Option A	*Option B*
1.	☐ 5 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
2.	☐ 10 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
3.	☐ 15 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
4.	☐ 20 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
5.	☐ 25 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
6.	☐ 30 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
7.	☐ 35 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
8.	☐ 40 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
9.	☐ 45 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
10.	☐ 50 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
11.	☐ 55 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
12.	☐ 60 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
13.	☐ 65 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
14.	☐ 70 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
15.	☐ 75 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
16.	☐ 80 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
17.	☐ 85 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
18.	☐ 90 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
19.	☐ 95 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten
20.	☐ 100 CHF in 3 Monaten	☐ 100 CHF in 6 Monaten

B   Survey 2010

Universität Zürich
ISU – Institut für Strategie und Unternehmensökonomik

Lehrstuhl für BWL,
insbes. empirische Methodik
der Arbeitsbeziehungen und
der Personalökonomik
Plattenstrasse 14
CH-8032 Zürich
Tel. +41 44 634 42 81
Fax +41 44 634 43 70
backes-gellner@isu.unizh.ch
www.unizh.ch/isu/emap/index.htm

Prof. Dr. Uschi Backes-Gellner

Fragebogen
„Lernende und ihre Erfahrungen im 1. Grundbildungsjahr"

Ein Projekt der Universität Zürich
in Kooperation mit dem Mittelschul- und Berufsbildungsamt des Kantons Zürich

Im vergangenen Herbst, zu Beginn Ihres ersten Grundbildungsjahres, haben Sie bereits ein erstes Mal an unserer Studie teilgenommen. Wir freuen uns, dass Sie auch heute wieder an unserer Studie teilnehmen. Im Rahmen dieser Befragung interessiert uns, wie es Ihnen in Ihrem ersten Lehrjahr erging und wie Ihre heutige Ausbildungssituation aussieht. **Wir bitten Sie, alle Fragen in Bezug auf die im Sommer/Herbst 09 begonnene Berufslehre zu beantworten.**

Bitte lesen Sie jede Aussage genau durch und kreuzen Sie als Antwort die Kategorie an, die Ihrer Sichtweise am Besten entspricht.

Ihre Angaben werden **streng vertraulich** behandelt und alle Daten **anonymisiert gespeichert und ausgewertet**. Rückschlüsse auf Ihre Person sind damit unmöglich.

Mitmachen und einen iPod touch gewinnen!
Unter allen Teilnehmenden, die einen ausgefüllten Fragebogen einreichen, verlosen wir als **Dankeschön zwei iPod touch**. Die Verlosung findet statt, sobald alle Fragebogen eingegangen sind, spätestens aber am 30. November 2010. Die Gewinnerinnen und Gewinner werden persönlich benachrichtigt.

Herzlichen Dank für Ihre wertvolle Mitarbeit!

Name: _____

Vorname: _____

Klasse: _____

Fragebogen
„Lernende und ihre Erfahrungen im 1. Grundbildungsjahr"

A. Beruf

1. **Im Sommer/Herbst 09 haben Sie Ihre Grundbildung in einem bestimmten Beruf begonnen (z.B. Polymechaniker; Elektroinstallateur; Kaufmann/Kauffrau). Bitte denken Sie jetzt nur an diesen Beruf.**
Wie stark treffen folgende Aussagen (unabhängig von Ihrem Ausbildungsbetrieb) auf Sie zu?

Bitte machen Sie in jeder Zeile ein Kreuz.	völlig falsch				völlig richtig
a) Die beruflichen Anforderungen entsprechen exakt meinen Vorstellungen.	1	2	3	4	5
b) Mit den **Weiterbildungsaussichten** im Beruf bin ich sehr zufrieden.	1	2	3	4	5
c) Mit den **Aufstiegsmöglichkeiten** im Beruf bin ich sehr zufrieden.	1	2	3	4	5
d) Mit den **Einkommensaussichten** im Beruf bin ich sehr zufrieden.	1	2	3	4	5
e) Mit den **Weiterbeschäftigungsaussichten** im Beruf bin ich sehr zufrieden.	1	2	3	4	5
f) Mein Beruf wurde mir im Vorfeld zu positiv dargestellt.	1	2	3	4	5
g) Mein derzeitiger Beruf entspricht meinem Wunschberuf.	1	2	3	4	5

