

# UZH Graduates on the Swiss Labor Market\*

Ulf Zölitz<sup>†</sup>  
Josef Zweimüller<sup>‡</sup>

May 2021

## Abstract

How do graduates of the University of Zurich (UZH) fare on the Swiss labor market? To measure UZH graduates' labor market success, we analyze data from the Swiss social security register (AHV). We link the AHV register to the UZH student register and the Swiss education register (LABB). The resulting dataset consists of the universe of UZH graduates born 1960-1990, who obtained their highest degree from the UZH. It allows a detailed analysis of UZH graduates' earnings- and employment trajectories on the Swiss labor market.

We highlight how much UZH graduates earn and how likely they are employed on the Swiss labor market after having left the university. We show how UZH graduates' earnings evolve in the years after graduation and document UZH graduates' position in the overall Swiss earnings distribution. We further highlight gender inequalities, trends in earnings across cohorts, and the differences in earnings across faculties. Based on more recent cohorts, we compare the (short-run) labor market success of UZH graduates to graduates from other Swiss universities.

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\*We thank Anna Hotz for outstanding research assistance and Simona Sartor who provided extremely helpful support in preparing the data. We gratefully acknowledge financial support by the also thank UZH Deputy President and UZH Vice President Education and Study Affairs, Prof. Dr. Gabriele Siegert, and Dean of the Faculty of Business, Economics, and Informatics, Prof. Dr. Harald Gall, for financial support for this study. We are thankful to Monika Egli and Benjamin Schmitt in providing UZH student data.

<sup>†</sup>University of Zurich, Email: ulf.zoelitz@uzh.ch

<sup>‡</sup>University of Zurich, Email: josef.zweimueller@uzh.ch

## SUMMARY OF MAIN RESULTS

This report uses data from the Swiss social security (AHV) register to study the labor market success of graduates from the University of Zurich (UZH).

We link data from the UZH register and data from the longitudinal education register (LABB) to the Swiss social security register (AHV) data. This allows us to explore the earnings- and employment outcomes of the universe of graduates (i) who are born 1960-1990, (ii) who obtained their highest degree from the UZH, and (iii) who are no longer enrolled in further tertiary education. We observe the earnings- and employment histories of these individuals over the 1992-2017 period. “Earnings” are defined as all labor income subject to social security contributions. (Capital income is not considered.) Earnings are unadjusted for hours (rather than full-time equivalent), because the AHV data do not report hours worked. All earnings are measured in real CHF terms, at prices of 2019. For more recent cohorts – the graduation cohorts 2012-2017 –, we can link the AHV data to the LABB register for all Swiss universities. This allows cross-university comparisons in the early years after graduation.

**The University of Zurich (UZH) is an important provider of talent for the Swiss labor market.**

- In 2015, UZH graduates comprised 1.5% of the prime-age labor force of Switzerland and 7.9% of the prime-age labor force of the canton Zurich.
- In 2015, earnings of UZH graduates amounted to 2.3% of all labor income in Switzerland and 11% of all labor income in the canton of Zurich.

**The average UZH graduate earns about 60% more than the average Swiss worker.**

- In 2015, the mean earnings of employed UZH graduates amounted to CHF 127,439. As mean-earnings measures are driven by few workers with very high incomes, we also report median- and mean log earnings, which were CHF 97,773 and CHF 86,789, respectively.
- UZH graduates mean earnings were 79% higher than mean earnings among all Swiss workers. Median and mean log earnings were 59% and 62% higher. (The higher earnings-gap for mean compared to the median reflects that fact that earnings inequality among UZH graduates is higher than among all Swiss workers.)
- These measures consider earnings on the *Swiss* labor market among workers with a strong labor force attachment. (UZH graduates who leave the country, as well as stayers who drop out of the labor force are not considered in the calculation.)

### **Less than 80% of UZH graduates are permanently employed on the Swiss labor market.**

- One year after graduation 75% of UZH graduates are permanently employed on the Swiss labor market. Ten years after graduation 80% are permanently employed. The remaining graduates either have left Switzerland or have temporarily or permanently dropped out of the labor force.
- The share of the permanently employed is less than 60% for non-Swiss graduates, while it is above 80% among Swiss graduates.
- Less than 5% of graduates are temporarily non-employed and only about 2% receive unemployment insurance benefits. This suggests that a small - though non-negligible - fraction of UZH graduates faces problems to find a suitable job on the Swiss labor market.

### **Gender inequalities among UZH graduates are large.**

- Across all cohorts, female UZH graduates earn 35% less than their male colleagues. In the 1960-1990 cohorts and the entire sample 1992-2017, average real earnings (in 2019 CHF) of female UZH graduates amounted to CHF 69,236, compared to CHF 107,515 for male UZH graduates.
- The gender earnings gap among UZH graduates has decreased over time but is still disturbingly large. In 2015, it is still 29.9%.
- The gender gap partly reflects a higher incidence of part-time work among women. While hours worked are not recorded in the AHV register, data from other sources suggest that about 20 percentage points – or two thirds – of the gender gap can be attributed to female graduates working fewer hours.
- There is also a large gender gap in employment. Female UZH graduates are 6 percentage points less likely to be continuously employed than men. The gender employment gap is mainly caused by more females dropping permanently out of the labor force, and to a lesser extent due to temporary non-employment.

### **There are unexpected trends in the earnings of UZH graduates across cohorts.**

- Surprisingly, we find that earnings growth across cohorts is limited. Earnings of the 1980s birth cohorts are actually lower than the 1960s cohorts. This is surprising, as one would have expected earnings profiles of younger cohorts to shift with per-capita income growth.
- The lack of earnings growth is partly accounted for by changes in the composition of graduates: younger cohorts consist of more women, are more likely to choose lower-income study programs, and are less likely to obtain a doctoral degree (and more likely to obtain a bachelor's degree). After controlling for observable characteristics capturing these compositional changes, we find that younger cohorts earn more than older cohorts.

- However, the earnings growth across cohorts (after controlling for observed characteristics) is entirely driven by female UZH graduates' earnings profiles shifting up. In contrast, the earnings profiles of males shift down. The reasons for the latter result remain unclear.

**Earnings differences among graduates from different UZH faculties are large.**

- The raw earnings of WWF graduates are 28% higher than the UZH average. In contrast, Vetsuisse graduates earnings are 23% lower than the UZH average. These earnings gaps, however, are likely to be driven by the substantial compositional differences in the pool of students across faculties. For instance, the WWF has the lowest percentage women among all UZH faculties (less than 30%), while the female share among the Vetsuisse is the highest (more than 60%). Meaningful earnings comparisons need to account for these compositional differences.
- After controlling for differences in observable characteristics, the cross-faculty earnings differences are somewhat smaller, but still quite large. After accounting for differences in the composition of the student pool we find: MeF (+22% above UZH average), WWF (+19%), RWF (+5%), MNF (-9%), PhF (-18%), ThF (-20%), VSF (-20%).

**The average UZH graduate earns slightly more than the average Swiss university graduate.**

- While raw earnings among UZH graduates are exactly equal to the average of Swiss university graduates, controlling for observed characteristics shows that UZH graduates have an earnings advantage of 1.3% compared to the average Swiss university graduate.
- UZH graduates have a stronger attachment to the Swiss labor market than graduates from other Swiss universities. The employment rate of UZH graduates is almost 8 percentage points higher. This is mainly due to a lower share of non-Swiss students. Employment rates within gender-nationality groups are only slightly higher among UZH graduates than among graduates from other Swiss universities.
- There are large differences in the raw earnings across graduates from different universities. Graduates from the University of St. Gallen achieve the highest earnings, followed by ETH Zurich and EPF Lausanne. The UZH ranks at number 4.
- After controlling for differences in the composition of the student pool, the ranking changes somewhat. Now ETH Zürich ranks first, followed by St. Gallen, while EPF Lausanne ranks third. The UZH stays on rank 4, with average earnings slightly above the Swiss average.

# THE REPORT IN DETAIL

## 1 Introduction

The University of Zurich (UZH) is an important provider of talent for the Swiss labor market. In the year 2015, UZH graduates made up 1.5% of the prime age labor force (aged 25-55) of Switzerland; and 7.9% percent of the prime age labor force of the canton of Zurich. The labor income generated by UZH graduates comprised 2.3% of the labor income earned by prime-age workers in Switzerland and about 11% of the labor income earned by prime-age workers in the canton of Zurich.

In this study, we show how UZH graduates fare on the Swiss labor market. We investigate how their labor earnings evolve and how likely they are to be permanently employed in Switzerland once they leave the university. Additionally, we provide some descriptive statistics how much they work and earn during their studies. We further document which ranks – of the overall earnings distribution – UZH graduates occupy. Furthermore, we highlight the enormous gender inequalities among UZH graduates, compare graduates' incomes across cohorts, by highest degrees obtained, and across faculties. Finally, based on recent graduation cohorts, we compare the (short-run) labor market success of UZH graduates to graduates from other Swiss universities.

This study breaks new ground by linking UZH student register data as well as data from longitudinal Swiss education register (LABB) to the Swiss social security data (AHV). The latter contain detailed information on the labor market outcomes of workers employed on the Swiss labor market. The AHV data are collected for the purpose of calculating old-age pensions and provide the workers' complete earnings- and employment history. To our knowledge, this is the first study combining education- and social-security registers to learn about the labor market outcomes of university graduates in Switzerland.

It is important to emphasize that the Swiss social security data report only labor income subject to social security (AHV) contributions. While this captures essentially all labor income earned in Switzerland, earnings generated outside Switzerland are not observed in the data and not considered in this report. We concentrate on workers with continuous employment (= positive earnings in each month of a calendar year) who have a strong attachment to the Swiss labor market.

Our overall conclusion is that UZH graduates do very well on the Swiss labor market. In 2015, the average employed UZH graduate earned almost 60% more than the average employed

Swiss worker, and 1.3% more than the average university graduate in Switzerland. However, earnings inequality among UZH students is high. The report documents a range of dimensions that contribute to the observed earnings differences. For instance, earnings are relatively low immediately after graduation but rise substantially later on; earnings and earnings growth differ strongly between female and male graduates; they vary substantially across graduates from different faculties; and there are substantial differences between graduates who leave the university with a bachelor degree compared to those with a doctoral degree.

