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The State of the Economy at Graduation, Wages, and Catch-up Paths: Evidence from Switzerland

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ABSTRACT

The State of the Economy at Graduation, Wages, and Catch-up Paths: Evidence from Switzerland*

This paper analyses whether the short- and mid-term labour market outcomes of Swiss university graduates are affected by the state of the domestic economy at the time of labour market entry, where the economic conditions are captured by the regional unemployment rate at the time of graduation. This analysis contributes to the question as to whether labour market outcomes are determined inter alia by luck even under fairly stable labour market conditions. The study provides empirical evidence demonstrating that less favourable economic conditions at the time of labour market entry have a negative impact on the individuals' wages one year after graduation. However, there appears to be a partial catchup towards luckier cohorts in the subsequent four years, which is primarily explained by higher job mobility with respect to the number of jobs an individual has held since his graduation as well as tenure with the first job. Finally, there is strong evidence in favour of heterogeneous effects with respect to, for instance, individuals employed in part-time, for whom the negative effects appear to be most pronounced, while at the same time it is found that the probability of part-time employment rises under less favourable entry conditions.

JEL Classification: J31, J39

Keywords: labour market entry conditions, wages, job mobility

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1 Introduction

How do economic conditions at the time of labour market entry affect college and university graduates' career and earnings trajectories? This question has been addressed by numerous recent studies (see e.g., Altonji et al., 2016; Kahn, 2010; Liu et al., 2016; Oreopoulos et al., 2012; van den Berge and Brouwers, 2017).[1] However, previous literature has exploited the variation in economic conditions stemming mostly from large-scale downturns. Little is known whether and how moderate business cycle fluctuations within overall fairly stable economic conditions affect career trajectories of labour market entrants. The aim of this study is thus to analyse whether there is a negative effect of adverse labour market entry conditions on labour market outcomes for graduates of Swiss universities, one of the world's most prosperous economies. Furthermore, this study addresses the possible catch-up paths towards cohorts, who graduated under more favourable conditions, and analyses potential heterogeneities, such as whether the individuals entered the labour market in part-time employment.

The analysis of the effects of entry conditions on future labour market outcomes relies on two theories. The underlying assumption of human capital theory is that individuals realise wage increases through human capital accumulation (Becker, 1962; Mincer, 1962) and learning (Rosen, 1972, 1976). In accordance with human capital theory, a mismatch between an individual's qualifications (or skills) and the assignments she receives in her first job, i.e., on entering the labour market, will negatively affect her human capital accumulation and hence disrupt her subsequent career progress.[2]

On the other hand, individuals may predominantly achieve wage growth by switching jobs (Mincer and Jovanovic, 1979; Mincer, 1986; Topel and Ward, 1992). Thus, in contrast to the previously outlined considerations, search theory suggests that employees who enter into sub-optimal positions may improve their career path by searching for jobs that better match their qualifications once the labour market conditions improve.

[1] Beaudry and DiNardo (1991) were among the first to show that wages are not only determined by current market conditions, but also by workers' previous labour market outcomes, where particularly the conditions at labour market entry can be decisive in shaping an individual's future (e.g., Ellwood, 1982; Franz et al., 1997).

[2] This path-dependency arises because individuals acquire "wrong" human capital (e.g., with respect to the task) when they are assigned to a mismatched job (Gibbons and Waldman, 2004). This is particularly true, if one believes that individuals experience the largest earnings gains in the beginning of their career (Murphy and Welch, 1990). Using the same data source as in this analysis, Diem and Wolter (2014) find that individuals who had a mismatching job (in terms of overeducation) one year after their graduation were much more likely to be still employed in a mismatching job four years later on. Furthermore, Hagedorn and Manovskiiz (2013) show theoretically and empirically that the observed effect of past labour market conditions determining present outcomes is entirely driven by the initial quality of the job match which is worse when individuals enter the labour market in a recession.

Most of the empirical studies on this issue (e.g., Altonji et al., 2016; Kahn, 2010; Liu et al., 2016; Oreopoulos et al., 2012; Oyer, 2006, 2008) agree on long lasting, statistically significant, and negative effects on wage development from entering the labour market in a bad state of the economy. Furthermore, some studies have investigated the underlying mechanisms of wage penalties associated with the adverse labour market entry conditions and identify, for instance, a job-skill mismatch (Liu et al., 2016) or the lower probability of full-time employment (Altonji et al., 2016).[3] However, the effect appears to be heterogeneous with respect to, for instance, an individual's skills. Oreopoulos et al. (2012) find that this effect is decreasing with an individual's qualification level. They attribute this to the fact that better qualified individuals have a greater incentive to "correct" an unsuccessful start in the labour market by changing jobs. Thus, they also identify job mobility as a potential catch-up channel for a sub-group of the analysed sample.[4] Using German administrative data, Bachmann et al. (2010) support the importance of job mobility as a catch-up path towards luckier cohorts. Finally, the size and prevalence of the scarring effect may also be affected by a country's institutional setting, for instance, in terms of employment protection or wage stickiness (Cockx and Ghirelli, 2016; Fernández-Kranz and Rodríguez-Planas, forthcoming; Genda et al., 2010; Kawaguchi and Murao, 2014).

The objective of this study is to analyse whether a scarring effect can also be observed in a labour market that is characterised by generally stable employment conditions. This is of particular interest as existing evidence on scarring effects mostly covers recessions. For my analysis, I therefore rely on a rich representative data set from Switzerland, the Swiss Graduate Survey. This survey covers every second cohort of graduates of Swiss universities since 2003, and offers information on the transition into the labour market and on the labour market outcomes one and five years after graduation. This allows me to examine the early career paths of over 30,000 individuals in the period from 2003 to 2015. Using Swiss data is very appealing in this context, because throughout the last decade Switzerland's labour market has attracted numerous highly qualified individuals, which speaks in favour of the generally bright employment conditions (see e.g., Graff et al., 2014). At the same time, the Swiss labour market offers a high rate of regional disparity owing to, for instance, its cultural and language diversity (Eugster et al.,

[3] In a study that is not limited to college graduates, Kwon et al. (2010) find a pro-cyclical pattern regarding promotions when controlling for an individual's initial position at labour market entry, i.e., employees who entered the labour market in a good state are promoted faster and realise a higher position throughout their employment career.

[4] Their results with respect to the graduates' heterogeneity in terms of skills is complemented by Altonji et al. (2016), who find that individuals who graduate with majors which are valued above average suffer least from recession-related wage cuts.

2017). Moreover, Switzerland is characterised by relatively liberal labour market regulations, which reduces the possibility that institutional settings confound the observed effects.

My second objective is to examine both the mechanisms underlying the possible scarring effect of unfavourable entry conditions and potential catch-up paths. I therefore verify the existing findings on the underlying channels by presenting results on several outcomes that reflect the relationship between the state of the economy at the time of an individual's graduation and her university to labour market transition and early labour market outcomes. In this contex, I also conduct a heterogeneity analysis, for instance, by gender, with respect to both the initial outcomes and the potential catch-up paths.

My results show that the effect of a higher regional unemployment rate in the year of an individual's labour market entry on wages one and five years after graduation is statistically significant and negative, however, the effect significantly fades out after five years. Next, I find that in particular job mobility in terms of tenure with the first job after graduation and number of jobs in the first five years since graduation, appear to drive the potential catch-up. That is, graduates who entered the labour market in less favourable conditions are found to be more mobile. Finally, my results exhibit several heterogeneous features. The scarring effects are predominantly observed for female graduates and part-time employees, while they are considerably lower for graduates of universities of applied sciences. Moreover, the initially disadvantaged groups also appear to be less mobile, which contributes to higher persistence of the negative labour market entry effects.