B. Fragen zur aktuellen Ausbildungssituation

1. **Haben Sie Ihr <u>Ausbildungsprofil</u> im letzten Jahr gewechselt?** ☐ **nein** ☐ **ja und zwar von**

   ☐ Profil **B** auf **E**   ☐ Profil **E** auf **B**

   ☐ Profil **M** auf **E**   ☐ Profil **E** auf **M**

   ☐ Profil **G** auf **E**   ☐ Profil **E** auf **G**

   ☐ anderes _ _ _ _ _ _ _ _ _ _ _

2. **Machen Sie zurzeit eine zweijährige Grundbildung mit <u>Berufsattest</u>?** ☐ **nein** ☐ **ja**

3. **Wurde Ihr damals abgeschlossener Lehrvertrag in der Zwischenzeit aufgelöst?**

   ☐ **Nein** → **Falls nein**, bitte weiter mit den Fragen zum Lehrbetrieb - **Block C.**

   ☐ **Ja**

4. **Bitte beantworten Sie die folgenden Aussagen mit richtig oder falsch.**

	richtig	falsch
a) Die Initiative für die Lehrvertragsauflösung ging von meiner Seite aus.	r	f
b) Der Vertrag wurde im gegenseitigen Einverständnis aufgelöst.	r	f
c) Der Vertrag wurde durch Konkurs bzw. Betriebsschliessung aufgelöst.	r	f

5. **Nach wie vielen Monaten haben Sie Ihren damaligen Lehrvertrag aufgelöst?** Nach _ _ _ _ _ _ Monat(en).

6. **Warum wurde Ihr damaliger Lehrvertrag aufgelöst (falls nicht durch Konkurs oder Betriebsschliessung) bzw. warum haben Sie gekündigt?**

   _

   _

7. **Falls Sie Ihren Lehrvertrag aufgelöst haben, sind Sie derzeit wieder in einem Lehrbetrieb in Ausbildung?**

☐ **Ja,** in einem anderen **Beruf,** nämlich _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ⎫ **Falls ja,** bitte weiter mit den Fragen

☐ **Ja,** in einem anderen **Betrieb,** nämlich _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ⎬ zum Lehrbetrieb - **Block C.**

☐ **Nein**

8. **Sie stehen zurzeit in keinem Lehrverhältnis. Wie würden Sie Ihre aktuelle berufliche Situation beschreiben?**
Bitte beantworten Sie die folgenden Aussagen mit „ja", „nein, aber geplant" oder „nein".

Ich bin derzeit …	ja	nein, aber geplant	nein
… Schüler/in einer allgemeinen Schule (z.B. Gymnasium).	j	g	n
… als ungelernter Arbeiter oder Angestellter beschäftigt.	j	g	n
… im Militärdienst.	j	g	n
… arbeitslos.	j		n

Wie würden Sie ihre aktuelle Situation beschreiben, falls keine der Aussagen auf Sie zutrifft?

Ich bin zurzeit _ .

9. **Planen Sie früher oder später wieder eine Berufslehre zu starten?**

☐ **nein**   ☐ **ja,** in einem anderen **Beruf,**   ☐ **ja,** in einem anderen **Betrieb,**

nämlich _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   nämlich _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

C. Lehrbetrieb

1. **Beziehen Sie <u>Leistungslohn</u>? (= Lohn, der abhängig ist von Ihrer Leistung in der Schule oder im Betrieb)**

☐ **Ja,** basierend auf der Leistung in der **Schule** (Noten) in der Höhe von _ _ _ _ _ _ und _ _ _ _ _ _ SFr.

☐ **Ja,** basierend auf der Leistung im **Betrieb** in der Höhe von _ _ _ _ _ _ und _ _ _ _ _ _ SFr.