While the focus of the report is on graduates' earnings, we also look at employment outcomes. More than 20% of all UZH graduates are *not* continuously employed in Switzerland after they have left the UZH. Most of the non-continuously employed are non-Swiss students, most likely returning to their home country – or going elsewhere – after having finished their studies. There are also a substantial number of UZH graduates staying in Switzerland but dropping out – permanently or temporarily – from the labor force, mainly females who interrupt their working career after the birth of a child. The share of UZH graduates who have trouble of finding a suitable job is not negligible but relatively low.

The report is organized as follows. In Section 2, we present the data and describe the sample used to study the labor market success of UZH graduates. In Section 3 we describe the data and discuss their advantages and limitations. In Section 4 we provide descriptive evidence on earnings and employment outcomes, without accounting differences across groups with respect to the relevant observable characteristics (such as gender, nationality, faculty, etc.). Section 5 implements regression models that allow for more meaningful earnings comparisons by accounting for compositional differences across groups and over time. In Section 6, we compare the (short-run) labor market success of recent UZH graduation cohorts to those from other Swiss universities. Section 7 concludes.

## 2 Data

The present study breaks new ground by linking information on *study careers* from (i) the UZH student register and (ii) the longitudinal Swiss education register (LABB) to *earnings- and employment histories* from (iii) the Swiss social security (AHV) register. To our knowledge, such a link has not been exploited in previous studies.

In this section, we describe the data sources and the procedure to link these data. We end up with a large data set comprising the universe of graduates born in 1960-1990, who (i) obtained their highest degree at the UZH, and (ii) are not longer enrolled in further tertiary education. This allows us to explore in some detail how the earnings of these individuals evolve after graduation – and how likely they are employed on a permanent basis on the Swiss labor market.

### Data on UZH graduates, birth cohorts 1960-1990

To identify UZH graduates, we start out from the UZH student register. The UZH student register contains the universe of UZH students (both the currently enrolled, those who eventually graduated, and the drop-outs) and contains a broad set of variables including the number and type of each completed degree, graduation date and study duration for each degree, year of birth, nationality, sex and high school. The raw data (not available to us) also provides student's first and last name, day/month/year of birth. This information was used by the UZH and the BFS to provide us with an anonymized person-identifier linking UZH-, LABB-, and AHV-registers. The UZH student register raw data comprise information about 168,000 students who were ever enrolled at the UZH since the year 1968. The data available to us ends in year 2019. About 86,000 students ( $\approx 50\%$ ) completed at least one degree.

Table 1 shows how we restrict these raw data to arrive the estimation sample that we analyse. As data from the very early years are somewhat less reliable, we confine the analysis to birth cohorts 1960-1990. Among these birth cohorts, a total of 64,465 students obtained at least one UZH degree until the year 2017.

For the purpose of studying the labor market success of UZH graduates, we restrict the analysis to students who got their highest degree from the UZH.<sup>1</sup> To obtain the information about the individual's highest degree, we link the UZH student register to the longitudinal Swiss education register (LABB). The latter data source contains individuals' entire university history (in Switzerland). The matching of the two data sources is based on the student's matriculation number, which is recorded both in the UZH register as well as the LABB data. The matching of the two data sources works very well with a matching rate of 97.5%.<sup>2</sup> The LABB contains longitudinal information on the academic careers of Swiss students at universities and applied universities (*Fachhochschulen*). This allows us to check, whether the degree rewarded at the UZH is an individual's highest degree obtained at a Swiss university. Excluding UZH graduates with a higher degree from another Swiss university reduces our sample by 9,946 (or 15.7%)

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<sup>1</sup>For instance, a student who obtained the BA from the University of Berne followed by a MA at the UZH is included in the analysis sample, while a student with a BA from the UZH and an MA from Berne is not.

<sup>2</sup>This is not surprising given that LABB information is based on the student register data run by the various Swiss universities.

to 52,907 individuals. Including only graduates who obtained their highest degree from UZH makes sense because the highest degree is decisive for the labor market success. Nevertheless, it is interesting to observe that a large fraction of UZH graduates continue their studies at – and end up with a higher degree from – another university within Switzerland.<sup>3</sup>

Table 1: UZH Graduates, Analysis Samples

UZH Graduates, birth cohorts 1960-1990	64,465	
Matched to LABB ( <i>matching rate</i> )	62,853	(97.5%)
Highest degree at UZH	52,907	
Matched to AHV ( <i>matching rate</i> )	51,292	(96.9%)
<i>Employment Sample</i>		
(No longer enrolled at UZH or another Swiss university)	36,371	
<i>Earnings Sample</i>		
(Cont'sly employed after graduation for at least 1 year)	30,374	

*Notes:* The UZH analysis sample contains individuals born between 1960 and 1990 who completed their highest degree at the UZH and could be matched to LABB- and AHV-data.

*Source:* AHV-, UZH- and LABB-register.

Finally, we match the resulting sample of UZH graduates to individuals whom we can link to the social security (AHV) data. As mentioned above, this matching procedure is based on the student's first and last name, day/month/year of birth and was carried out by the *Bundesamt für Statistik* (BFS) Neuchatel, who also provided an anonymized identifier for each individual in our sample. This matching procedure worked very well with a matching rate of 96.9%, leaving us with a sample size of 51,292 individuals. Finally, we exclude all individuals still enrolled in further tertiary education. This leaves us with 36,371 individuals, among whom 30,374 individuals were continuously employed (= employed in all months of a calendar year) in at least one year after graduation. The latter restriction selects workers with a strong attachment to the Swiss labor market.

As we consider all birth cohorts 1960-1990, we are left with a large analysis sample allowing us to explore in much detail how well UZH students do on the Swiss labor market. Using AHV data for the entire Swiss population, we can also compare the labor market outcomes of the 1960-1990 birth cohorts of UZH graduates to the labor market outcomes of the 1960-1990 birth cohorts of the entire Swiss population.<sup>4</sup>

<sup>3</sup>An advantage of restricting the sample to birth cohorts is that it allows to compare UZH graduates with the Swiss resident population (irrespective of whether they went to university) of the same birth cohorts. Inter alia, we can document the position of UZH graduates in the country-wide earnings distribution of birth cohorts 1960-1990.

<sup>4</sup>Notice that the link to the AHV data is possible due to the joint de-identification procedure implemented by the UZH and the BFS. Graduates from other Swiss universities cannot be linked to the AHV data before the year 2012. After 2012, the LABB register contains the student's AHV number, hence we can link graduation cohorts to labor market outcomes from 2012 onward.



## Data on Swiss university graduates, graduation cohorts 2012-2016

To compare the labor market performance of UZH graduates to graduates of other Swiss universities, we match the LABB register to the AHV data. Starting with the year 2012, the LABB register reports the students' AHV number. The analysis samples are based on linked, de-identified LABB-AHV data, provided by the BFS. Table 2 provides information how the analysis sample for Swiss university graduates was selected.

Table 2: Graduates at Swiss Universities, Analysis Samples

Graduates, graduation cohorts 2012-2017	127,708	
Matched to AHV ( <i>matching rate</i> )	118,910	(93.1%)
<i>Employment Sample</i>		
(No longer enrolled in a Swiss university)	76,808	(97.3%)
- UZH Graduates	11,903	
- Graduates from other Swiss university	64,905	
<i>Earnings Sample</i>		
(Cont'sly employed after graduation for at least 1 year)	43,303	
- UZH Graduates	7,849	
- Graduates from other Swiss universities	35,454	

*Notes:* The analysed sample for all Swiss universities corresponds to individuals who graduated from a Swiss university between 2012 and 2017 and could be matched with the AHV-data.

*Source:* AHV- and LABB-register.

The LAAB data contains information on student careers back to the 1970s. Since 1976, 427,237 individuals obtained at least one degree from a Swiss university. From these, we select graduation cohorts 2012-2017 (which can be linked to the AHV data), in total 127,708 individuals. The matching works reasonably well, with a matching rate of 93.1%, and lets us end up with 118,910 individuals. We exclude individuals, who are still enrolled in a university. This restriction reduces the analysis sample to 76,808 individuals, of whom 11,903 are UZH graduates and 64,905 are graduates from other Swiss universities.<sup>5</sup> For the earnings analyses we use only (person-year) observations with continuous employment (= positive earnings in each month of the calendar year). This restriction leaves us with 43,303 Swiss university graduates for the earnings analyses, 7,849 UZH graduates and 35,454 graduates from other Swiss universities.<sup>6</sup>

The linked data sets provide comprehensive and precise information on the labor market success of UZH and Swiss-university graduates. There are at least three reasons why these data are an ideal source for the present purpose.

<sup>5</sup>A large fraction of those with a BA degree continue their studies to obtain a MA degree. Hence this restriction strongly reduces the analysis sample.

<sup>6</sup>The AHV data report the earnings- and employment-spells subject to social security (AHV) contributions for all employment contracts in Switzerland. The Swiss AHV data are comprehensive in the sense that also earnings from self-employment and employment in the public sector are included. (These earnings are not covered in social security data for other countries.)

*First*, the AHV data cover all kinds of employees: the self employed as well as employees, both in the private and in the public sector. (This is different from social security data of many other countries, which often cover only employees in the private sector.) Hence the linked data sets give us a complete picture of labor incomes earned by university graduates on the Swiss labor market. *Second*, the data sets cover the whole population of UZH graduates since 1981 (analysis sample I), and the population of university graduates in Switzerland since 2012 (analysis sample II), allowing us to draw a comprehensive picture of the labor market success of university graduates. *Third*, because the data are used for administrative purposes, there is little measurement error. (This is clearly supported by the high matching rates when linking the various registers.) In this respect our data set is quite different from many other sources, such as labor force surveys with self-reported income, which are plagued by high non-response to the earnings question and/or higher measurement error in the earnings variable.

### 3 Measuring labor market success

It is important to keep in mind that the earnings (and employment) measures provided in the AHV data report precise information on UZH graduates' labor earnings *in Switzerland*. Ideally, we would like to capture the full labor market history of individuals, including earnings abroad, periods of non-employment, and hours worked. This would allow us to calculate measures such as *average (unconditional) earnings* in the population of UZH graduates (unconditional of employment and hours worked); or *average full-time equivalent earnings*. The former measure is a catch-all indicator encompassing employment and earnings outcomes. The latter measure captures the earnings potential of an individual on a regular (full-time) job.