The remainder of this paper is structured as follows. Section 2 describes the data and the key variables, while Section 3 outlines the econometric approach. Section 4 continues with the results. In Section 5, I the heterogeneity of my results and conduct various robustness checks. Section 6 concludes this paper.

2 Data and Variables

The data set used in this analysis is the Swiss Graduate Survey.[5] The data are complemented by macroeconomic variables, such as regional unemployment rates or the consumer price index (CPI), retrieved from the Swiss Federal Statistical Office's (FSO) data base (FSO, 2016a; FSO,

[5]Swiss Graduate Survey, panel data sets 2002, 2004, 2006, 2008, and 2010, FSO 2016, for more information, see http://www.bfs.admin.ch/bfs/portal/en/index/infothek/erhebungen__quellen/blank/blank/bha/01.html.

2016c). The Swiss Graduate Survey aims to capture the graduates' transition between university graduation and the labour market. It covers questions on the graduates' completed education, their transition into the labour market, and early labour market outcomes. The survey's questions concern, for instance, an individual's fields of study, how long he searched for a job after having graduated, his current labour market status, and his wage.[6,7]

The Swiss Graduate Survey is conducted on a bi-annual basis and attempts to cover the total population of graduates of Swiss universities. The survey also includes the graduates of universities of applied sciences ("Fachhochschule", further on referred to as UAS). In contrast to general universities, UAS usually offer degrees in an applied field in a range of subjects that differ from those offered at universities.

For the current analysis, data from all even cohorts from 2002 to 2010 are used.[8] These cohorts have been surveyed twice, one year and five years after the individuals' graduation. The first cohort, i.e., 2002, also includes 650 graduates of UAS who graduated in early 2003. Since the survey is designed as a total population survey, approximately 55% of all graduates return the questionnaire in the first survey and approximately 65% of these graduates participate in the second survey wave, which takes place four years later on (FSO, 2014).[9,10]

In the present analysis, the main dependent variable of attention is an individual's wage.[11] Wages refer to an individual's total annual gross wage (stated in Swiss francs) from his main occupation one and five years after graduation, respectively. The annual wage is adjusted by the individuals' contractual working hours.[12] The wages are then adjusted for CPI (base

[6]The original questionnaires can be retrieved online http://www.bfs.admin.ch/bfs/portal/en/index/infothek/erhebungen__quellen/blank/blank/bha/02.html.

[7]Graduates who possess more than one degree, which can mean both a degree in another field of study or a postgraduate degree, are asked to answer the questionnaire with regard to the last degree obtained.

[8]The first survey has been conducted as early as 1977, however, the data starting with the 2002 cohort offer a harmonised set of questions, which can be used for a longitudinal analysis.

[9]The presented survey return rates are exemplary and apply to the graduation cohort of 2008 (FSO, 2014).

[10]The questionnaire is sent by email and mail in German, French, and Italian up to three times to the graduates.

[11]Most publications on labour market entry outcomes which rely on European data use the labour market status, i.e., employed or unemployed, as the key dependent variable (e.g., Franz et al., 1997). In contrast, corresponding publications that cover North America (e.g., Kahn, 2010; Oreopoulos et al., 2012) rely on wages. Raaum and Røed (2006) attribute this difference to the fact that the European labour markets tend to be more heavily regulated than the North American labour markets, for example, by means of a minimum wage. (Note that their publication stems from the year 2006; i.e., before the United States implemented its statutory minimum wage in 2009.) According to Raaum and Røed (2006), this wage regulation distorts outcomes in such a way that individuals who would otherwise be employed for lower wages in the United States tend to be unemployed in Europe. Yet, for the present research, this problem appears to be of an incidental nature. On the one hand, this analysis focuses on the rather liberal Swiss labour market, and, on the other hand, the group of individuals which is considered in this analysis is restricted to graduates of tertiary education; i.e., a group which is usually remunerated on a level above the minimum wage, even if Switzerland had a minimum wage legislation in place, which is not the case to date.

[12]The contractual working hours refer to weekly hours and cannot be converted to annual hours, because no information is collected on the number of working weeks per year.

year=2010) and extreme outliers are cleared by removing observations of the lowest and highest 1% percentiles.[13] The resulting wage is set in logarithms. Individuals who are self-employed are excluded from the analysis. Also, individuals aged below 22 or above 35 at the time of first observation are removed from the sample, as it is reasonable to assume that these individuals are implausibly young (graduating from university below the age of 21) or have an employment career with work experience before entering university, which makes them distinctly different from average university graduates.[14] Finally, individuals working abroad (i.e., not in Switzerland) are not considered in the analysis, as the aim of this paper is to analyse the effects of variations in the Swiss economy on individual labour market outcomes.

The regional unemployment rate in the region of an individual's university serves as the indicator for the state of the economy.[15,16] Although mobility in the geographically small Swiss labour market is arguably high, I chose the regional and not the national unemployment rate for three reasons. First, the country's three main languages, i.e., German, French, and Italian, arguably separate its labour market. Second, a regional rate increases the variation of my major explanatory variable. Third, descriptive statistics of the data show that approximately 65% of graduates of Swiss universities work in the region of their university one year after graduation and 60% still do so four years later. It therefore appears that the regional indicator is more determining for labour market outcomes.[17]

[Insert Figure 1 about here]

Figure 1 plots the mean log wages by cohort versus the regional unemployment rate. From this Figure it becomes evident that while wages one year after graduation increased throughout the observation period, the respective cohorts' wages five years after graduation remained relatively stable. Second, Figure 1 reveals that throughout the covered graduation period (2002-2010) there was both inter- and intra-regional variation in the unemployment rate. The unemployment rate reached a peak in 2004 in most regions, decreased thereafter and peaked again in

[13] Kahn (2010) and Mansour (2009) work with the hourly wage which they restrict to USD 1–1000 and USD 3–100, respectively.

[14] See Altonji et al. (2016), for a similar argumentation.

[15] The FSO divides Switzerland into seven regions: Région Lémanique, Espace Mittelland, Nordwestschweiz, Zurich, Ostschweiz, Zentralschweiz, and Tessin.

[16] Unemployment rate calculated according to ILO – see http://www.bfs.admin.ch/bfs/portal/de/index/themen/03/11/def.html.

[17] For instance, Diem and Wolter (2014) also use the unemployment rate in the region, where the individual attended university as the control variable reflecting economic conditions in their analysis of overeducation among graduates of Swiss universities.

2010. Between 2004 and 2006, the Tessin surpassed Région Lémanique, which took over the lead again in 2010 as the region with the highest unemployment rate, while Zentralschweiz steadily remained the region with the lowest unemployment rate.

3 Empirical Strategy

The aim of this analysis is to identify the effect of the state of the economy in the year of the individuals' university graduation on their subsequent labour market outcomes. Therefore, I start the analysis by regressing an individual's i wage, y_i, on the state of the economy in the year of her graduation. The state of the economy in the year of the individual's graduation is represented by the unemployment rate in the region of her institution of tertiary education and denoted by UR_i. This specification is defined as follows:

$$y_i = \gamma UR_i + X_i\beta + u_i. \tag{1}$$

In equation (1), u_i denotes an idiosyncratic error term with zero mean and finite variance.

Vector X conveys the fact that an individual's labour market outcomes may also depend on various factors that are not related to the state of the economy at the time of her labour market entry. More specifically, X includes various individual characteristics, such as age, age squared, gender, nationality, whether an individual has responsibility for children, her canton of origin,[18] and dummies indicating whether the individual's mother and father hold tertiary degrees. The set of control variables also depicts the details of an individual's university degree. Namely, whether the individual holds a degree at the Master's level,[19] her standardised GPA,[20] dummies

[18]The dummies for the canton of origin serve as a proxy for the individual's skills, because the cantonal university eligibility rate (acquired through grammar school graduation, "gymnasiale Maturitätsquote") varies highly over the cantons. The rate was between 11.7% for St. Gallen and 32.1% for Basel City in 2015 (FSO, 2015). If one assumed normally distributed intelligence over the cantons, this would mean that the average university entrant from St. Gallen is more skilled than the average university entrant from Basel City (for a detailed discussion, see Ramel, 2015).