☐ **Nein.**

2. **Wie viele <u>Mitarbeiter</u> hat der Betrieb, bei dem Sie zurzeit tätig sind?**

1 bis 9 ☐   10 bis 49 ☐   50 - 99 ☐   100 - 499 ☐   500 und mehr ☐

3. **Denken Sie jetzt bitte an Ihren Lehrbetrieb. Wie stark treffen folgende Aussagen auf Sie zu?**

Bitte machen Sie in jeder Zeile ein Kreuz.	völlig falsch				völlig richtig
a) Meine Tätigkeiten im Betrieb sind stark berufsbezogen.	1	2	3	4	5
b) Die Ausbildungsinhalte werden im Betrieb sehr gut vermittelt.	1	2	3	4	5
c) Ich bin zufrieden mit dem Reglement bezüglich Überstunden und Ferien.	1	2	3	4	5
d) Mit meinem Lehrlingslohn bin ich vollkommen zufrieden.	1	2	3	4	5
e) Mein Umgang mit den Berufsbildnern und Chefs im Betrieb ist konfliktfrei.	1	2	3	4	5
f) Mein Umgang mit den Arbeitskollegen(-innen) im Betrieb ist konfliktfrei.	1	2	3	4	5
g) Im Lehrbetrieb verrichte ich schwere körperliche Arbeit.	1	2	3	4	5
h) Im Betrieb bin ich vollkommen mit Arbeit ausgelastet.	1	2	3	4	5
i) Ich bin mit meiner Arbeit im Betrieb häufig überfordert.	1	2	3	4	5
j) Ich bin mit meiner Arbeit im Betrieb häufig unterfordert.	1	2	3	4	5
k) Ich bleibe dem Lehrbetrieb aus diversen Gründen häufig fern.	1	2	3	4	5

D. Berufsfachschule

Die folgenden Fragen zu Berufsfachschule beziehen sich auf die im Sommer/Herbst 09 begonnene Berufsausbildung. Uns interessiert, wie es Ihnen im ersten Grundbildungsjahr dort erging.

1. Denken Sie jetzt bitte an Ihre Berufsfachschule. Wie stark treffen folgende Aussagen für Sie zu?

Bitte machen Sie in jeder Zeile ein Kreuz.	völlig falsch				völlig richtig
a) Die Unterrichtsinhalte sind perfekt auf meinen Ausbildungsberuf abgestimmt.	1	2	3	4	5
b) Der Unterricht ist sehr verständlich.	1	2	3	4	5
c) Ich bin in der Schule häufig unterfordert.	1	2	3	4	5
d) Ich bin in der Schule häufig überfordert.	1	2	3	4	5
e) Ich fühle mich in der Schule oft gestresst.	1	2	3	4	5
f) Ich habe grosse Prüfungsangst.	1	2	3	4	5
g) Ich stehe häufig in Konflikt mit Lehrpersonen.	1	2	3	4	5
h) Ich stehe häufig in Konflikt mit Klassenkameraden.	1	2	3	4	5
i) Ich bleibe vom Schulunterricht häufig fern.	1	2	3	4	5

2. Wenn Sie an Ihr letztes Semesterzeugnis der <u>Berufsfachschule</u> denken, welche Noten haben Sie erzielt?

Bitte Noten aus dem letzten Semesterzeugnis eintragen.

Mathematik: _____   ☐ Fach nicht besucht.

Englisch: _____   ☐ Fach nicht besucht.

Deutsch: _____   ☐ Fach nicht besucht.

W&G (Wirtschaft und Gesellschaft): _____   ☐ Fach nicht besucht.

FRW (Finanz- und Rechnungswesen): _____   ☐ Fach nicht besucht.

VBR (Volksw.; Betriebsw.; Recht): _____   ☐ Fach nicht besucht.

Zeugnisdurchschnitt: _____

3. Wenn Sie an den <u>Ausbildungsbericht</u> des Lehrbetriebes denken, welche Durchschnittsnote haben Sie erhalten?

Note der letzten ALS: ☐

4. Wenn Sie an die letzte <u>Prozesseinheit</u> denken, die Sie im Betrieb verfasst haben, welche Note haben Sie erzielt?