Unfortunately, information in the AHV data does not allow us to calculate these measures of labor market success. First, the AHV data captures only earnings on the *Swiss* labor market. However, for a full assessment of the labor market success of UZH graduates, information on the entire earnings- and employment history would be required, irrespective of the country in which this income was generated.<sup>7</sup> Second, the AHV data does not report information on hours worked. While they provide accurate information on annual earnings, a decomposition into hours worked and full-time equivalent wages is not possible. Because of these limitations, our analysis of UZH graduates' labor market success focuses on two main labor market outcomes:

- Earnings of workers with continuous AHV employment
- Probability of continuous AHV employment

#### Earnings of graduates with continuous AHV employment

This earnings measure focuses on the average earnings of UZH graduates with a strong attachment to the Swiss labor market. In particular, this measure excludes person-year observations with zero income throughout the year and those who were non-employed in some months of the year (despite having positive annual income). These restrictions leave us with a sample of individuals with a strong attachment to the Swiss labor market yielding an informative picture of the labor market success of UZH graduates. However, there are at least three issues that need to be taken into account when interpreting the evidence.

- *Selection*: Average labor market success among all UZH graduates is different from the one of graduates staying in Switzerland to the extent that leavers differ from stayers. The earnings of workers with continuous AHV employment *over- or underestimate* average labor earnings among all Swiss university graduates, depending on whether leavers are negatively or positively selected.
- *Earnings abroad*: An individual with positive earnings in Switzerland during a given year may also generate positive income outside Switzerland. To the extent that Swiss graduates

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<sup>7</sup>More precisely, it captures all employment activities that are subject to AHV contributions (which covers all labor earnings generated in Switzerland and those employment activities conducted outside the country that are subject to AHV contributions and therefore recorded in the data).

earn positive labor incomes outside Switzerland in the same year, our earnings measure *underestimates* true earnings success of Swiss university graduates.

- *Hours worked.* The social security data provide high-quality information about the yearly AHV-taxable earnings but do not report hours worked. Hence, we cannot calculate average earnings normalized by working time (e.g. full-time equivalent earnings). Because of the high prevalence of part-time work on the Swiss labor market, the earnings measures clearly *underestimates* the earnings potential of a (full-time) employed UZH graduate.

Despite these measurement problems, we think that the variable “earnings among workers with continuous AHV employment” is a meaningful measure of the UZH graduates’ labor market success. Moreover, we are often less interested in correctly measuring absolute earnings, but more interested in comparisons across groups, over time or between faculties and universities. To the extent that these problems are similar between the units of comparison, the measurement error “cancels out”. In other words, while absolute levels are subject to bias, comparisons are less so. Nevertheless, the interpretation of the results needs to take the measurement problems into account.

**Measuring average earnings** In what follows, we are primarily interested in measuring average earnings of UZH graduates and particular subgroups among them. As we will see, earnings are very different across individuals, which raises the question how to represent the earnings of a typical UZH graduate. The following three measures are obvious candidates:

- Mean earnings
- Median earnings
- Mean log earnings

Absent any dispersion in earnings the three measures coincide. In reality, earnings distributions are typically right-skewed, with the right tail being much longer than the left one. The problem of the *mean earnings* measure is that it may be strongly driven by outliers, i.e. a few individuals with super-high earnings blow up mean earnings. A measure avoiding this problem is the *median*, the earnings value separating the higher- from the lower-half earnings. (Because the earnings distribution is right-skewed, the mean is larger than the median. Frequently the ratio of median to mean earnings is used as measure of earnings dispersion.) Another average-earnings measure often used in the literature is *mean log earnings*. Typically, real-world earnings distributions are well approximated by a log-normal distribution (capturing its right-skewed shape). If an earnings distribution is precisely log-normal distributed, median earnings and mean log earnings coincide.<sup>8</sup>

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<sup>8</sup>A random variable  $Y$  is log-normally distributed, if  $y = \ln Y$  is normally distributed with mean  $\mu$ , variance  $\sigma^2$ . With a log-normal, the *median* of  $Y$  is  $\exp(\mu)$  and the mean of  $Y$  is  $\exp(\mu + \sigma^2/2)$ . The difference between the mean and the median earnings is determined by the variance  $\sigma^2$ . For most subsequent analyses, we focus on *mean log earnings* as our average earnings measure, and represent this measure in CHF terms. In other words, if the mean of log earnings is our data is  $\bar{y}$ , then we report  $\exp(\bar{y})$  – the CHF equivalent of  $\bar{y}$  – in our tables and figures. In slight abuse of its definition, we refer to  $\exp(\bar{y})$  as “mean log earnings”.

In what follows, we use *mean log earnings* as our main average-earnings measure. One reason is that we are often interested in relative (%-) differences rather than absolute earnings, and the log-scale captures relative differences. A second reason is that our subsequent regression analysis is based on log earnings regressions, a standard tool in the labor economics literature to study earnings distributions. These regressions allow comparisons across groups that are not affected by compositional differences and scaled in log earnings. When we refer to “mean log earnings” in the following, we always mean the CHF value corresponding to the average of mean log earnings (= the *anti-log* of mean log earnings).

## **Employment, non-employment and unemployment on the Swiss labor market**

Labor market success – or lack thereof – is also determined by the probability of having a job, the risk of being unemployed (and drawing unemployment insurance benefits), or the probability of being non-employed for other reasons.

In the AHV data, we observe on a monthly basis, whether an individual earns positive (social-security taxable) income in Switzerland. Clearly, if we observe an individual without a job in Switzerland, it does not necessarily indicate joblessness. He or she could work and make a career abroad. As we will see below a surprisingly large share of UZH graduates (more than 20% of a graduation cohort) has no continuous AHV employment. It is therefore important to understand who is continuously employed on the Swiss labor market – and how employment- and non-employment probabilities change over the career or across different groups of UZH graduates.

Since our earnings measure is based on workers with continuous AHV employment throughout the calendar year, our employment measure will concentrate on the percentage individuals with continuous AHV employment. We think this is a robust indicator to measure the attachment to the Swiss labor market in the population group under consideration. Alternatively, we will also look at three other groups: the permanently non-employed, the temporarily non-employed and the unemployment insurance (UI) benefit recipients.

This UI benefit recipient indicator is most likely capturing more severe labor market problems. The main eligibility criterion for UI benefit take-up is that the individual has no job; that he or she is a resident of Switzerland and searches actively for a new job on the Swiss labor market.<sup>9</sup> In the AHV data, we observe take up of UI benefits, hence we can shed light on how many graduates are jobless *and* draw UI benefits.<sup>10</sup>

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<sup>9</sup>There are some exceptions to this general rule. For instance, cross-border workers (workers who are residing in another country but working in Switzerland) are also entitled. Moreover, an individual is still entitled to UI benefits in Switzerland if he or she searches for work in other countries (rather than on the Swiss labor market). The AHV data provide information on both cross-border workers and unemployment workers searching for work in other countries. The data we use to construct the unemployment measure includes cross-border workers and individuals who search for a job outside Switzerland.

<sup>10</sup>It is worth pointing out that there may be individual not taking up UI benefits despite having no job. This could have various reasons. For instance, it could be that the individuals do not fulfill one or more of the eligibility criteria to get entitled, such as a minimum contribution requirement (you are only entitled to UI benefits, if you had been employed and paid UI-contributions for a minimum number of months before entering the unemployment pool). Or they may be entitled to UI benefits but abstain from take-up because they expect to find a new job soon, because they do not want to be stigmatized, and so on. Nevertheless, we think that UI take-up is a useful indicator and points to the fact that an individual faces problem to find a suitable job.

## 4 Labor market success of UZH graduates

In this section, we provide descriptive evidence on the labor market success of UZH graduates. If not indicated otherwise, the numbers presented in this section refer to the birth cohorts 1960-1990, as measured in the Swiss social security (AHV) data.

As mentioned above, UZH graduates' labor market success is measured by two main indicators: (i) earnings of (continuously) employed workers; and (ii) the percentage of (continuously) employed workers. Both earnings and employment measures presented in this section are "raw" measures – not accounting for the compositional differences over time and across groups. In Section 5 below we provide more meaningful comparisons across groups and over time (based on regression analyses) that account differences in observable characteristics across the compared units.

### 4.1 Earnings of UZH graduates with continuous AHV employment

In this section we provide descriptive evidence on the "raw" earnings of UZH graduates. To get a first impression, we start out by looking at the level and distribution of UZH graduates' earnings in the year 2015. We focus on birth cohorts 1960-1990 who comprised the prime-age work force (aged 25-55) in the year 2015. In next step, we look at earnings by time since graduation exploiting information over the entire observation period 1992-2017. Finally, we compare the earnings distribution of UZH graduates to the earnings distribution of all Swiss workers. Inter alia, this allows us to document which ranks of the overall Swiss earnings distribution are occupied by UZH graduates.

**The earnings distribution of UZH graduates in 2015** The mean earnings among UZH graduates, who were employed in each month of 2015 (the "continuously employed"), amount to CHF 127,439. As mentioned above, the earnings distribution is heavily right-skewed, so the mean earnings measure is inflated by a small share of workers with very high earnings. Indeed, median earnings and mean log earnings are substantially smaller, equal to CHF 97,773 and CHF 86,789, respectively.<sup>11</sup>

In Figure 1 we show the cumulative earnings distribution. The horizontal axis measures individuals' income (in log-scale), while the vertical axis measures the cumulative density of the earnings distribution at a given income, i.e. the share of individuals earning less than that income. The graph shows that about 20% of UZH graduates earn less than CHF 50,000 and 20% earn more than CHF 150,000. The top 10% earn more than CHF 234,000, the top 5% earn more than CHF 336,000, the top 1% earn more than CHF 688,000, and the top 0.1% earn more than 1,722,000 CHF. (Recall that by "earnings" we mean labor income; capital incomes are not considered. Earnings do not account for hours worked, hence higher earnings could result either

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<sup>11</sup>The fact that median and mean of log earnings do not coincide suggests that the earnings distribution is not (perfectly) described by a log-normal. In fact, the actual distribution of log earnings among UZH graduates is not symmetric (as for by the log-normal) but skewed. As a result, median earnings and mean log earnings do not coincide.

from a higher hourly wage, from longer hours, or both. All earnings are real earnings, measured in 2019 CHF.)