[19]Since graduates are questioned with respect to the last degree they obtained (compare footnote 7), it is possible that an individual is represented more than once in the data i.e., first as a Bachelor's graduate and at a later point in time as a Master's graduate. Since the data set is provided by cohorts and without a unique identifier over all cohorts, there is no possibility to identify these individuals. This problem appears to be negligible for the rather few cases where an individual has obtained successive degrees in different fields of study. However, there are certainly individuals in the data who have been surveyed after their Bachelor's degree and also after having obtained a Master's degree. The clustering of the standard errors by individuals is thus not correct in such a case. I therefore rerun my main regressions under the exclusion of all Bachelor's graduates. The results remain qualitatively the same and are therefore not reported here.

[20]In order to calculate an individual's standardised GPA, I first group graduates by field of study, the scale of their GPA, their institution, year, and type of degree (Bachelor's or Master's). Thereafter I standardise the observed GPA into a variable with mean 0 and variance 1 by subtracting the group's mean from the individual's

for the degree major and the university, and whether an individual has acquired labour market experience during her studies. The latter is represented by two dummy variables, the first indicating whether an individual had (occasionally or regularly) a job related to her studies and the second indicating whether she had a job unrelated to her studies. I further enrich the set of control variables, X, with an individual's job characteristics that may affect her wage. I control for working conditions, such as whether the current position requires an academic degree, the type of employment contract (fixed-term vs. permanent), dummies for the individual's occupational status (intern, Ph.D. student/research assistant, employee, or management), dummies for the individual's economic area of employment (private, public, non-profit), and the industry sector of the company the individual is employed in. I also include a dummy for whether the individual has a side job apart from her main employment. In order to account for possible self-selection into regions with better employment opportunities, I also include six regional dummies for the region of employment into my analysis. I control for the state of the economy in the year of the observation itself by including the regional unemployment rate in the workplace region. I do so, in order to account for the fact that earning and employment opportunities could be confounded by the prevailing economic conditions in the moment of the observation itself. Finally, I also include a linear time trend and its second-degree polynomial into the regression equation.[21] Table A.1 in the Appendix provides the definitions and descriptive statistics of the complete set of variables used in this study.

In order to obtain the maximum of variation, all five cohorts are pooled into one regression, so equation (1) is estimated using the pooled OLS estimator. Since I include various fixed effects, the identification relies on intra-individual variation for graduates who are employed in the same region and sector, attended the same university and pursued the same field of study, i.e., individuals who follow similar career paths in different years. Equation (1) is estimated twice. First, only outcomes one year after graduation are considered. Then, only outcomes five years after graduation are considered.

When observations from both survey periods are pooled in one regression, equation (1) is

observation and dividing this difference by the respective group's standard deviation.

[21] The inclusion of a linear time trend variable only, did not affect my results to a noteworthy extent.

rewritten in the following way:

$$\begin{aligned} y_{it} =& \gamma_1 UR_i + \gamma_2 Exp_{it} \times UR_i + \theta Exp_{it} + X_{1,i}\beta_1 + Exp_{it} \times X_{1,i}\beta_2 \\ &+ X_{2,it}\beta_3 + Exp_{it} \times X_{2,it}\beta_4 + \epsilon_{it}. \end{aligned} \tag{2}$$

In equation (2), the moment of the observation, i.e., one or five years after graduation, is denoted by the index t. Exp_{it} is a binary variable with the value 1 if the individual's potential experience on the labour market is five years; i.e., this dummy variable indicates that the observation is from the second survey.[22] $Exp_{it} \times UR_i$ denotes the interaction term of the regional unemployment rate and potential experience. In this context, γ_2 captures how the effect of the regional unemployment rate at labour market entry on subsequent labour market outcomes changes between observations; i.e., one and five years after graduation. Furthermore, the vector X of control variables is now split into a time-invariant component, denoted by $X_{1,i}$ and a time-variant component, denoted by $X_{2,it}$. Finally, all control variables are also interacted with the experience dummy (denoted by $Exp_{it} \times X_{1,i}$ and $Exp_{it} \times X_{2,it}$). Proceeding in this way, allows me to utilise the panel structure of the data and to differentiate between the effects of labour market conditions on wages one year and five years after graduation.

Nevertheless, estimation of equation (2) is likely to suffer from an omitted variable bias caused by time-invariant and time-varying unobserved individual characteristics. Since the explanatory variable of my analysis is only observed once, i.e., in the year of the individual's university graduation, it does not vary over time. In such a setting, the implementation of an individual fixed effects model is not feasible, because the fixed effects estimator relies on the within variation. Therefore, I specify a random effects model that relies on both within and overall variation:

$$\begin{aligned} y_{it} =& \gamma_1 UR_i + \gamma_2 Exp_{it} \times UR_i + \theta Exp_{it} + X_{1,i}\beta_1 + Exp_{it} \times X_{1,i}\beta_2 \\ &+ X_{2,it}\beta_3 + Exp_{it} \times X_{2,it}\beta_4 + c_i + v_{it}. \end{aligned} \tag{3}$$

In equation (3), the error term is split into a time-invariant component, c_i, and a time-variant component, v_{it}. However, a major disadvantage of the random effects model is that it relies on the very strong assumption of mean independence, i.e., $E[c_i|X_{1,i}, X_{2,it}, UR_i] = 0$, which is

[22] Since the actual experience on the labour market could be less than five years for observations five years after graduation (also due to unfavourable entry conditions), the dummy variable captures potential and not actual experience (compare Kahn, 2010)

unlikely to be fulfilled as it implies that the individual heterogeneity cannot be correlated with any of the regressors. Therefore, I proceed with the so-called Mundlak's approach and rewrite equation (3) in the following way:[23]

$$\begin{aligned} y_{it} =& \gamma_1 UR_i + \gamma_2 Exp_{it} \times UR_i + \theta Exp_{it} + X_{1,i}\beta_1 + Exp_{it} \times X_{1,i}\beta_2 \\ &+ X_{2,it}\beta_3 + Exp_{it} \times X_{2,it}\beta_4 + \overline{X_{2,i}}\lambda + \mu_i + v_{it}. \end{aligned} \tag{4}$$

In equation (4), the time-invariant component, c_i, is split into the time-invariant stochastic error term μ_i and $\overline{X_{2,i}}$, the person-specific mean values of all time-varying covariates. Mundlak's approach relies on the assumption that after controlling for the person-specific mean values, the remaining error term μ_i is no longer correlated with X_2. This approach can therefore be understood as a "compromise" between the fixed effects and the random effects model.

In contrast to several related studies, I include female individuals in my regressions as labour force participation is comparable for men and women. For instance, for the 2008 graduation cohort, it is approximately 95% for both female and male university graduates with a Master's degree in both surveys, i.e., one and five years after graduation (Gfeller and Weiss, 2015). Nevertheless, I also present regression results from separate estimations in Section 5.2.

The main analysis focuses on university graduates, since UAS graduates are often not labour market entrants per se, because these institutions' entry regulations frequently require a vocational degree in a field related to the aimed final degree. Furthermore, the degree is often pursued on an extra-occupational basis. However, in order to account for possible heterogeneity with respect to skills, job training provided by UAS institutions, pre-degree labour market experience, and career goals, I run an analysis similar to my main analysis for UAS graduates in Section 5.2.