Note der letzten Prozesseinheit: ☐

E. Persönliche Situation

1. Wie viele Freund/innen haben Sie zurzeit?

bis zu 10   10 bis 20   mehr als 20

☐   ☐   ☐

2. Wenn Sie nun nur an Ihre fünf besten Freund/innen denken, was machen diese zurzeit?

Bitte die zutreffenden Haupttätigkeiten der 5 besten Freunde ankreuzen. Mehrfachantworten sind möglich.	
Lernender, Schüler, Student	☐
Lehrabbrecher, Schulabbrecher	☐
Berufstätig, nach bereits abgeschlossener Grundbildung	☐
Berufstätig, ohne Ausbildungsabschluss	☐
Arbeitslos	☐
Andere Haupttätigkeit, nämlich _	☐

3. Wenn Sie an Ihre persönliche Situation denken, wie zutreffend sind die folgenden Aussagen?

Bitte machen Sie in jeder Zeile ein Kreuz.	völlig falsch				völlig richtig
a) Ich bin mir aus heutiger Sicht sehr sicher, dass ich die Lehre abschliessen werde.	1	2	3	4	5
b) Meine Eltern unterstützen mich in meinen beruflichen Vorhaben immer.	1	2	3	4	5
c) Mit meinem Leben als Ganzes bin ich sehr zufrieden.	1	2	3	4	5
d) Ich fühle mich im Allgemeinen sehr gesund.	1	2	3	4	5
e) Gesundheitliche Probleme erschweren mir die Ausübung meines Berufes.	1	2	3	4	5
f) Meine finanzielle Situation belastet mich sehr.	1	2	3	4	5
g) Die meisten meiner heutigen Freunde habe ich im letzten Jahr kennen gelernt.	1	2	3	4	5
h) Für meine Schulkollegen/innen sind gute Noten sehr wichtig.	1	2	3	4	5
i) Ich bin von einer schlimmen **familiären** Veränderung betroffen. (z.B. Scheidung, Arbeitslosigkeit Vater oder Mutter, Todesfall, Krankheit)	1	2	3	4	5
j) Ich bin von einer schlimmen **ausserfamiliären** Veränderung betroffen. (z.B. Todesfall innerhalb der Schulklasse, am Ausbildungsplatz)	1	2	3	4	5

4. Bitte geben Sie hier Ihre Adresse an, damit wir Ihnen im Fall eines Gewinnes den iPod touch zusenden können:

_____

Strasse, Hausnummer

_____

PLZ und Wohnort

5. Sind Sie im vergangenen Jahr bei Ihren Eltern ausgezogen?   Ja ☐   Nein ☐

6. Gerne lassen wir Ihnen via Email eine kurze Zusammenfassung der Ergebnisse zukommen. Wie lautet Ihre private Emailadresse?

_____ @_____

Wenn Sie uns noch Kommentare oder Bemerkungen zukommen lassen möchten, können Sie diese hier notieren.

- -

- -

- -

So, nun haben Sie es geschafft. Haben Sie alle Fragen beantwortet?
Für Ihre Mithilfe bedanken wir uns ganz herzlich!

Auf Ihrem weiteren beruflichen Weg wünschen wir Ihnen alles Gute.

Da es aus wissenschaftlicher Sicht interessant ist, Veränderungen über die Zeit zu beobachten, würden wir uns freuen, wenn wir Sie auch in Zukunft nochmals kontaktieren dürften.

Falls Sie Fragen an uns haben, können Sie sich jederzeit bei uns melden.

Prof. Uschi Backes-Gellner und Yvonne Oswald (yvonne.oswald@isu.uzh.ch)
Lehrstuhl für Betriebswirtschaftslehre, insbes. empirische Methodik der Arbeitsbeziehungen und der Personalökonomik
Plattenstrasse 14
CH-8032 Zürich

C   Survey 2011

Universität Zürich

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Lehrstuhl für BWL, insbes. empirische Methodik der
Arbeitsbeziehungen und der Personalökonomik
Plattenstrasse 14
CH-8032 Zürich
Telefon +41 44 634 42 76
http://www.business.uzh.ch/professorships/emap

**Fragebogen
„Lernende und ihre Erfahrungen im Lehrjahr 2010/2011"**

**Ein Projekt der Universität Zürich
in Kooperation mit dem Mittelschul- und Berufsbildungsamt des Kantons Zürich**

Seit Beginn Ihrer beruflichen Ausbildung haben Sie bereits zwei Mal an unserer Studie teilgenommen. Wir freuen uns deshalb, dass Sie auch heute wieder bereit sind an unserer Befragung teilzunehmen. Im Rahmen dieser Befragung interessiert uns, wie es Ihnen in Ihrem vergangenen Lehrjahr erging und wie Ihre heutige Ausbildungssituation aussieht.