Figure 1

**Earnings by year since graduation** Figure 2 shows average annual (gross) earnings by year since graduation from the highest UZH degree, where  $t = 0$  is the year of graduation,  $t = -1$  is the last year before and  $t = 1$  the first year after graduation, and so on.<sup>12</sup> To get a sense of the extent to which they work and earn during their studies, we also show their earnings before graduation. For the study years (up to  $t = 0$ ), the calculation of average earnings includes person-year observations with zero earnings.<sup>13</sup> For the years after graduation ( $t = 1$  or later), the calculation of average earnings is based on continuously employed workers (i.e. person-year observations with zero earnings and with employment in some but not all months of the year are excluded).

Figure 2

Figure 2 shows that, unsurprisingly, graduation is associated with a large increase in earnings. From  $t = 1$  onward, the graph of 2 shows that mean log earnings are slightly above 70,000 CHF one year after graduation. Moreover, the earnings trajectory has a steep slope, hitting the CHF 100,000 mark in  $t = 7$  and amounting to roughly CHF 115,000 in  $t = 10$ . The figure also shows that UZH graduates work during their studies, though earnings are not very large, around 5,000 CHF per year. In  $t = 0$ , the calendar year of graduation, the average (log) earnings of UZH graduates is around 15,000 CHF.<sup>14</sup>

**Dispersion of UZH graduates' earnings** Figure 2 shows the mean (log) earnings of UZH graduates. It is important to keep in mind that this average earnings measure hides a lot of heterogeneity. Individuals differ in luck, talent, connections, experience, and many other dimensions relevant for labor market success. Moreover, depending on their field of study, university graduates enter very different segments of the labor market. In some segments, workers with the appropriate skill are in short supply; in other segments workers are abundant. Clearly, these

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<sup>12</sup>The various data points average annual earnings across different calendar years. In the calculation of average earnings at  $t=0$  we include all individuals who graduated in 2017, 2016, 2015, 2014, ..., 1992. The graphs are based on "unbalanced" samples. This means, many cohorts are not observed throughout the time window  $t=-5, \dots, 0, \dots, 10$ . Since the AHV data start in 1992, individuals born in 1960 can be observed from age 32 onward. At that age, most individuals already obtained their highest degree. Hence the earnings of the 1960 cohort are taken in later years after graduation,  $t \gg 0$ , but unlikely in years before graduation,  $t < 0$ . Similarly, since the AHV data end in 2017, the cohort born in 1990 is observed from age 18 (the age from which earnings are covered in the AHV data) up until age 27. While the earnings of the 1990 cohorts will be taken into account in most years before graduation, they are increasingly unlikely to be covered in the years after graduation.

<sup>13</sup>After year  $t = 0$ , only person-year observations with continuous employment are considered. Person-year observations with temporary or permanent non-employment are not considered in the calculation. Up to year  $t = 0$ , the calculation includes person-year observations with 0 earnings. The average measure is mean log earnings. When calculating mean log earnings for observations before  $t = 0$ , we set the log of earnings to zero for individuals with no earnings.

<sup>14</sup>Earnings are measured on an annual basis during a *calendar year*. Hence the earnings measure in  $t = 0$  (the calendar year of graduation) comprises graduates who finished their studies late in the year and those who finish it early during that year. By construction, earnings in  $t = 0$  are not informative about graduates' earnings potential.

differences in market conditions will result in earnings differences. Importantly, individuals' earnings differences result also from differences in hours worked, which we cannot observe in the data.

Figure 3 displays a box plot indicating, for each year since graduation, the 90/10 percentile earnings range, as well as the 75th, 50th (median) and 25th percentile of the earnings distribution. The figure shows the high dispersion in labor earnings among UZH graduates. In the first years after graduation, the individual at the 90th percentile earns about 3 times as much as the individual at the 10th percentile. This ratio increases strongly as time progresses: 10 years after graduation, the 90/10 ratio increases to a factor larger than 5. Graduates at the 75th percentile earn almost 100,000 CHF in year 1 after graduation, which increases to CHF 177,000 by year 10. In contrast, individuals at the 25th percentile start out with earnings around CHF 60,000 and end up with about CHF 80,000 in year 10.

Figure 3

Figure 3 also highlights the difference between mean earnings, median earnings and our measure of log mean earnings. Mean earnings are substantially higher than median earnings – and the gap is growing with time since graduation. This is very intuitive: as time goes by, some workers climb up the earnings ladder very quickly thus blowing up the measure of average earnings. In contrast, the profile of median earnings is substantially flatter. The figure also shows that mean log earnings fall short of median earnings suggesting that the earnings distribution among UZH graduates is more right-skewed than the log-normal. However, the gradient (by time since graduation) in mean log earnings closely follows the median-earnings gradient.

**The position of UZH graduates in the 2015 Swiss earnings distribution** As mentioned above, the UZH is an important provider of talent on the Swiss labor market. It is interesting to consider the ranks that UZH graduates occupy in the Swiss earnings distribution. Figure 4 compares the 2015 log earnings distribution of UZH graduates to the one of the entire Swiss population. Both distributions refer to birth cohorts 1960-1990 and to workers who were continuously employed in 2015 with annual earnings above 10,000 CHF.

Figure 4

Figure 4 shows that the UZH earnings distribution clearly dominates the one for all Swiss workers: the former has considerably more (less) mass at high (low) incomes. It is interesting to observe that both distributions have considerable dispersion and also considerable overlap. In other words, a large share of UZH graduates earns relatively low labor incomes (see also Figure 1). Moreover, earnings inequality among UZH graduates is considerably higher than among the overall Swiss labor force: the standard deviation of log earnings among UZH graduates is 0.79, more than 25% higher than the one among all Swiss workers (0.63).

Figure 5



Figure 5 presents the same message in a slightly different way by asking: In which percentiles of the overall Swiss earnings distribution are UZH graduates over- or underrepresented? By construction, the overall Swiss population is on the flat 1%-line, while the red graph shows the frequency of UZH graduates at the various percentiles of the overall Swiss distribution. UZH graduates are strongly underrepresented below the 75th percentile, while they are increasingly over-represented at higher percentiles. The probability to find a randomly drawn UZH graduate in the 100th percentile of the Swiss earnings distribution is 6.5%, while it is only 0.5% around the median.

As mentioned above, this report uses mean log earnings as the average earnings measure (if not otherwise indicated). We have already seen that mean log earnings measure are lower than mean earnings, and also lower than the median. It is therefore interesting to highlight the differences in the UZH earnings advantage, under these three measures of average earnings. Table 3 shows that the UZH earnings premium is particularly pronounced (79%) when we look at the mean, while it is smaller, 62% and 59%, when we look at mean log earnings and median, respectively. Put differently, the earnings distribution of UZH graduates is more skewed (and characterized by higher inequality) than the overall Swiss earnings distribution.<sup>15</sup>

Table 3: The 2015 Earnings Distribution: UZH Graduates vs All Swiss Workers

	UZH graduates	All Swiss workers	UZH Earnings Premium (%)
Mean log earnings	86,789	53,738	62
Median earnings	97,773	61,450	59
Mean earnings	127,439	71,163	79
10th percentile	26,278	19,572	34
25th percentile	57,807	39,947	45
50th percentile	97,773	61,450	59
75th percentile	148,088	84,811	75
90th percentile	234,241	120,035	95
95th percentile	336,049	153,324	119
99th percentile	688,179	294,118	134
99.9th percentile	1,722,328	799,598	115
Observations	38,602	2,899,085	

*Notes:* Only continuously employed workers born 1960-1990 with a yearly income higher than 10,000 CHF are considered. *Source:* AHV-, UZH- and LABB-register.

## 4.2 Employment and non-employment of UZH graduates

The above evidence focuses on earnings of continuously employed UZH graduates. The idea was to highlight the earnings of workers with a strong attachment to the Swiss labor market. It is

<sup>15</sup>According to the standard deviation of log earnings – a measure often used to describe the extent of inequality in the earnings distribution – is 0.79 among UZH graduates and 0.63 among all Swiss workers suggesting the inequality among UZH graduates exceeds the one among all Swiss workers by 25%.

important to know how many are actually continuously employed. To describe the employment status of UZH graduates it turns out useful to distinguish the following three groups of workers:

- The *continuously employed* (AHV employment in each month of the year)
- The *temporarily non-employed* (no AHV employment in some but not all months of the year)
- The *permanently non-employed* (no AHV employment throughout the year)

The AHV data also allow us to look at

- *UI benefit recipients* (a subgroup of the – permanently or temporarily – non-employed),

which are recorded on a monthly basis in the AHV data. Since UI take-up is confined to workers residing in Switzerland, having currently no job and searching actively for a new job, UI benefit reciprocity indicates both a strong attachment to the Swiss labor market and difficulties in finding an adequate job.

**Percentage continuously employed and non-employed** Figure 6 shows that 56% of UZH graduates worked in year of graduation ( $t = 0$ ). In the following year the percentage continuously employed rises strongly and approaches 80% in year 10 after graduation. It also shows that the majority of them worked already during their studies. A non-negligible share did not work at all (in Switzerland) during a given calendar year. The share continuously non-employed is 10% or higher throughout all years  $t = -5, \dots, 10$ . Particularly after graduation year  $t = 0$ , one would have expected to see all graduates working on the labor market. However, a sizable number, 10% or more, do not work at all on the Swiss labor market after graduation.

Figure 6

There are several reasons why UZH students do not take up regular jobs on the Swiss labor market after graduation. One major reason is that many non-Swiss students return back home after having finished their studies and take jobs there; female graduates often drop out of the labor force temporarily (and sometimes permanently) after the birth of a child; some Swiss will go abroad to acquire international work experience; others stay in Switzerland but are involuntarily non-employed because they face difficulties finding a suitable job (many of whom will take up unemployment insurance (UI) benefits); some may simply chose to stay away from the labor market to take off a whole year or more; and so on.

**Employment- and non-employment rates** Figure 7 contrasts the percentage continuously employed (the graph shown in Figure 6) to the *employment rate* of the UZH graduate labor force, which also includes those UZH graduates who are temporarily employed (in some, but not all months) during the respective calendar year. Two years after graduation the employment rate levels off at about 84% and remains there up until year 10 after graduation. Conversely,

the non-employment rates of the UZH graduate labor force is as large as 16%.<sup>16</sup> The gap between the two employment graphs in Figure 7 measures the fraction of time spent in temporary employment.