Finally, Ph.D.-level graduates are excluded from the main analysis, because the GPA is not surveyed for this group in the 2008 and 2010 cohorts. However, I run a robustness check, where these individuals are included for the sake of dropping the GPA from the set of control variables (see Section 5.1).

[23] This approach was originally proposed by Mundlak (1978) and is discussed, for example, in Greene (2008).

4 Results

4.1 Wages and the State of the Economy at Graduation

The results of the regression analyses on the relationship between the regional unemployment rate and the wages of graduates of Swiss universities are displayed in Table 1. The results for the regressions of an individual's wages one year and five years after graduation on the regional unemployment rate according to equation (1) are displayed in columns (1) and (2), respectively. The combination of these two regressions according to equation (2) is displayed in column (3). In this column, the pooled wage is regressed on the regional unemployment rate, the individual's potential labour market experience, the interaction term of these two variables, and the vector X of covariates.

[Insert Table 1 about here]

In all these models, all estimated coefficients are negative and statistically highly significant. Since the pooled regression (column (3)) is a combination of the two separate regressions, the initial effect of the regional unemployment rate on log wages corresponds to the result in column (1), while the post-estimation fitted effect for outcomes five years after an individual's graduation, which is the sum of the initial effect and the interaction term, corresponds to the result in column (2). There appears to be a relatively large (-0.022) and statistically significant effect for the estimate referring to an individual's wage one year after her graduation, meaning that a one-percentage-point increase in the regional unemployment rate in the graduation year translates into a wage loss of approximately 2.2%.[24] According to the OLS specifications, the effect halves five years after graduation. Thus, there is evidence for a small, but statistically significant effect of adverse labour market conditions on wages five years after an individual's graduation. It means that for university graduates a one-percentage-point increase in the regional unemployment rate in their graduation year translates into a wage loss of approximately 1% five years later. Keeping in mind that my specification accounts for university, field of study, and region of employment fixed effects, this is, nevertheless, a substantial effect. Finally, the size of the interaction term between the regional unemployment rate and an individual's potential

[24] Since the dependent variable is log-transformed, a one-percentage-point increase in the explanatory variable corresponds to a $\widehat{\gamma}$-log-points increase in the dependent variable. The transformation into a percentage value is calculated as follows: $(e^{\widehat{\gamma}} - 1) \times 100$. However, for small values of $\widehat{\gamma}$, this transformation can be approximated by $\approx \widehat{\gamma} \times 100$. In the following, this is assumed, when interpreting the regression coefficients.

experience is 0.012, which means that individuals reduce their initial wage gap by approximately 1.2% in the four years following the initial wage observation.

Since the Breusch Pagan LM test for positive variance of the random effects rejects the null hypothesis of no random effects, results from a random effects regression according to equation (3) are presented in column (4). Furthermore, I run a F-test for the joint significance of the averages of all time-variant person-specific variables. The null hypothesis of all averages being zero is rejected. My preferred specification is therefore a regression that applies Mundlak's approach according to equation (4). The results of this regression are displayed in column (5). However, neither step of correction for potential unobserved individual heterogeneity produces coefficients that visibly differ from the OLS results, i.e., compared to the OLS specification, results only differ at the third decimal place. This potentially suggests that controlling for the observables sufficiently eliminated individual heterogeneity.

The presence of a statistically significant effect of the regional unemployment rate on wages one year after graduation suggests that even without substantial recessions labour market fluctuations affect wages, nevertheless, the size of the effect on graduates' wages one year after their labour market entry is substantially smaller than it is for the United States and Norway, respectively, as found in Kahn (2010) and Liu et al. (2016). Both studies, however, cover more volatile periods.

4.2 Self-Selected Timing of Graduation and Adjustment on the Margins?

Several related studies (e.g., Kahn, 2010; Oreopoulos et al., 2012) discuss the possibility of biased results.[25] A bias occurs, if, for instance, individuals time their graduation in accordance with the state of the economy; i.e., they avoid entering the labour market when the economy is weak. I therefore analyse, whether potential self-selection issues may have biased my results.

[Insert Table 2 about here]

The associated results are displayed in Table 2.[26] First, I run a test for possible self-selection with respect to the timing of graduation by regressing the gap between the actual and the expected graduation year on the regional unemployment rate in the year of an individual's

[25] While Kahn's (2010) results substantially increase after instrumenting the regional unemployment rate, Oreopoulos et al. (2012) dismiss their IV specification in favour of the more efficient OLS regression.

[26] All these results are conducted on a cross-sectional sample and do not apply econometric techniques that fully tackle endogeneity. Therefore, these results should be considered as associations without the claim of indicating causal effects.

graduation (column (1)). However, I do not find any statistically significant relationship between this gap and the regional unemployment rate.[27]

Related to the issue of self-selection in timing is the question of whether the more skilled individuals are more willing to enter the labour market, so that the previously obtained results may be biased downwards; i.e., if the more skilled are the only ones who do not shy away from facing adverse economic conditions, then their outcomes should be better than the potential outcomes of the average graduates.[28] I therefore check, whether particularly capable individuals are the ones not shying away from graduating in less favourable times and regress the individuals' final GPA on the regional unemployment rate (column (2)). I also check whether the probability of conducting a Ph.D. increases with the regional unemployment rate (column (3)), i.e., individuals avoid labour market entry by pursuing further education (see, Kahn, 2010). However, again, I do not find any statistically significant association for both outcomes.

Finally, in line with Kahn (2010), I also analyse the probability of non-employment and the extent of underemployment by regressing a dummy for whether an individual is working and the individual's actual working hours in the year following his graduation on the regional unemployment rate (columns (4) and (5)), respectively. Both the probability of working and the amount of working hours appear to slightly decrease with higher regional unemployment rates. Thus, certain individuals appear to adjust on either the extensive or intensive margin to adverse entry conditions. Both findings suggests that the resulting wage penalty from adverse economic conditions could have been higher if these individuals had remained in employment or worked more hours. Since underemployment may negatively affect subsequent career outcomes, such as promotion opportunities, this would also contribute to explaining, why wages are negatively affected by entry conditions even after adjusting them for working hours. This finding is also in line with Altonji et al. (2016), who identify the lower incidence of full-time employment as the major driver behind negative outcomes in the post "Great Recession" period in the United States.

[27] I also implemented an IV specification, where I instrumented the regional unemployment rate in the year of an individual's graduation with the regional unemployment rate in the expected year of graduation (an approach similar to, for instance, Kahn, 2010, Mansour, 2009 or Oreopoulos et al., 2012). The results remained qualitatively similar to the main results with the exception that I observed a complete catch-up after five years in the IV specification. In the OLS specification, which utilised the same sample as the IV specification, the effect after five years was reduced to 0.8% and remained statistically significant at the 5% level. Since the C-test for endogeneity of the main regressor was rejected at the 1% level for the specification which referred to wages one year after graduation and the sample was reduced by approximately 6,000 observations, I restrained from further following this approach.

[28] Mansour (2009) suggests that the observed scarring effect is usually underestimated because the more skilled graduates are rather the ones not shying away from entering the labour market in a recession.