Wichtig: Wir bitten Sie, alle Fragen in Bezug auf das vergangene Lehrjahr 2010/11 zu beantworten. Bitte lesen Sie jede Aussage genau durch und kreuzen Sie als Antwort die Kategorie an, die Ihrer Sichtweise am Besten entspricht.

Ihre Angaben werden **streng vertraulich** behandelt und alle Daten **anonymisiert gespeichert und ausgewertet**. Rückschlüsse auf Ihre Person sind damit unmöglich.

Mitmachen und einen iPod touch gewinnen!
Unter allen Teilnehmenden, die einen komplett ausgefüllten Fragebogen einreichen, verlosen wir als **Dankeschön drei iPod touch** (pro Schule einen iPod). Die Verlosung findet statt, sobald alle Fragebogen eingegangen sind, spätestens am 30. November 2011. Die Gewinnerinnen und Gewinner werden persönlich benachrichtigt. Über den Wettbewerb wird keine Korrespondenz geführt.

Herzlichen Dank für Ihre wertvolle Mitarbeit!

Name: _____

Vorname:_____

Klasse: _____

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Fragebogen - „Lernende und ihre Erfahrungen im Lehrjahr 2010/2011"

A. Fragen zur aktuellen Ausbildungssituation

1. Haben Sie Ihr <u>Ausbildungsprofil</u> im vergangenen Schuljahr 2010/2011 gewechselt?

☐ **nein**   ☐ **ja und zwar von** ☐ Profil **B** auf **E**   ☐ Profil **E** auf **B**

☐ Profil **M** auf **E**   ☐ Profil **E** auf **M**

☐ Profil **G** auf **E**   ☐ Profil **E** auf **G**

☐ anderes _ _ _ _ _ _ _ _ _ _ _

2. Wurde Ihr Lehrvertrag im vergangenen Schuljahr 2010/2011 aufgelöst?

☐ **nein** ➜ **Falls nein,** bitte direkt weiter mit den Fragen zum Lehrbetrieb – **Block B.**

☐ **ja**

3. Bitte beantworten Sie die folgenden Aussagen mit richtig oder falsch.

	richtig	falsch
a) Die Initiative für die Lehrvertragsauflösung ging von meiner Seite aus.	r	f
b) Die Initiative für die Lehrvertragsauflösung ging vom Arbeitgeber aus.	r	f
c) Der Vertrag wurde im gegenseitigen Einverständnis aufgelöst.	r	f
d) Der Vertrag wurde durch Konkurs bzw. Betriebsschliessung aufgelöst.	r	f

4. Falls der Vertrag nicht durch Konkurs oder Betriebsschliessung aufgelöst wurde, warum wurde Ihr Lehrvertrag aufgelöst bzw. warum haben Sie gekündigt?

_ _

_ _

5. Nach wie vielen Lehrjahren und Monaten haben Sie diesen Lehrvertrag aufgelöst?

Nach _ _ _ _ _ _ Lehrjahr(en) und _ _ _ _ _ _ Monat(en).

6. Sind Sie nach der Lehrvertragsauflösung wieder in einem Lehrbetrieb in Ausbildung?
(Mehrfachantworten möglich)

☐ **Ja,** in einem anderen **Beruf:** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ⎫

☐ **Ja,** in einem anderen **Betrieb:** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ⎬ **Falls ja,** bitte weiter mit den Fragen zum Lehrbetrieb -

☐ **Ja,** ich mache eine zweijährige Grundausbildung mit Berufsattest. ⎭ **Block B.**

☐ **Nein**

7. Sie stehen zurzeit in keinem Lehrverhältnis. Wie würden Sie Ihre aktuelle berufliche Situation beschreiben?
Bitte beantworten Sie die folgenden Aussagen mit „ja", „nein, aber geplant" oder „nein".

Ich bin derzeit …	ja	nein, aber geplant	nein
… Schüler/in einer allgemeinen Schule (z.B. Gymnasium).	j	g	n
… als ungelernter Arbeiter oder Angestellter beschäftigt.	j	g	n
… im Militärdienst.	j	g	n
… arbeitslos.	j		n

Wie würden Sie Ihre aktuelle Situation beschreiben, falls keine der Aussagen auf Sie zutrifft?
Ich bin zurzeit _ .