Figure 7 also shows that the non-employment rate is surprisingly high, but the high non-employment rate is mostly driven by permanent non-employment. The latter is mainly caused by workers leaving the country (for non-Swiss students) or withdrawing voluntarily from the labor force for a baby break (for females), indicating that the high non-employment rate is unlikely due to UZH graduates not finding a suitable job.

Figure 7

**Temporary employment and UI benefit recipiency** The fraction of individuals facing problems to find a suitable job is perhaps best reflected in temporary non-employment and UI benefit recipiency. Figure 8 looks at the risk of UZH graduates to experience temporary non-employment for at least one month; as well as the risk of becoming a UI benefits recipient during the respective year for at least one month. The figure shows that, in year 1 after graduation more than 1 in 5 individuals is temporarily non-employed. While the non-employment risk is falling later on, it is 10% in year 5, and is still about 6% 10 years after graduation. The same pattern, on a lower level, shows up for the risk of becoming a UI benefit recipient. This risk is 11% in the year after graduation and falls below 3% in year 10.

Figures 8 and 9

In Figure 9 we show the percentage months (rather than the percentage individuals) during which UZH graduates are temporarily non-employed or draw UI benefits. These graphs differ from the risk-measures in Figure 8 by taking the duration in non-employment or UI benefit recipiency into account (similar to an unemployment rate). The non-employment and UI benefit recipiency rates are less than half as large as those in Figure 9, mainly because the state of temporary non-employment and/or UI recipiency last less than half of the year, on average.<sup>17</sup> The UI benefits recipiency rate is close to zero during the study years. Most of those without a job do not actively search for one. Even those looking for a job are unlikely entitled to UI benefits, because eligibility is tied to previous employment. Hence students without much previous work experience are not eligible. However, unemployment becomes larger around graduation ( $t = 0$  and  $t = 1$ ) when individuals start actively searching for work. However, the UI benefit recipiency rate stays always below 5% and falls to less than 2% 10 years after graduation. While some UZH graduates may face difficulties finding a suitable job, the UI recipiency rate is not alarmingly large and clearly below the country-wide unemployment rate.

<sup>16</sup>By definition, the employment rates of the continuously employed and continuously non-employed are 100% and 0%, respectively, while the employment rate of the temporarily employed is between 0 and 100%. On average, the employment rate of the temporarily employed is between 60% and 65% and slightly rising with time since graduation. The overall employment rate is the weighted average of the employment rates of these three groups.

<sup>17</sup>The percentage months on UI benefits comes close to an unemployment rate – and would be identical to it if there was no non-employment other than time spent on UI. (The common definition of an unemployment rate is the share of individuals in unemployment relative to the labor force, the sum of employed and unemployed, and does not include the non-employed not on UI benefits in the denominator.)

### 4.3 The gender gap among UZH graduates

While women have become much better integrated into the labor market, gender differences continue to be large and persistent. Women are still often discriminated against, crowd in less well-paying occupations and face a large earnings penalty after giving birth to their first child. One might think that these adverse effects are particularly true for low-skill low-wage workers but less so for university-educated females. After all, a university education is a time-consuming and very costly investment (in terms of foregone income), the benefits of which females and males alike should want to reap. It is therefore interesting to look at gender differences in labor market outcomes across UZH graduates.

**Earnings of continuously employed females and males** Figure 10 documents the gender differences in earnings by time since graduation. First of all, the earnings gap is negligible before graduation – and even in the year of graduation, the difference is minor.<sup>18</sup> However, starting with the year after graduation,  $t = 1$ , the gender gap is looming and widening dramatically over time. 10 years after graduation, average (log) earnings of female UZH graduates lag as much as 50% (!) behind those of their male colleagues.<sup>19</sup>

Figure 10

The gap immediately after graduation mainly reflects females' under-representation among the best paying occupations. The gap may also be due to discrimination, i.e. women starting out with lower initial hourly wages in similar jobs. An important factor behind the widening gender gap after  $t = 2$  is most likely a switch from full-time to part-time employment after the birth of a child. Traditional gender norms in the Swiss society assign to women a disproportionate role in childcare and household work. This leaves less time and energy for working on the labor market.

Because the AHV register does not report information on hours worked, we look at data from the Swiss *Strukturerhebung* to get a sense of the relative importance of fewer hours worked for the gender gap. It turns out that tertiary educated females' hours worked are 20% lower than those of males, (33.6 hours per week for females and 42.4 hours per week for males) suggesting that the gender earnings gap is to a large extent – but by far not entirely – due to females working fewer hours. Since labor market outcomes of UZH graduates are likely similar to labor market outcomes of all tertiary educated in Switzerland, we conclude that both lower hours (but also lower hourly wages) contribute in an important way to the observed gender earnings gap among UZH graduates.<sup>20</sup>

<sup>18</sup>Just like in Figure 2, in Figure 10 we consider the earnings of all former students irrespective of their employment status during their studies (up to  $t = 0$ ) while, beginning with  $t = 1$ , only continuously employed individuals contribute to the graph displayed in the figure.

<sup>19</sup>The size of the gender gap depends on the chosen earnings measure. Figure 10 uses mean log earnings. Instead if we used mean earnings, the earnings gap in year 10 amounts to 66%, and if we used median earnings the gap is 75%.

<sup>20</sup>In Appendix Table A.16 we compare the contribution of the gender hours gap to the gender earnings gap between the tertiary educated and the less than tertiary educated using data from the Swiss *Strukturerhebung* 2010-2017. We find that the earnings disadvantage among employed females with tertiary education is only slightly lower

The gender gap document comprises cohorts born in the 1960s, 1970s and 1980s. However, there were substantial changes over time that affected these cohorts very differently. For instance, an important change over the last decades has been the increasing share of females among university students. This is particularly true for the UZH. In the early 1990s, the percentage female among UZH graduates was 35%. By the year 2016, this share has increased to 58%. The rising female share among university graduates indicates that traditional gender norms are eroding. Figure 10 shows that this translates into a falling gender earnings gap. The gender gap was huge among the cohorts born in the 1960s: 3 years after graduation the female earnings were 29% lower than those of their male colleagues, falling even to 50% 10 years after graduation. Things have improved somewhat since for younger cohorts: the gender gap amounts to “only” 16% in year 3 after graduation for cohorts born in the 1980s. However, despite that the gap has narrowed over time, it remains disturbingly large: 10 years after graduation, the female labor earnings lag 41% behind even for these younger cohorts.

Figure 11

**Gender differences in employment and non-employment** The earnings gap documented above relates to continuously employed workers. In addition, there is a substantial gap in employment between males and females suggesting that the overall gender inequality is larger than indicated in the gender earnings gaps documented in Figures 10 and 11.

High rates of permanent non-employment among females are driven, to a large extent, by non-Swiss students, leaving Switzerland after finishing their studies. However, the gender gap in the percentage permanently non-employed is also due to higher female labor-force withdrawals among the Swiss. The obvious reasons are interruptions of the working career by female graduates who have children. While the gender gap in permanent non-employment amounts only 1 percentage point in the year after graduation, it builds up over time and reaches 6 percentage points in year 10 (18% for females and 12% for males). The mirror image of higher female permanent non-employment is a lower percentage continuously employed. In the year of graduation, the percentage continuously employed is 56%, the same for males and females. 10 years later this number rises to 83% for males graduates but only to 74% for females.

Figures 12 and 13

Figure 12 comprises older and younger cohorts. Since female labor force participation has increased over time, it is likely that the gender employment gap among UZH graduates has narrowed. Figure 13 shows that this is indeed the case and that the gender-conservative norms of the Swiss society are eroding, at least to some extent. For the cohorts born in the 1960s and 1970s, the employment gap is still very large and persistent (although for cohorts born in the 1970s the gap has become small during the study years). However, for cohorts born in the

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than the one of the less than tertiary educated. However, labor force participation among the tertiary educated exceeds the one of the less than tertiary educated. Hence average earnings per *capita* (rather than per *employed worker*) are higher among tertiary-educated females.

1980s, the employment gap has entirely disappeared up until 5 years after graduation. Thereafter, however, the employment gap builds up very quickly reaching almost the same gap as for the older cohort in year 10 after graduation.

#### 4.4 Swiss versus non-Swiss UZH graduates

Over the last decades, universities have become increasingly international, a trend which has also strongly affected the composition of the UZH student pool. Back in 1983, the share of the non-Swiss amounted to 8.1% among all UZH graduates. Over the following 30 years this share more than doubled and stands at 17.8% in 2017.

**Earnings differences by nationality** We first investigate whether non-Swiss UZH graduates who end up employed on the Swiss labor market once they leave the university show a similar earnings performance than their Swiss colleagues (Figure 14). Interestingly, the difference between the two groups is minor. Foreign graduates ending up continuously employed in Switzerland earn slightly more than their native Swiss colleagues, although it is not clear to which extent this is due to study-choice differences in Swiss and non-Swiss student pools. Note also that non-Swiss graduates staying in Switzerland may be positively selected: the most career-oriented take jobs in Switzerland (taking advantage of the high Swiss wages) while the less competitive return to their home country. In any case, average earnings differences are not very large, with a gap of less than 4% after 10 years since graduation.

Figure 14

**Employment and non-employment by nationality** To grasp the quantitative importance of non-Swiss graduates leaving the country, Figures 15 contrasts the percentage continuously employed non-Swiss and to the Swiss. During their studies, employment is similar, but starting with the year of graduation, the percentage continuously employed among the Swiss increases, approaching somewhat less (more) than 80% of females (males). In contrast, the share among the non-Swiss males (females) falls and remains below 60% (55%) during the first 10 years after graduation. The significantly lower employment rates among the non-Swiss notwithstanding, it is interesting that the majority of non-Swiss UZH graduates stays in Switzerland and pursues a career on the Swiss labor market.

Figure 15 and 16

Figure 16 shows that the gap in continuous employment is mirrored in the gap among the continuously non-employed. This is consistent with the idea that, after obtaining their degree and finishing their studies, a large number of non-Swiss graduates leave the country and take up a job abroad.

A permanent non-employment rate of 10% among the Swiss may still look rather high. Also some Swiss UZH graduates may want to gather international experience and work outside the

country for extended periods. This could help explaining why the percentage permanently non-employed among male Swiss graduates amounts to 6% in the year after graduation and even increases to 8% in year 10 after graduation.