4.3 Channels of Catch-up

According to the main results, the persistence of the negative effect of graduating under adverse conditions is considerably weaker than, for instance, in Kahn (2010) or Liu et al. (2016). In my specifications, the observed effect almost fades out after five years, which lends some support to search theory, according to which graduates manage to correct an initially adverse labour market outcome and catch up with their peers from other, i.e., "luckier", cohorts. Thus, in order to contribute to a better comprehension of the underlying channels of the observed catch-up, I enhance my analysis by regressing further dependent variables on the regional unemployment rate. In this context, Oreopoulos et al. (2012) suggest that job mobility is a substantial factor (which is in line with search theory), while Kahn (2010) finds that individuals with initial wage penalties partly catch-up by working more hours. I therefore, first, analyse how many job stations an individual has had in the first five years of his career, in order to account for job mobility. In line with the theoretical argumentation, one would assume that an initial bad assignment (for instance, caused by an adverse economic situation and consequently fewer jobs to chose from) should result in subsequent job mobility once the economic conditions improve. Second, I examine the tenure with the fist job since graduation. In line with the job mobility hypothesis, it should be lower for individuals who entered the labour market in less favourable conditions.[29] Finally, I verify as to whether individuals who entered in suboptimal conditions work longer hours in the subsequent years, in order to catch-up potential underemployment, which arose in the first years.

[Insert Table 3 about here]

Table 3 displays the results of these supplementary regressions.[30] Column (1) displays the estimated incidence rate ratios of the Negative Binomial-ML regression on the relationship between the regional unemployment rate and the total number of jobs that an individuals has had in the first five years since his graduation.[31] I find a statistically significant positive association for the total number of jobs that an individuals has had and the regional unemployment rate

[29] Kahn (2010) also finds a negative effect of state level entry conditions on tenure in the short run. However, on the national level she finds that the tenure increases in the long run and interprets this as a hint of lower job mobility, which may be responsible for potentially slower wage growth of individuals who graduated in recessions.

[30] As in the previous Section, all results should be only interpreted as associations and not causal effects (compare footnote 26).

[31] Please note that the number of observations in this regression is lower than in the main specification, since the section on the employment biography in the first five years since graduation was (*i*) surveyed five years after graduation and (*ii*) contains over-proportionally many missing values.

prevailing at the moment of his labour market entry, although the effect's size of approximately 2.7% is relatively small given that the average university graduate has had 2,5 jobs in the first five years since his graduation (compare Table A.1 in the Appendix). Nevertheless, this finding provides an indication of job mobility and appears to support the idea that if an initial job match is suboptimal, individuals move on, in order to improve their career paths, which lends support to job search theory and the idea of a catch-up. Next, column (2) displays results from a Poisson-ML regression for the tenure with the first job since graduation.[32] In this case, an incidence rate ratio below one indicates that individuals, who faced higher regional unemployment rates in the year of their graduation, remained for a shorter period with their first employers than their peers. This finding lends further support to a potential catch-up via job mobility, but also indicates that the initial job may have been a suboptimal match. These findings support the results of, for instance, Oreopoulos et al. (2012) or Bachmann et al. (2010), who suggest that job mobility explains the declining gap between luckier and less lucky entry cohorts.

Finally, column (3) displays results from the OLS regression of the individuals' weekly working hours five years after graduation on the regional unemployment rate in the year of graduation. In line with Kahn (2010), I find that individuals who experienced suboptimal conditions when graduating report to work more hours five years later, which at least partly explains the catch-up in the wage gap.

5 Heterogeneity and Sensitivity Analysis

In this section, I aim at checking the robustness and heterogeneity of the results obtained in the previous section. In Section 5.1, I check the sensitivity of my main results by running various robustness checks. Next, in Section 5.2, I analyse the heterogeneity of my main results with respect to the individuals' gender, their level of employment (full- or part-time employment) and the type of their tertiary institution.

5.1 Robustness Checks

[Insert Table 4 about here]

Table 4 presents the results of various robustness checks. In the main analysis, I omitted

[32] The likelihood-ratio test for alpha (the over-dispersion parameter) being zero cannot be rejected, therefore, in this case, the Poisson model appears appropriate as compared to a Negative Binomial model.

individuals who obtained a Ph.D. as their highest university degree, since for this group the overall GPA was not surveyed for the 2008 and 2010 cohorts. Although the GPA is an important confounding variable as it serves as proxy for an individual's skills, I repeat the main specification under the exclusion of this variable for the sake of integrating individuals who hold a Ph.D. It should be noted, however, that this specification still includes a proxy for skills as I account for an individuals canton of origin (compare footnote 18 in Section 3). The results of this specification are reported in column (1). The results remain qualitatively the same, although the estimated coefficient for the initial wage penalty is slightly lower than in the main regression. This could be explained by both the inclusion and thus dilution of the sample by a group of highly skilled individuals and the insufficient correction for the confounding variable GPA.

The main specification did not allow me to include graduation region fixed effects, since these are highly overlapping with the university fixed effects. While I expect very similar results, because most Swiss greater regions have only one university, it is worthwhile to make this substitution, in order to account for regional trends. The associated results are presented in column (2) and there appears to be literally no difference to the main results. Since those few institutions that are located in the same region are usually of very distinct orientation in terms of the offered fields of study,[33] I prefer to include institution fixed effects over graduation region fixed effects.

Finally, I present findings, from uncensored wage observations. That is, I restrain from removing outliers. The associated results are displayed in column (3) and deviate from the main findings in that I do not observe a statistically significant catch-up effect after five years. However, as said, this specification included outliers in wage observations, which may potentially strongly bias the linear regression. I therefore rely on my main approach of censoring extreme wage outliers, which is in line with the related literature (e.g., Kahn, 2010; Mansour, 2009).

5.2 Heterogeneity Analysis

5.2.1 Entry Conditions and Wages by Gender and Part-Time Status

Despite the very high labour force participation among female graduates of Swiss universities, the share of female part-time workers is higher than the share of male part-time workers. In

[33]For instance, the University of Zurich and the Federal Institute of Technology are located in Zurich. The latter has a very strong focus on natural sciences and engineering, while the first offers all regular fields of study covered by universities.

the analysed sample, the respective shares for women and men are on average, i.e., over all graduation cohorts, approximately 39% and 25% one year after graduation, and 44% and 23% four years later. Yet, the consequences of part-time employment include, for example, limited investment in human capital and thus less steep wage profiles (e.g., Hirsch, 2005). Moreover, Anderson et al. (2002) suggest that career disruptions for highly skilled women may dampen human capital accumulation and thus result in lower mid- and long-term wages.[34,35] Therefore, I rerun the main regressions, split by gender and the individuals' part-time status, i.e., whether they are employed in full-time or part-time.

[Insert Table 5 about here]

The results from these regressions are presented in Table 5.[36] The inspection of columns (1) and (2), which refer to men and women, respectively, reveals that the direction of the estimated coefficients is in line with the main estimates. In both regressions, the estimated coefficient with respect to wages one year after graduation is negative and statistically significant. However, the coefficients lie below the main estimates for male graduates and above the main estimates for female graduates. The effect for male graduates halves, while the effect for female graduates increases by more than 50% as compared to the main results. In precise terms, this means that a one-percentage-point increase in the regional unemployment rate in the year of a male university graduate's labour market entry translates into a wage loss of approximately 1%, while the corresponding value for a female university graduate is 3.6%. Four years later, for both sexes a wage penalty of approximately 1% remains, albeit, at lower levels of statistical significance than in the main analysis.

According to the results of the gender-specific regressions, the adverse effects of unfavourable entry conditions on wages appear to be stronger for women than for men. Since women are more frequently employed in part-time, I proceed by examining whether this disparity is caused by part-timers.[37] These results can be found in columns (3) and (4), which refer to full- and

[34] Anderson et al.'s (2002) study refers to career disruptions because of children.

[35] Also, recent evidence by Hershbein (2012) suggests that women are less likely to be in the labour force in the first years following high school graduation, when facing adverse entry conditions.

[36] I define part-time employees as individuals who report to work less than 40 hours per week, since regular Swiss full-time employment contracts usually specify 42 working hours per week with some exceptions specifying 40 hours per week. The part-time sample refers to employees who were employed in part-time in both observation periods. Relaxing this restriction to individuals who were part-time employees in the first observation period and either part- or full-time employees in the second observation period does not qualitatively affect the results. However, the effect of adverse entry conditions five years after graduation declines in comparison to the main part-time sample.