8. Planen Sie früher oder später wieder eine Berufslehre zu starten?

☐ **nein**   ☐ **ja,** in einem anderen **Beruf,**   ☐ **ja,** in einem anderen **Betrieb,**
nämlich _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   nämlich _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

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B. Lehrbetrieb

1. Denken Sie jetzt bitte an Ihren <u>Lehrbetrieb</u>. Wie stark treffen folgende Aussagen auf Sie zu?

Bitte machen Sie in jeder Zeile ein Kreuz.	**völlig falsch**				**völlig richtig**
a) Mit meinem Lehrlingslohn bin ich vollkommen zufrieden.	1	2	3	4	5
b) Mein Umgang mit den Berufsbildnern und Chefs im Betrieb ist konfliktfrei.	1	2	3	4	5
c) Mein Umgang mit den Arbeitskollegen(-innen) im Betrieb ist konfliktfrei.	1	2	3	4	5
d) Ich bin mit meiner Arbeit im Betrieb häufig überfordert.	1	2	3	4	5
e) Ich bin mit meiner Arbeit im Betrieb häufig unterfordert.	1	2	3	4	5
f) Ich bleibe dem Lehrbetrieb häufig fern.	1	2	3	4	5

2. Wie viel Zeit nimmt Ihr <u>Arbeitsweg</u> normalerweise in Anspruch? (Angabe in Minuten, Tür zu Tür)

_ _ _ _ _ Minuten und ich verwende dabei meistens _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ (bitte Verkehrsmittel angeben).

3. Wie hoch ist <u>zur Zeit</u> Ihr monatliches Grundsalär, das Ihr Arbeitgeber Ihnen bezahlt,
brutto in SFr pro *Monat*? ☐ unter 800 ☐ 800 + ☐ 900 + ☐ 1'000 + ☐ 1'100 + ☐ 1'200 +
☐ 1'300 + ☐ 1'400 + ☐ 1'500 + ☐ 1'600 + ☐ über 1'700

4. Denken Sie nun zurück an die Zeit, als Sie eine Lehrstelle gesucht haben.
Geben Sie an wie zutreffend folgende Aussagen sind.

Bitte machen Sie in jeder Zeile ein Kreuz.	**völlig falsch**				**völlig richtig**
a) Die Entfernung zum Lehrbetrieb war bei der Auswahl des Betriebes sehr wichtig.	1	2	3	4	5
b) Die Branche des Lehrbetriebes war bei der Auswahl des Betriebes sehr wichtig.	1	2	3	4	5
c) Das monatliche Grundsalär war bei der Auswahl des Betriebes sehr wichtig.	1	2	3	4	5
d) Bei der Lehrstellensuche war mir bekannt, dass manche Lehrbetriebe zusätzlich zum monatlichen Grundsalär einen Leistungslohn (= Bonus für gute individuelle Leistung) vergüten.	1	2	3	4	5
e) Das Vorhandensein eines solchen Leistungslohnes war mir bei der Auswahl des Betriebes sehr wichtig.	1	2	3	4	5

5. Hatten Sie im vergangenen Lehrjahr in Ihrem Lehrbetrieb die Möglichkeit einen <u>Leistungslohn</u> (Bonus für gute Schulnoten oder gute Leistung im Betrieb) zu erzielen?

☐ **nein** ➔ **Falls nein,** bitte weiter mit den Fragen zur Berufsfachschule – **Block C.**

☐ **ja**

6. Haben Sie selbst auch einen Leistungslohn ausbezahlt bekommen? ☐ nein ☐ ja

7. Auf welches Leistungs<u>mass</u> bezieht sich Ihr Leistungslohn? (Mehrfachantworten möglich)

	ja	**nein**
a) Notendurchschnitt im Semesterzeugnis über <u>alle</u> Fächer.	j	n
b) Notendurchschnitt im Semesterzeugnis von <u>einzelnen</u> Fächern, nämlich _ .	j	n
c) Individuelle Leistung im Betrieb	j	n
d) Anderes Mass, nämlich _ .	j	n

8. <u>Wann</u> wird Ihnen dieser Leistungslohn ausbezahlt? (Mehrfachantworten möglich)

☐ nach Erhalt des Jahresendzeugnisses ☐ nach Erhalt des Semesterzeugnisses

☐ zu anderen/weiteren Zeitpunkten, nämlich _ .