It is also interesting to observe the dynamics of non-employment among Swiss females, which amounts to 7% in the year after graduation and increases to 15% in year 10. If Swiss female graduates are equally (or less) likely than their male colleagues to work abroad, this suggests that a substantial number of Swiss female graduates drops permanently out of the labor force (but stays in Switzerland), presumably after the birth of a child. In any case, permanent non-employment is a quantitatively large part of gender inequalities among UZH graduates with Swiss nationality.

#### 4.5 Earnings and employment trends across cohorts

The last decades have witnessed an enormous skill upgrading of the labor force, particularly a large increase in the supply of university graduates. This shift in educational attainment coincided with other trends, most notably the globalization of the world economy and new technologies at the workplace, which raised the demand for university graduates.<sup>21</sup> On the one side, an increase in the number of tertiary educated workers implies that skills become abundant in supply, hence wages for high skilled workers should fall. On the other side, globalization and technical change raise the demand for skills, hence wages for high skilled workers should go up.

Like all other labor markets in developed countries, the Swiss labor market has been exposed to these shifts in supply and demand. A look at trends in labor market outcomes across cohorts helps us to understand whether and how these shifts have affected UZH graduates.

**The shifting earnings profiles across birth cohorts** Figures 17 and 18 compare the earnings profiles of UZH graduates born in 1980s (who graduated around the year 2010) to those born in the 1970s and 1960s (who graduated around year 1990 and 2000, respectively). Figure 17 reveals a striking fact. At any given year since graduation, male UZH graduates born in the 1980s earn *less* (in real terms) than their colleagues born in the 1970s, who in turn earn *less* than those born in the 1960s. This is striking because per-capita incomes in Switzerland grew substantially over the last 20 years. Had UZH graduates benefited from economic growth in a similar way as the average resident of Switzerland, a per-capita income growth of almost 1% over a period of 20 years should translate into 20% *higher* earnings among the 1980s cohorts than those of the cohorts born in the 1960s. Strikingly, Figure 17 shows around 10% *lower* earnings for the 1980s cohorts.

Figure 17

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<sup>21</sup> According to data from the Swiss *Sturkturerhebung*, the share of individuals with a university (or *Fachhochschul-*) degree in the total Swiss population was 16.3%, 24.1% and 26.0% for cohorts born in the 1960s, 1970s and 1980s, respectively. The trend is also reflected in the absolute UZH student numbers, which have more than doubled within 25 years: Since 1980, the number of students who obtained a MA or lic degree and left the university increased from about 1,000 in 1983-85 to about 2,000 in 2016-18 (see Table A.14), when the overall Swiss population increased by about 30%.

Note, however, that comparing cohorts born in the 1980s to those born in the 1960s is like comparing apples and oranges. The composition of UZH graduates could have changed over time in ways that mechanically lead to lower wages. For instance, students from younger cohorts (born in the 1980s) are more likely to leave the university with a BA degree, while a large fraction of students born in the 1960s obtained a doctorate. Accounting for this degree “deflation” is important, because PhDs earn substantially more than BAs. Below, we will undertake regression analyses which net out the changing composition of the student pool. This will allow us to make more meaningful cross-cohort comparisons and better understand the time trends in pay for UZH graduates.

Interestingly, the trend across cohorts looks different for females. Here the earnings profile of cohorts born in the 1980s cohorts are above the one of the 1970s cohorts, which is itself above the one of the 1960s cohorts. The upward shift in the earnings profile across cohorts could be due to a changing composition of the student pool (e.g. women may have increasingly enter study programs that eventually yield higher pay on the labor market). It may also be caused by the erosion of traditional gender norms (less discrimination, fewer females switching to part-time, etc.)

Figure 18

**Cohort trends in employment** In Figure 19 we look at the cohort trends in employment. The employment patterns of younger cohorts are not very different from those of older cohorts. However, younger cohorts are somewhat less likely to be continuously employed on the Swiss labor market after graduation. The most obvious reason is the growing internationalization of the student pool. The share of non-Swiss students among all graduates was about 10% of cohorts born in the early 1960s and increased to 18% for cohorts born in the early 1980s. Since non-Swiss students are less likely employed on the Swiss labor market, it is not surprising to see a lower share of students continuously employed on the Swiss labor market after having finished their studies.

Figure 19

#### 4.6 Labor market outcomes of BA-, lic-/MA- and PhD graduates

The introduction of the Bologna system brought at least one major change of particular importance in the present context: it created the BA degree, which provides an “early-exit gate” that was not available for previous cohorts.

**Earnings by highest degree** Contrasting graduates with different degrees means comparing students with different study durations. Moreover, there are potential selection issues. To the extent that more talented aim a higher degree, PhDs will earn more than BA/MAs due to their higher talent (rather than their degree), and so on. For these reasons, the earnings comparisons across degrees need to be interpreted with caution.



Figure 20 shows earnings by time since graduation, separately for BA, lic/MA and Dr/PhD graduates. As expected, obtaining a higher degree seems to pay off on the labor market. The raw earnings gap between lic/MA and Dr/PhD seems somewhat higher than the gap between lic/MA and BA graduates.

Figure 20

**Employment patterns across graduation degrees** There are large differences in the employment patterns by graduation degree (Figure 21). About 80% of *lic-MA* students are continuously employed in Switzerland 2 years after graduation, a share that remains constant up to 10 years after graduation. The percentage continuously employed is higher before being awarded the *PhD*, but thereafter it falls short of the employment rate among *lic-MA* graduates. Since many *PhD* students are disproportionately non-Swiss, a lower employment rate among *PhDs* is to be expected. It could also be that *PhD* students have better job opportunities on the international labor market inducing many graduates to make their career abroad.

Figure 21

#### 4.7 Earnings and employment across UZH faculties

The type of qualifications UZH students acquire vary substantially by field of study. How this translates into labor market outcomes depends on the supply and demand conditions of the particular labor market segments entered by UZH graduates after finishing their studies and starting their work career.

**Earnings differences of graduates from different faculties** We now compare the labor market success across graduates of the UZH's seven faculties. In Figure 22, we draw mean (log) earnings by time-since-graduation for the faculties of Business, Economics, and Informatics (WWF), Law (RWF) and Medicine (MeF). For comparison, we also show the corresponding graph for the UZH as whole. Graduates from these three faculties earn more than the average UZH graduate. 10 years after graduation, the mean (log) earnings are larger than 150,000 CHF for WWF graduates, followed by MeF graduates with slightly less than 150,000 and RWF graduates (118,000 CHF).

Figure 22 and 23

Figure 23 shows the corresponding evidence for the remaining faculties: The faculties of Science (MNF), Arts and Social Sciences (PhF), Theology (ThF) and Vetsuisse. the graduates' earnings are close to the UZH average. 10 years after graduation, the mean (log) earnings of MNF graduates are about 100,000 CHF. In contrast, PhF-, ThF- and Vetsuisse graduates achieve the lowest earnings, with mean (log) earnings of about CHF 75,000- 80,000 each 10 years after graduation. It is important to keep in mind that faculties differ in many ways include those relevant for pay. For instance, 2 in 3 students graduating from the PhF are female, while less than 1 in 3

WWF graduates are female. Because of the high gender earnings gap, differences in pay across faculties may just reflect the gender composition of graduates but may be unrelated to the study programs of the faculties. In Section 5 below, we perform regression analysis controlling for observable characteristics. This will allow contrasts across faculties that are not contaminated by compositional differences in observable characteristics.

**Employment patterns by faculty** Figures 24 and 25 show the probability of being continuously employed on the Swiss labor market by time since graduation, separately for each of the seven UZH faculties. Just like before, we show the cross-faculty graphs in two figures.

Figures 24 and 25

There are differences in employment patterns across faculties. WWF and RWF graduates appear to have the best employment opportunities. In contrast, the probability to be continuously employed is substantially lower among MNF graduates. Since the MNF has by far the largest share of non-Swiss among all faculties (among the birth cohorts 1980-84 44.7% are non-Swiss) many of them may have left the country. The low VSF employment rate is driven by a high share of foreigner and a large percentage females (which is 87.8% among birth cohorts 1980-84).

## 5 Earnings of UZH graduates: Accounting for group composition

As we repeatedly emphasized, comparing raw earnings across groups (gender, faculties, etc.) or over time is problematic due to differences in student composition across groups and over time. For instance, the female share among WWF graduates is low and high among PhF graduates, so the earnings difference between these two faculties may simply reflect the fact that females earn less than males. It may tell us little about the value of a degree obtained from a particular faculty. Similarly, the falling earnings trend among male UZH graduates may simply be due to the high share of BA graduates (and the lower share of Dr/PhDs) among the younger cohorts. To make progress and to provide comparisons net of compositional differences across groups and over time, we perform regression analyses that control for relevant characteristics observed in the data. More specifically, the OLS regressions below are of the following type

$$y_{ic\tau} = X_i\eta + \alpha_c + \beta_\tau + \gamma_F + \varepsilon_{ic\tau}. \quad (1)$$

(In alternative specifications, we run simplified and extended versions of the above model.) We use the following notation

- $y_{ic\tau}$  denotes log annual earnings of individual  $i$  of birth cohort  $c$  in year  $\tau$  after graduation.
- $X_i$  is a vector of control variables (sex, nationality, age at university entry, indicators for highest degree BA, lic/MA, and Dr/PhD), and  $\eta$  is the corresponding vector of coefficients.
- $\alpha_c$  are birth-cohort fixed effects (with  $c = 1960, \dots, 1990$ ).
- $\beta_\tau$  are year-since-graduation fixed effects (with  $g = m, f$  and  $\tau = 1, \dots, 20$ ).
- $\gamma_F$  are faculty fixed effects (with  $F = ThF, RWE, WWF, MeF, VSF, PhF, MNF$ ).
- $\varepsilon_{ic\tau}$  is an error term (mainly capturing unobserved heterogeneity).

Table 4 provides the results from this regression exercise. All regressions are cross-sectional and based on person-year observations with continuous AHV employment (194,356 observations by 30,374 UZH graduates). The dependent variable in all regressions is the log of annual earnings. Hence the estimated coefficients measure log-point differences in earnings per unit-change of the corresponding right-hand-side variable.