[37] van den Berge and Brouwers (2017) conduct a similar heterogeneity analysis with respect to gender for the

part-time employees, respectively. As suspected, there is an inherent difference between the effects of adverse entry conditions for full- and part-timer workers, while the estimated wage penalty one year after labour market entry for full-timers is roughly 1%, it is over 5% for part-timers. Also, the effect of adverse entry conditions does not persist for full-time employees, but remains remarkably large for part-time employees. Thus, it appears that my main results are largely driven by part-time workers. Since the outcome variable, annual wages, is adjusted by contractual working hours, this finding suggests that there is an additional penalty for part-time employment under adverse entry conditions. Yet, it should be kept in mind that according to the results in Section 4.2, the probability of full-time employment declines under adverse economic conditions, i.e., these results do not permit to disentangle whether the observed increasing penalty through part-time employment is inter alia driven by the fact that some of the part-timers are involuntary in such arrangements.[38] Thus, their part-time status may at least partly reflect sub-optimal employer-employee matches, which was previously found to be one of the main drivers for the wage penalty of adverse labour market entry conditions (see e.g., Liu et al., 2016).

As it is not clear yet, whether the more prevalent part-time employment among women is solely responsible for the difference observed between men and women, I additionally present the results for a sample of full-time employees split by gender in columns (5) and (6). I find that women who were employed in full-time in both periods catch-up with luckier peers five years later, yet, the initial wage gap due to adverse labour market entry conditions still appears to be larger for women than for men. Moreover, for men who were employed in full-time in both observation periods the scarring effects of adverse entry conditions completely disappear. Thus, after decomposing the sample, an unexplainable penalty of adverse entry conditions for female university graduates remains.

Previously job mobility has been suggested as a channel for potential catch-up. I therefore hypothesise that full-time employees are able to successfully improve their career trajectories because of higher job mobility.[39] In order to verify this assumption, I present again results from

Dutch case. They also attribute the larger negative impacts of entry conditions for women to potential part-time employment, however, they do not further progress into investigating these heterogeneities.

[38] In a specification, which is not presented here, I run an according regression for individuals who were employed in part-time in the year following their university graduation and in full-time four years later. For these individuals, the immediate wage penalty is approximately 4%, while the effect vanishes four years later. However, this specification relies on less than 3,000 observations, so its comparison to the main findings remains questionable.

[39] Loprest (1992) suggests that even for full-time employees, wage growth in the first years after labour market entry is higher for men than for women. Though in her analysis this is not attributed to a higher job mobility among men per se, but to a higher wage increase associated with job changes for men than for women.

the specifications discussed in Section 4.3 split by part-time status in Table 6.

[Insert Table 6 about here]

The results presented in Table 6 reveal that indeed job mobility associated with the economic conditions at labour market entry is significantly lower for part-time than for full-time workers. This finding hints at the possibility that an individual initially employed in part-time experiences difficulties in changing his job, for instance, because human capital accumulation on a part-time job is slower than for comparable full-time employees.[40]

In total, the results of this heterogeneity analysis indicate that the penalty for disadvantaged or possibly discriminated groups increases with unfavourable economic conditions.

5.2.2 Entry Conditions and Wages for Graduates of Universities of Applied Sciences

I excluded graduates of UAS from my main analysis, because these graduates differ substantially in several key characteristics. Therefore, in order to account for possible heterogeneity between university and UAS graduates, I repeat my main analysis for UAS graduates.

[Insert Table 7 about here]

Table 7 presents the results of wage estimation for UAS graduates. These results exhibit the same direction as those for university graduates, but differ in that the estimated coefficients for the initial effect are smaller for UAS graduates than for university graduates. For UAS graduates, an increase in the regional unemployment rate by one-percentage-point results in a wage loss of approximately 1.3% one year after their graduation. A possible explanation for this divergence has already been briefly mentioned in Section 3: Usually UAS graduates are not labour market entrants per se and often follow their degree on an extra-occupational basis. Hence, the mechanisms of wage bargaining at work for UAS graduates may not be the same as for university graduates. In specific, UAS graduates are often professionals who have completed a vocational training in a field related to their subsequent studies and have also acquired work experience before following tertiary education. Therefore, on re-entering the labour market after degree completion they often possess work experience, which is not

[40] Table A.2 in the Appendix presents the same heterogeneity analysis by gender. Again, it appears that men exhibit a higher level of job mobility than women.

the case for most university graduates. Also, the share of full-time employees is higher among UAS graduates, i.e., approximately 79% of UAS graduates are employed in full-time as opposed to 68% of university graduates one year after graduation. This is at least partly explained by the gender share in both graduates groups. The sample of UAS graduates is constituted by 64% of male individuals as compared to the equally distributed university graduates sample. Next, usually high-paying technical and science degrees are well represented among the analysed UAS graduates sample.[41] And finally, because of both the educational content and the close relationship with the corporate world UAS education tends to be more practically oriented than education of university graduates.

Interestingly enough, the relative catch-up for UAS graduates lags behind university graduates. However, when I split the UAS graduates sample by gender (columns (4) and (5)), I find again the strong heterogeneous pattern as previously observed for the main sample of university graduates. Thus, it appears that the negative effects of entry conditions observed for UAS graduates are unanimously driven by female UAS graduates, who again represent a substantial share of part-time employees among this group.[42]

6 Conclusion

The aim of this paper was to provide evidence on the effect of the prevailing economic conditions at labour market entry on future labour market outcomes for graduates of Swiss universities and to analyse these findings with respect to their heterogeneity and persistence. The main findings indicate that there is an initial wage loss of over 2% per each percentage-point increase in the regional unemployment rate at the moment of labour market entry. It appears that the wage loss is mostly attributable to a lower probability of finding full-time employment. Thus, this finding supports the human capital accumulation theory, which predicts that a bad initial job placement contributes to a negative path dependence leading to worse outcomes. However, the initially negative effect almost fades out five years after graduation with a remaining, statistically weak, effect of approximately 1%. Since the regional unemployment rate in the year of an individual's graduation is positively associated with the number of jobs she has in the first five years after

[41] As previously mentioned, Altonji et al. (2016) find that higher paying majors suffer least from adverse entry conditions.

[42] Among UAS graduates, approximately 39% of female graduates and only 12% of their male counterparts were employed in part-time one year after graduation. Four years later, the corresponding figures are 49% and 14% for women and men, respectively.

her graduation as well as negatively associated with the tenure in her first job, it appears that job mobility potentially contributes to any catch-up that is achieved. So, this finding supports search theory, which predicts that individuals can (partly) catch up on a bad start by switching jobs.

Interestingly, there is a pronounced heterogeneity with respect to these findings. First, women appear to be more affected by adverse entry conditions than men. While this effect is mostly explained by higher female inclination towards part-time employment, it does not account for the entire gap between the sexes. Moreover, female and part-time workers exhibited lower job mobility, which was identified as key for a catch-up towards luckier cohorts. Finally, all observed effects were significantly weaker for graduates of universities of applied sciences. I attribute this to the fact that (*i*) UAS graduates often have more labour market experience when they graduate, (*ii*) their education usually focuses on applied sciences, and (*iii*) their education is often pursued on an extra-occupational basis, i.e., while they are still employed by their previous employer. Evidently, all three factors considerably mitigate initially unfavourable entry conditions.