9. <u>Wie hoch</u> ist dieser Leistungslohn maximal? _ _ _ _ _ _ _ _ _ SFr.

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C. Berufsfachschule

1. Denken Sie jetzt bitte an Ihre Berufsfachschule. Wie stark treffen folgende Aussagen für Sie zu?

Bitte machen Sie in jeder Zeile ein Kreuz.	völlig falsch				völlig richtig
a) Ich bin in der Schule häufig unterfordert.	1	2	3	4	5
b) Ich bin in der Schule häufig überfordert.	1	2	3	4	5
c) Ich stehe häufig in Konflikt mit Lehrpersonen.	1	2	3	4	5
d) Ich stehe häufig in Konflikt mit Klassenkameraden.	1	2	3	4	5
e) Ich bleibe vom Schulunterricht häufig fern.	1	2	3	4	5

2. Wenn Sie an Ihr letztes Semesterzeugnis der <u>Berufsfachschule</u> denken, welche Noten haben Sie erzielt?

Bitte Noten aus dem letzten Semesterzeugnis eintragen.

Englisch _____ ☐ Fach nicht besucht.

Deutsch _____ ☐ Fach nicht besucht.

W&G (Wirtschaft Profil B & E) _____ ☐ Fach nicht besucht.

FRW & VBR (Wirtschaft Profil M) _____ ☐ Fach nicht besucht.

Mathematik _____ ☐ Fach nicht besucht.

Information/Kommunikation/Administration _____ ☐ Fach nicht besucht.

Zeugnisdurchschnitt: _____

3. Welche Durchschnittsnote haben Sie für den letzten <u>Ausbildungsbericht</u> erhalten?

Note der letzten ALS:

4. Welche Durchschnittsnote haben Sie für die letzte <u>Prozesseinheit</u> erhalten?

Note der letzten
Prozesseinheit:

D. Persönliche Situation

1. Wie viele Freund/innen haben Sie zurzeit?

bis zu 10   10 bis 20   mehr als 20

☐   ☐   ☐

2. Wenn Sie nun nur an Ihre fünf besten Freund/innen denken, was machen diese derzeit?

Bitte die zutreffenden Haupttätigkeiten der 5 besten Freunde ankreuzen. Mehrfachantworten sind möglich.	
Lernender, Schüler, Student	☐
Lehrabbrecher, Schulabbrecher	☐
Berufstätig, nach bereits abgeschlossener Grundbildung	☐
Berufstätig, ohne Ausbildungsabschluss	☐
Arbeitslos	☐
Andere Haupttätigkeit, nämlich _	☐

3. Waren oder sind Ihre Eltern oder gute Bekannte selbstständig erwerbstätig/im Besitz einer Firma?

☐ **nein**   ☐ **ja**

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4. Wenn Sie an Ihre <u>heutige persönliche Situation</u> denken, wie zutreffend sind die folgenden Aussagen?

Bitte machen Sie in jeder Zeile ein Kreuz.	völlig falsch				völlig richtig
a) Die meisten meiner heutigen Freunde habe ich im letzten Jahr kennen gelernt.	1	2	3	4	5
b) Für meine Schulkollegen/innen sind gute Noten sehr wichtig.	1	2	3	4	5
c) Gute Schulnoten sind mir sehr wichtig.	1	2	3	4	5
d) Ich bin mir aus heutiger Sicht sehr sicher, dass ich die Lehre abschliessen werde.	1	2	3	4	5
e) Mit meinem Leben als Ganzes bin ich sehr zufrieden.	1	2	3	4	5
f) Im letzten Jahr wurde ich von einer schlimmen **familiären** Veränderung betroffen (z.B. Scheidung, Arbeitslosigkeit Vater oder Mutter, Todesfall, Krankheit).	1	2	3	4	5
g) Im letzten Jahr wurde ich von einer schlimmen **ausserfamiliären** Veränderung betroffen. (z.B. Todesfall innerhalb der Schulklasse, am Ausbildungsplatz).	1	2	3	4	5
h) Meine finanzielle Situation belastet mich sehr.	1	2	3	4	5

5. Wenn Sie an Ihre berufliche Situation nach dem Abschluss Ihrer Lehre denken, also an Ihre Zukunft, wie wichtig sind die folgenden Aussagen?