The various columns of the table show the coefficients from simple and extended versions of the basic regression model (1). All regressions in the various columns include the variables in  $X_i$ . The bottom panel of the table indicates which additional fixed effects were included in the regression.

The regression analysis allows us to reconsider the earnings differences among UZH graduates after controlling for the characteristics we observe in the data. As raw earnings differences are particularly difficult to interpret when comparing (i) males and females; (ii) younger and older cohorts; and (iii) the various faculties, the following discussion focuses on earnings gaps along these three dimensions.

Table 4: Regression Results: UZH Graduates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)
Female	-0.391*** (0.003)	-0.388*** (0.003)	-0.386*** (0.003)	-0.290*** (0.003)			
Non-Swiss	0.007 (0.005)	0.010 (0.005)	0.005 (0.005)	-0.019*** (0.005)	0.035*** (0.005)	-0.015** (0.005)	-0.019*** (0.005)
Entry Age	-0.003*** (0.000)	-0.004*** (0.001)	0.000 (0.000)	0.006*** (0.000)	0.003*** (0.000)	0.006*** (0.000)	0.007*** (0.000)
Degree (baseline lic-MA)							
-BA	-0.249*** (0.010)	-0.203*** (0.010)	-0.220*** (0.010)	-0.211*** (0.010)			
-Dr	0.226*** (0.003)	0.220*** (0.003)	0.231*** (0.003)	0.277*** (0.004)			
Birth Cohort FE	X	✓	✓	✓	✓	✓	X
Gender-specific Birth Cohort FE	X	X	X	X	X	X	✓
Time Since Graduation FE	X	X	✓	✓	X	X	X
Gender-specific Time Since Graduation FE	X	X	X	X	✓	✓	✓
Faculty FE	X	X	X	✓	✓	X	X
Faculty-Degree FE	X	X	X	X	X	✓	✓
<i>N</i> (Person – Years)	194,356	194,356	194,356	194,356	194,356	194,356	194,356
<i>n</i> (Individuals)	30,374	30,374	30,374	30,374	30,374	30,374	30,374
adj. <i>R</i> <sup>2</sup>	0.119	0.120	0.155	0.211	0.202	0.227	0.229

Standard errors in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Notes: The dependent variable is the log of annual earnings. The regression is based on birth cohorts 1960-1990 who obtained their highest degree from the UZH. Earnings observations during years 1992-2017 are considered. Only individuals who are continuously employed on the Swiss labor market during at least one year after graduation and who are no longer enrolled in a Swiss university are considered in the regression. Source: AHV-UZH- and LABB-register.

## 5.1 The gender earnings gap

We start by reconsidering the UZH gender gap. The coefficients of the *Female* dummy in columns 1-4 capture the average gender gap (as we do not allow for gender-specific effects by year since graduation). In column 1, where we control for characteristics  $X_i$  (but not for any fixed effects), the coefficient of the *Female* dummy is 0.391. This means that, holding all other characteristics in  $X_i$  constant female UZH graduates earn 32.4% ( $= 1 - \exp(-.391)$ ) less than their male colleagues.<sup>22</sup> The estimated gender gap does not change much when we introduce birth cohort fixed effects, or (gender-neutral) time-since-graduation fixed effects. However, when we introduce faculty fixed effects in column 4, the female earnings gap drops to 25.2% ( $= 1 - \exp(-.290)$ ). This suggests that gender differences in pay are to a large extent due to the fact that females are over-represented in faculties/study programs where subsequent earnings are low.

**Time-since-graduation profiles by gender** In Figure 10 above we have seen that the raw gender gap strongly increases with time since graduation. This is not taken into account in columns 1-4.<sup>23</sup> In columns 5 and 6 we allow time-to-graduation fixed effects to be gender-specific. This is important, since the analysis of the raw earnings profile suggests that the gender gap strongly widens with time since graduation. In Figure 26, we plot the time-since-graduation fixed-effects obtained in the most comprehensive regression of column 6. We additionally estimate the regression of column 6 using all available observations up to year 20 after graduation. This yields the long-term (20-years) earnings profile of UZH graduates, separately for females and males, by time since graduation.<sup>24</sup>

Figure 26 makes clear that, even after controlling for relevant observable characteristics, the gender gap remains huge. The gender gap is already as large as 20% in the first year after graduation and increases to 29% and 46% after 5 and 10 years, respectively. 20 years after graduation, the gap becomes even 52%.

Figure 26

**Cross-sectional versus longitudinal regressions** Notice that we obtain the coefficients plotted in Figure 26 from a cross-sectional regression. Alternatively, we could estimate a fixed-effects model exploiting the longitudinal information in the data. The fixed-effects model identifies the time-to-graduation profile from earnings changes (“within” individuals), accounting for time-invariant individual heterogeneity. Contrasting the time-to-graduation dummies obtained from

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<sup>22</sup>The percentage difference is calculated as follows. Let us denote by  $Y_f = \exp(E(y_f | X))$  and  $Y_m = \exp(E(y_m | X))$  our average earnings measure (in CHF) for females and males, respectively, once we control for characteristics  $X$ . From the regression, we obtain an estimate for the variable “Female”,  $\eta_f$ , where  $\eta_f = E(y_m | X) - E(y_f | X)$  or  $\exp(\eta_f) = Y_m/Y_f$ . The gender earnings gap – the earnings disadvantage of females relative to males – is then given by  $1 - Y_f/Y_m = 1 - \exp(\eta_f)$ .

<sup>23</sup>In columns 3 and 4 we introduce time-since-graduation fixed effects that do not vary by gender. Hence, while we take into account that earnings change after graduation, these specifications do not allow for gender differences in the effect of time since graduation.

<sup>24</sup>Notice that later data points in Figure 26 are identified only from older cohorts. Since we control for cohort fixed effects in the regression of column 7, these coefficients are informative to the extent that the time-to-graduation gradient does not change across cohorts.

an individual fixed-effects model to those from a cross-sectional regression is a test whether the controls included in the cross-sectional model (all of them are time-constant) capture the relevant (time-constant) individual heterogeneity.

### Figures 27

The graphs in Figure 27 show that cross-sectional and fixed-effects regressions coincide almost perfectly, both for females and for males, suggesting that our cross-sectional regression model does not miss any individual heterogeneity that would be captured by the fixed-effects model. We conclude that the estimated gender-specific earnings profiles are unlikely biased by unobserved time-constant individual heterogeneity.

## 5.2 Earnings trends across cohorts

The regression exercise of this section also allows for meaningful earnings comparisons across cohorts and thereby reveals long-run earnings trends. The birth cohort fixed effects estimated in the regression are informative on shifts in the earnings profile (by time since graduation) across cohort born between 1960 and 1990. We compare cohorts born in the early 1960s to cohorts born in the late 1980s. The former entered the labor market in the mid/late 1980s, the latter in the 2010s. In other words, these cohorts are 25 years apart – a period during which real per-capita incomes in Switzerland grew by about 25%. If earnings of UZH graduates kept pace with Swiss per-capita incomes, we would expect the earnings profiles of cohorts born in the late 1980s to shift up by roughly 25%.<sup>25</sup>

**The shifting earnings profiles across cohorts** The regressions in columns 2-5 estimate birth cohort fixed effects but restrict them to be identical between females and males. Figure 28 plots the birth cohort fixed effects obtained from regression 5, which controls comprehensively for the other characteristics. This tells us how earnings profiles have shifted from cohorts born in the early 1960s to cohorts born in the late 1980s. Because the latter group is on average 25 years younger than the former, any differences in the coefficients reveals to which extent the younger cohorts benefit from economic growth over a period of 25 years.

The graph clearly shows that younger cohorts earn more than older cohorts. The results suggest that the average income difference between graduates from birth year cohort  $t$  and  $t - 1$  is 260 CHF per year or roughly 0.3% per year.<sup>26</sup> This is clearly below the GDP per capita growth of 0.96% during 1992-2017. Instead of 25%, the earnings profile shifted up by only 7.5%.

### Figure 28

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<sup>25</sup>When we say the earnings profile shift up by  $x\%$ , we mean earnings are  $x\%$  higher *at each year* since graduation. Put differently, the conjecture assumes that the earnings gradient by time since graduation remains unchanged.

<sup>26</sup>Notice that the 0.3% measures the shift in the earnings/time-since-graduation profile across cohorts.

**Gender specific cohort trends** The birth cohort fixed effects of Figure 28 are estimated under the assumption that the earnings profile shifts by the same (relative) amount for females and males. However, in almost all labor markets, younger females' earnings have caught up with those of males in recent decades. To check for gender-specific shift in the earnings profile, column 6 of Table 4 allows the birth cohort fixed effects to differ between females and males. In Figure 29, we show the results graphically.

Figure 29

For younger female cohorts, the earnings profile by time since graduation shifts up by a substantial amount. Fitting a trend through the points of Figure 29 suggests that a female in a cohort that is one year younger than another one earns CHF 540 more each year (roughly 0.7% from one vintage to another). However, also female graduates' earnings did not grow as fast as real per-capita incomes in Switzerland. Comparing a female cohort to another one that is 25 years younger, the latter cohort has an earnings profile which is 17.5% above the one of the former cohort. In other words, female UZH graduates achieved only 2/3 of the income growth experienced by the average Swiss resident.

The surprising picture of Figure 29 is an earnings profile of males shifting *down* across cohorts. The downward shift amounts to 150 CHF per year of later birth (roughly  $-0.15\%$ ). In other words, while per-capita incomes grew by 25%, the earnings of male UZH graduates fell by 3.7%.<sup>27</sup> This downward shift in the earnings profile of male UZH graduates is disturbing. While the reasons are unclear – and exploring them is beyond the scope of this report –, it is, nevertheless, interesting to consider a few arguments that may explain this surprising result.

A first argument is that the huge expansion of tertiary education implies that tertiary educated workers nowadays have to do work that was previously performed by less educated workers. (In other words, the demand for tertiary educated workers has not grown *pari passu* with the supply.) A related argument is that, in the past only the most talented acquired a university degree, while nowadays this becomes more prevalent also among the less talented. As a consequence, wages of the tertiary educated have fallen behind. A second argument is based on the much discussed trend of weaker educational attainment among younger males compared to females. The patterns we see in our data could reflect the labor market consequences of the weaker performance in formal education among younger male cohorts. A further argument is related to the nature of recent technological progress during recent decades. This has changed the skill requirements at the workplace with social skills becoming increasingly important, particularly for high-skilled occupations. To the extent that females have a comparative advantage in social skills, women have better chances to end up in good jobs, while this is getting more difficult for men. Clearly, this report cannot address the empirical relevance of these arguments. However, it is interesting to observe that gender-trends among UZH graduates are consistent with these arguments.