In general, my findings suggest that the timing of labour market entry makes a difference even in Switzerland's generally bright economy. The wage penalty resulting in the first year is not only statistically significant, but also of non-negligible size. However, these effects appear to largely fade out five years after graduation, where job mobility appears to be a crucial factor. Moreover, the driving factors of job success are not limited to the economic situation upon graduation, but also to the individuals' performance at university. For instance, Diem and Wolter (2014) identify a higher GPA and a study duration below median as important for both wages and an optimal job-skills match. Therefore, for the Swiss case it is not advisable to deliberately prolong education in spite of adverse economic conditions.

Part-time employment, in particular in combination with sub-optimal entry conditions, appears to dampen career progress as despite the adjustment of wages by working hours, part-time employees experience substantial wage cuts when entering the labour market under sub-optimal conditions. This said, it should be also considered that part-time employment or underemployment is more likely under less favourable entry conditions. Thus, a future avenue of research may focus on further disentangling the relationship between gender, part-time employment, economic conditions and labour market entry.[43] For instance, causal evidence and careful econo-

[43]Similar to Hershbein's (2012) analysis of female high school graduates.

metric modelling are necessary on establishing whether the female inclination towards part-time employment is at least partly driven by a smaller pool of jobs to chose from.

Finally, a "practical" orientation of higher education and an early integration into the labour market by means of, for instance, mandatory work experience, appears to mitigate any negative effects of adverse entry conditions. Thus, policy makers may consider revising university curricula towards a stronger practical orientation.

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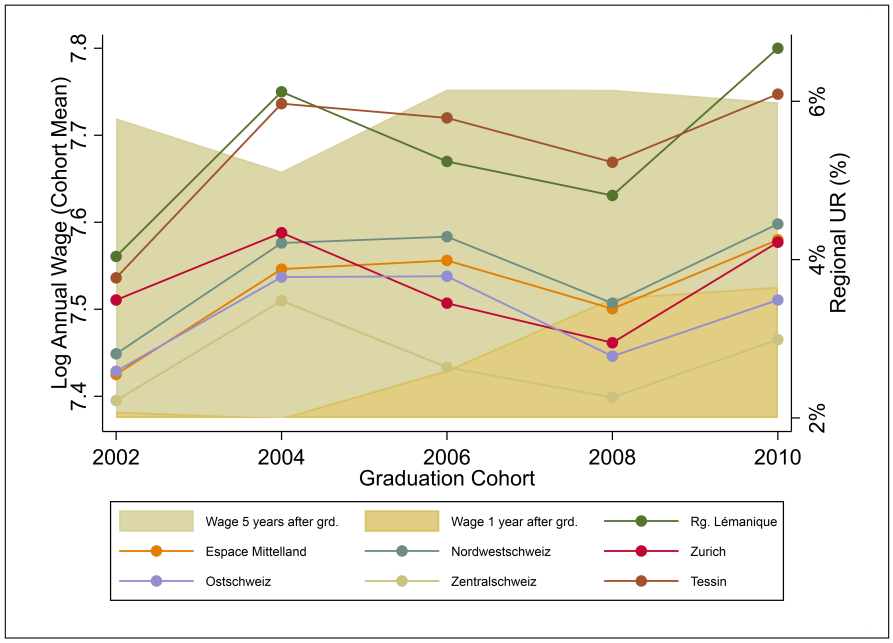
Tables and Figures

Figure 1: Regional Unemployment Rate at the Time of Graduation and Wages (University Graduates) by Cohort



Notes: The above figure plots the log annual average wages (adjusted for CPI and contractual working hours) one and five years after graduation (beige and sand areas) on the left y-axis and the regional unemployment rates in the graduation years (solid lines) on the right y-axis.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 1: Wages of University Graduates and the State of the Economy at Graduation

Dependent variable	**Annual salary/contractual hours (log)**				
Sample	One year	Five years	One year and five years (pooled)		
	(1)	(2)	(3)	(4)	(5)
Model	OLS	OLS	OLS	RE	Mundlak
Regional UR	−0.022***	−0.011***	−0.022***	−0.023***	−0.022***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Exp × Regional UR			0.012**	0.012**	0.012**
			(0.005)	(0.005)	(0.005)
Fitted effect after five years			−0.011***	−0.011***	−0.010***
			(0.004)	(0.004)	(0.004)
Controls	YES	YES	YES	YES	YES
Observations	19,888	15,483	35,371	35,371	35,371
Adj. R^2 / R^2-overall	0.431	0.323	0.483	0.486	0.488

Notes: */**/*** denotes statistical significance at the 10/5/1% level. The values in parentheses represent heteroskedasticity-robust standard errors (columns (1)-(2)) and robust standard errors clustered at the individual-level (columns (3)-(5), 23,806 individuals and 1.5 years). *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 2: Timing of Graduation and Adjustments on the Margins

Dependent variable	**Gap Grad Year (real-exp)**	**GPA (std)**	**PhD Student**	**Working**	**Actual Working Hours (ln)**
Sample	One year after graduation				
	(1)	(2)	(3)	(4)	(5)
Model	OLS	OLS	Probit	Probit	OLS
Regional UR	0.023	0.003	0.002	−0.027***	−0.013***
	(0.022)	(0.012)	(0.004)	(0.002)	(0.004)
Controls	YES	YES	YES	YES	YES
Observations	19,888	19,888	19,888	23,767	19,888
Adj. R^2 / Pseudo-R^2	0.146	0.038	0.153	0.257	0.243

Notes: */**/*** denotes statistical significance at the 10/5/1% level. Conditional marginal effects reported for columns (3) and (4). The values in parentheses represent heteroskedasticity-robust standard errors. *Regional UR* is the regional unemployment rate in the year of an individual's graduation. All specifications contain a (reduced) set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 3: Catch-up Paths for University Graduates

Dependent variable	**Tenure First Job (months)**	**No. of Jobs**	**Actual Working Hours (ln)**
Sample	Five years after graduation		
	(1)	(2)	(3)
Model	Poisson	Neg. Bin	OLS
Regional UR	0.91***	1.027***	0.026***
	(0.011)	(0.008)	(0.004)
	YES	YES	YES
Observations	12,619	13,834	15,483
Adj. R^2 / Pseudo-R^2	0.016	0.030	0.281

Notes: */**/*** denotes statistical significance at the 10/5/1% level. Incidence rate ratios reported for columns (1) and (2). The values in parentheses represent robust standard errors clustered at the individual-level. *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 4: Robustness Checks

Dependent variable	**Annual salary/contractual hours (log)**		
Sample	With PhDs	Region FE	Uncensored Wages
	One year and five years after graduation (pooled)		
	(1)	(2)	(3)
Regional UR	−0.019***	−0.022***	−0.021***
	(0.003)	(0.004)	(0.005)
Exp × Regional UR	0.009**	0.012**	0.002
	(0.004)	(0.005)	(0.006)
Fitted effect after five years	−0.009***	−0.010***	−0.018***
	(0.003)	(0.004)	(0.005)
Controls	YES	YES	YES
Individuals	28,731	23,806	24,094
Observations	42,645	35,371	36,093
R^2-overall	0.487	0.488	0.388

Notes: */**/*** denotes statistical significance at the 10/5/1% level. The values in parentheses represent robust standard errors clustered at the individual-level. *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 5: Heterogenous Wages of University Graduates and the State of the Economy at Graduation

Dependent variable	**Annual salary/contractual hours (log)**					
Sample	Men	Women	Full-Timers	Part-Timers	Full-Timers (Male)	Full-Timers (Female)
	One year and five years after graduation(pooled)					
	(1)	(2)	(3)	(4)	(5)	(6)
Regional UR	−0.010*	−0.036***	−0.011**	−0.054***	−0.001	−0.025***
	(0.005)	(0.006)	(0.004)	(0.008)	(0.005)	(0.006)
Exp × Regional UR	0.001	0.027***	0.008	0.026***	−0.004	0.023***
	(0.007)	(0.007)	(0.005)	(0.010)	(0.007)	(0.008)
Fitted effect after five years	−0.011**	−0.010*	−0.004	−0.027***	−0.004	−0.002
	(0.005)	(0.005)	(0.004)	(0.007)	(0.005)	(0.006)
Controls	YES	YES	YES	YES	YES	YES
Individuals	11,940	11,866	17,347	9,211	9,589	7,758
Observations	17,667	17,604	23,862	11,509	13,504	10,358
R^2-overall	0.504	0.478	0.602	0.353	0.605	0.593