Bitte machen Sie in jeder Zeile ein Kreuz.	sehr unwichtig				sehr wichtig
a) Nach dem Lehrabschluss möchte ich auf meinem erlernten Beruf tätig sein.	1	2	3	4	5
b) Nach dem Lehrabschluss möchte ich eine höhere Ausbildung absolvieren.	1	2	3	4	5
c) Nach dem Lehrabschluss möchte ich möglichst ohne Unterbruch eine Beschäftigung finden.	1	2	3	4	5
d) Nach dem Lehrabschluss möchte ich möglichst viel Geld verdienen.	1	2	3	4	5

6. a) Haben Sie sich schon einmal Gedanken gemacht, später eine eigene Firma zu gründen oder selbstständig erwerbstätig zu sein? ☐ Nein. ➔ **Falls nein,** bitte weiter mit der **Frage 7.**

☐ Ja.

b) Wie konkret ist Ihre Idee für eine eigene Firma/selbstständige Erwerbstätigkeit? (Mehrfachantworten möglich)

☐ Ich habe keine konkrete Idee für eine eigene Firma.

☐ Ich habe bereits eine konkrete Idee für eine eigene Firma, aber noch keine Schritte unternommen.

☐ Ich habe eine konkrete Idee für eine eigene Firma und bereits erste Schritte unternommen.

☐ Ich habe bereits einen Geschäftsplan konkretisiert und/oder mit Kapitalgebern verhandelt.

☐ Ich besitze bereits eine eigene Firma.

7. Bitte geben Sie hier Ihre Adresse an, damit wir Ihnen im Falle eines Gewinnes den iPod touch zusenden können:

_____

Strasse, Hausnummer

_____

PLZ und Wohnort

_____

Email

8. Sind Sie im vergangenen Jahr bei Ihren Eltern ausgezogen? ☐ Nein ☐ Ja

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Wenn Sie uns noch Kommentare oder Bemerkungen zukommen lassen möchten, können Sie diese hier notieren.

- -

- -

**So, nun haben Sie es geschafft. Haben Sie alle Fragen beantwortet?
Für Ihre Mithilfe bedanken wir uns ganz herzlich!**

Auf Ihrem weiteren beruflichen Weg wünschen wir Ihnen alles Gute.

Da es aus wissenschaftlicher Sicht interessant ist, Veränderungen über die Zeit zu beobachten, würden wir uns freuen, wenn wir Sie auch in Zukunft nochmals kontaktieren dürften.

Falls Sie Fragen an uns haben, können Sie sich jederzeit bei uns melden.

Prof. Uschi Backes-Gellner und Yvonne Oswald (yvonne.oswald@business.uzh.ch)
Lehrstuhl für Betriebswirtschaftslehre, insbes. empirische Methodik der Arbeitsbeziehungen und der Personalökonomik
Plattenstrasse 14
CH-8032 Zürich

CURRICULUM VITAE

YVONNE OSWALD

PERSONAL DETAILS

Date of Birth	November 18th, 1982
Nationality	Swiss

EDUCATION

11/2009 – 04/2013	**Doctoral Studies** in Management and Economics, University of Zurich Supervisor: Prof. Dr. Uschi Backes-Gellner
09/2011 – 03/2012	**Visiting Scholar** at the School of Education, Stanford University, USA (Scholarship for prospective researchers funded by the Swiss National Foundation)
10/2002 – 09/2006	**Licentiate** in Management and Economics, University of Zurich Graduation: lic. oec. publ., magna cum laude
08/1995 – 05/2002	**Matura** (High School Diploma), Kantonsschule Alpenquai, Luzern Maturity Type E (Business Administration and Economics)

WORK EXPERIENCE

11/2009 – present	**Teaching and Research Associate** at the Chair of Prof. Dr. Uschi Backes-Gellner Department of Business Administration, University of Zurich
12/2006 – 10/2009	**Commodity Controlling Analyst** Kraft Foods, Zug
11/2003 – 12/2006	**Back Office Employee** Kinesiologie-Haus, Sursee
12/2005 – 07/2006	**Student Assistant** at the Chair of Prof. Dr. Ernst Fehr Department of Economics, University of Zurich