Notes: */**/*** denotes statistical significance at the 10/5/1% level. The values in parentheses represent robust standard errors clustered at the individual-level. *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 6: Heterogeneous Catch-Up Paths – Job Mobility by Part-Time Status

Dependent variable	**Tenure First Job**	**No. of Jobs**	**Tenure First Job**	**No. of Jobs**
Sample	Full-Timers		Part-Timers	
	Five years after graduation			
Model	(1) Poisson	(2) Neg. Bin.	(3) Poisson	(4) Neg. Bin.
Regional UR	0.887***	1.034***	0.943**	1.009
	(0.013)	(0.010)	(0.021)	(0.015)
Controls	YES	YES	YES	YES
Observations	8,586	9,455	4,033	4,379
Pseudo-R^2	0.017	0.032	0.014	0.033

Notes: */**/*** denotes statistical significance at the 10/5/1% level. Incidence rate ratios reported in all columns. The values in parentheses represent robust standard errors clustered at the individual-level. *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Table 7: Wages of UAS Graduates and the State of the Economy at Graduation

Dependent variable	**Annual salary/contractual hours (log)**				
Sample	All Graduates			Men	Women
	One year and five years after graduation(pooled)				
Model	(1) OLS	(2) RE	(3) Mundlak	(4) Mundlak	(5) Mundlak
Regional UR	−0.013***	−0.014***	−0.013***	−0.005	−0.027***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)
Exp × Regional UR	0.002	0.002	0.001	0.005	0.002
	(0.005)	(0.005)	(0.005)	(0.006)	(0.009)
Fitted effect after five years	−0.011**	−0.012***	−0.012***	0.000	−0.029***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.008)
Controls	YES	YES	YES	YES	YES
Individuals	13,530	13,530	13,530	8,569	4,961
Observations	20,411	20,411	20,411	12,983	7,428
Adj. R^2 / R^2-overall	0.338	0.343	0.347	0.381	0.305

Notes: */**/*** denotes statistical significance at the 10/5/1% level. The values in parentheses represent robust standard errors clustered at the individual-level. *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.

Appendix

Table A.1: Definition and Descriptive Statistics of all Variables

Variable	Definition	N	Mean	Std	Min	Max
Main Dependent Variable						
Wage	Annual gross wage of individual in t, CPI corrected (100=2010), adjusted by contractual weekly working hours, set in logs	35,371	7.56	0.41	4.78	9
Further dependent variables						
Gap Grad Year	Difference between the actual and the expected year of university graduation (in years)	19,888	1.88	2.04	-4	14
GPA	Standardised GPA; serves also as a control variable in main analysis	35,371	0	0.99	-6.94	3.37
Ph.D. Student	Dummy variable indicating whether individual is a Ph.D. student in the year after the degree, with respect to which he was interviewed, was obtained	19,888	0.19	0.39	0	1
Working	Dummy variable indicating whether individual is in the labour force one year after graduation	23,767	0.93	0.25	0	1
Actual Working Hours	Natural logarithm of actual weekly working hours	35,371	3.67	0.37	0	5.35
No. of Jobs	Total number of jobs that the respondent has had in the five years since graduation	13,834	2.45	1.44	1	10
Tenure First Job	The respondent's tenure with his first job after graduation (in months)	12,619	27.24	24.1	0.46	258.12
Independent variables						
Regional UR upon Graduation	Regional unemployment rate in the year of graduation in the university's region	35,371	4.09	1.01	2.22	6.67
Male	Dummy variable indicating whether respondent is male	35,371	0.5	0.5	0	1
Foreign Nationality	Dummy variable indicating whether respondent is of non-Swiss nationality	35,371	0.09	0.29	0	1
Age	Age of respondent	35,371	29.15	3.05	22	40
Age Squared	Age of respondent squared	35,371	859.13	183.91	484	1600
Children	Dummy variable indicating whether respondent is responsible for one or more children	35,371	0.09	0.29	0	1
Education Father	Dummy variable indicating whether respondent's father holds a tertiary degree	35,371	0.38	0.49	0	1
Education Mother	Dummy variable indicating whether respondent's mother holds a tertiary degree	35,371	0.19	0.39	0	1
Job Study-unrelated	Dummy variable indicating whether the individual had (occasionally or regularly) a job not related to his studies during his education	35,371	0.73	0.44	0	1
Job Study-related	Dummy variable indicating whether the individual had (occasionally or regularly) a job related to his studies	35,371	0.66	0.47	0	1
Academic Requirement	Dummy variable indicating whether the individual's position requires an academic degree	35,371	0.86	0.35	0	1
Fixed-Term Contract	Dummy variable indicating whether respondent has a fixed-term contract	35,371	0.4	0.49	0	1
Side Job	Dummy variable indicating whether respondent has a side job	35,371	0.12	0.32	0	1
Employment Area Public	Dummy variable indicating whether individual works in the public sector (serves as reference category)	35,371	0.5	0.5	0	1

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Variable	Definition	N	Mean	Std	Min	Max
Employment Area Private Non-Profit	Dummy variable indicating whether individual works in the non-profit sector	35,371	0.06	0.24	0	1
Employment Area Private	Dummy variable indicating whether individual works in the private sector	35,371	0.44	0.5	0	1
Regional UR in t	Regional unemployment rate in the region of respondent's employment in t	35,371	4.28	1.11	2.45	7.05
Experience	Dummy variable indicating whether the observation is from the second survey wave	35,371	0.44	0.5	0	1
Time Trend	Linear time trend	35,371	3.98	1.71	1	7
Time Trend Squared	Linear time trend squared	35,371	18.78	13.94	1	49
Canton of Origin	28 Dummy variables for the individual's canton of origin					
Field of Study Dummies	7 Dummy variables for the individual's field of study					
Occupational Status	4 Dummy variables for the individual's occupational status					
Regional Dummies	7 Dummy variables for the individual's region of employment					
Sector Dummies	13 Dummy variables for the industry a respondent is employed in					
University Dummies	12 Dummy variables for the individual's university					

Notes: N is the number of observations. Std is the standard deviation.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, own calculations.

Table A.2: Heterogeneous Catch-Up Paths – Job Mobility by Gender

Dependent variable	**Tenure First Job**	**No. of Jobs**	**Tenure First Job**	**No. of Jobs**
Sample	Men		Women	
	Five years after graduation			
	(1)	(2)	(3)	(4)
Model	Poisson	Neg. Bin.	Poisson	Neg. Bin.
Regional UR	0.867***	1.044***	0.944***	1.015
	(0.014)	(0.012)	(0.018)	(0.011)
Controls	YES	YES	YES	YES
Observations	6,238	6,961	6,381	6,873
Pseudo-R^2	0.017	0.024	0.016	0.028

Notes: */**/*** denotes statistical significance at the 10/5/1% level. Incidence rate ratios reported in all columns. The values in parentheses represent robust standard errors clustered at the individual-level. *Regional UR* is the regional unemployment rate in the year of an individual's graduation and *Exp* is a dummy variable with the value 1 if the individual's potential experience on the labour market is five years. All specifications contain a set of covariates introduced in Section 3.
Source: Swiss Survey of Graduates, FSO, cohorts 2002, 2004, 2006, 2008, 2010, own calculations.