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<sup>27</sup>Nota bene: the claim is *not* that earnings of the typical male UZH graduate would not grow over her or his career. It does grow because earnings increase with time since graduation. However, at any given year since graduation, male UZH graduates born in the late 1980s do not earn more in real terms than male UZH graduates born in the early 1960s, despite the 25 years time – and 25 years of economic growth of the aggregate economy – between the two cohorts.

**A closing gender gap?** The evidence in Figure 29 shows that, among younger cohorts, females catch up with males. To see more clearly the implications of this result, Figures 30 and 31 compare the predicted earnings profiles (by time since graduation) for cohorts born in 1960-65 to those of cohorts born in 1985-90.

Figure 30 and 31

The red line in Figures 30 and 30 depict predictions for the 1985-90 cohorts. The dashed line after year  $t = 5$  indicates that data points after this are out-of-sample predictions (assuming that the time-since-graduation profiles of younger cohorts follow the one of the older cohorts in the year to come).

Figure 30 shows the upward shift in the earnings profile for females and the (slight) downward shift for males. The figure makes clear that, even for the younger cohorts, the female earnings profile is far below the one of males. It also shows that the speed of gender convergence is rather slow. The difference between the cohorts reflects progress over a period of 25 years. If female earnings approach those of males also in future decades, it will take (at least) another century until gender equality among UZH graduates is achieved. Figure 31 shows that gender earnings gap for the two cohorts. While the gap has narrowed substantially during the first years since graduation (by about 15 percentage points, or by 50% or more during the first 5 years after graduation), it needs to be seen whether the gap also narrows in later years. The out-of-sample predictions of Figure 31 suggest that, later in the life cycle (12 years after graduation or later), the gender gap will be larger than 40% even among the 1985-1990 birth cohorts.

### 5.3 Comparing earnings across faculties

Finally, we reconsider earnings differences across faculties through the lens of our regression analysis. For ease of comparison Figure 32 normalizes average earnings to unity and shows the relative deviation of the various faculties from the UZH average. The left (blue) bar plots the average raw earnings as observed in the data, the right (red) bar shows the corresponding deviation after controlling for observed characteristics. The coefficients are estimated with the model in column (5), which controls for birth cohort effects and gender-specific time-to-graduation fixed effects.

Figure 32

It turns out that, after controlling for compositional differences across faculties, the adjusted faculty-earnings gaps remain large. MeF and WWF graduates achieve earnings about 20% higher than the UZH average, while RWF graduates are 5% above and MNF 10% below the UZH average. PhF, ThF and VSF graduates earn roughly 20% below the UZH average. It is worth noting that the adjusted earnings gaps do not differ very much from the raw earnings gaps.

It is also important to remember that Figure 32 displays differences in earnings, not adjusted for differences in hours worked. While the adjusted earnings gaps control, inter alia, for the



percentage of females (females work on average fewer hours than males), it may well be that the PhF graduates work fewer hours than MeF graduates. In other words, the differences in full-time equivalent earnings may be lower than those shown in Figure 32.

A final issue relates to the highest degree obtained. The coefficients shown in Figure 32 are estimated from the regression in column 5 of Table 4. This regression does *not* control for the highest degree. The reason is that faculties differ in the relative value of an MA/lic degree relative to a doctoral degree. For instance, the majority of MeF or VSF graduates have a doctoral degree, because the labor market does not reward lower degrees very much. In contrast, only relatively few WWF graduates obtain a PhD, because a MA already yields high earnings on the labor market.

It is important to keep the difference in the composition of degrees – and the corresponding study durations – in mind, when interpreting the regression-adjusted faculty earnings differences. In Appendix Tables A.7 and A.8, we describe the differences across faculties in the distribution of degrees and the average study duration among UZH students. Table A.8 shows that, across all birth cohorts and all faculties, the average study duration (from university entry to the highest degree) was 8.2 years. The duration is longest among MeF and ThF graduates, equal to 9.1 and 9.6 years, respectively. This means, the high earnings achieved by MeF graduates require many years of study. (Though we have to keep in mind that MeF students earn more labor income than students from other faculties during their study years.) While long study duration might partly explain the high earnings for MeF graduates, the patterns are less clear for the other faculties. WWF graduates have the lowest study duration, 6.7 years, but earn substantially above the UZH average. In contrast, study duration of PhF-, ThF- and VSF-graduates are disproportionately long (9.0, 9.6, and 8.7 years, respectively), but graduates from these faculties earn substantially lower labor incomes after graduation.<sup>28</sup>

Appendix Table A.7 shows the distribution of degrees across faculties. Across all faculties and cohorts, the share of graduates whose highest degree is a Dr/PhD or a MA-lic, is 31.9% and 63.6%, respectively. The BA program was no option for the 1960s and 1970s cohorts but has become important among the 1980s birth cohorts: 12.1% of UZH graduates have left the university with a BA (and are no longer enrolled at a university at the end of the observation period). However, there are big differences across faculties. In the MeF and VSF, the share with a doctoral degree is higher than 85%, while it is 20.5%, 13.3%, 16.4% and 8.5% among RWF, PhF, ThF and WWF students, respectively; MNF-students are in between, with 43.7% having obtained a doctoral degree.<sup>29</sup>

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<sup>28</sup>Appendix Table A.8, also splits up study duration by cohorts. It turns out that the average duration (until award of the highest degree) has decreased across cohorts. This holds for all faculties alike. The average study duration among all UZH students was 9.5 years for the 1960s cohorts and decreased to 8.4 and 6.9 years for the 1970s and 1980s cohorts, respectively. (For the 1980s cohorts, we have to keep in mind that the number may be biased downwards, as some students may enroll in continuing program and achieve a higher degree in the future.) The table also splits up students into those who never changed the study program and those who changed at least once (either the study program, the university or both). Not surprisingly, changers have substantially longer study durations.

<sup>29</sup>It should be noted, though, that the share among the 1980s cohorts is biased towards lower degrees to the extent that students have not yet completed their educational career. The calculation of the numbers in the table are based on the universe of graduates who are no longer enrolled in further education at the end of the observation period (2017). Some individuals may not have completed their student career and will come back later to achieve a BA or PhD in the future. This is a potential problem for the 1980s cohorts (the cohort 1989 is 28 years old in the year 2017),

## 6 UZH versus other Swiss universities

The above analysis was confined to UZH graduates (whom we can observe over long periods of time). We now go one step further and compare the labor market success of UZH graduates to graduates from other Swiss universities. The analysis here is somewhat less comprehensive here, because LABB- and AHV registers can only be linked since the year 2012. In other words, graduates' earnings and employment histories can only be studied for graduation cohorts 2012-2016.<sup>30</sup>

Since our data end in 2017, we can provide evidence only on short-run labor market outcomes for up to five years after graduation. Moreover, it is important to keep in mind that the graduation cohorts we can use for the analysis below is an “unbalanced” panel: graduation cohort 2012 is observed during years 1–5 after graduation (2013, ... , 2017), cohort 2013 only for years 1–4 (2014, ..., 2017), and so on. The youngest graduation cohort is the one of 2016, for which we have only information for year 1 after graduation.

### 6.1 Descriptive analysis of earnings and employment

In a first step, we start with comparing raw earnings and employment of graduates from the UZH and other Swiss universities. In a second step, we also provide a regression analysis allowing us more detailed earnings comparisons across graduates from different Swiss universities.

**Earnings of continuously employed graduates** In Figure 33 we look at the raw earnings of UZH graduates and of graduates from other Swiss universities. Just like before, the comparison is based on earnings on the Swiss labor market by continuously employed workers who are no longer enrolled at a Swiss university. Interestingly, it turns out that UZH graduates are quite representative for the average graduate from Swiss universities. Between year 1 and 5 average (log) earnings of the two groups are almost identical.

Figure 33

Inspection of earnings differentials by nationality reveals that, among these recent cohorts, the non-Swiss nationals make somewhat more money than the Swiss. This holds for graduates both from the UZH and other Swiss universities. Figure 34 shows that average (log) earnings among the non-Swiss are up to 10% higher than those of their Swiss colleagues throughout the first five years following graduation. There are several possible explanations: the non-Swiss may choose study programs paying more on the labor market, or there may be selection: the best foreign students remain in the country and take advantage of the high wages they can earn on the Swiss labor market. We will address these issues in our regression analysis below, where our results account for compositional differences across the groups we are interested in.

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but not for the 1970s and 1960s cohorts.

<sup>30</sup>Recall that the matching of the UZH students register data to the AHV data is based on the student's names and exact date of birth. Therefore, we could study the labor market success of UZH graduates also for graduation cohorts before 2012. We cannot do a similar matching for the other Swiss universities.

#### Figure 34

In contrast to the earnings gap by nationality, the gender earnings gap among UZH graduates does not differ much from the one observed at other Swiss universities. 5 years after graduation, the average (log) earnings are around CHF 100,000 for males and around CHF 75,000 for females, the same for UZH and other Swiss-university graduates.<sup>31</sup>

#### Figure 35

**Share of continuously employed graduates: UZH versus other Swiss universities** Figures 33-35 are based on continuously employed graduates. This raises the question how many graduates were actually continuously employed on the Swiss labor market after graduation. Interestingly, in the employment dimension there is a substantial difference: UZH graduates have a significantly stronger attachment to the Swiss labor market. The percentage continuously employed in years 1-5 after graduation is 5-10 percentage points higher among UZH graduates compared to graduates from other Swiss universities.

#### Figure 36

It turns out that the employment gap of Figure 36 is driven by the share of non-Swiss students rather than by differences in employment behavior. The graphs in the two panels of Figure 37 show employment rates within gender-nationality groups which are very similar and almost identical from year 3 after graduation. (Only non-Swiss female UZH graduates have slightly higher employment rates). The higher overall UZH employment rates are due to different compositions with respect to nationality: 24% of UZH graduates are non-Swiss, while the foreign share among graduates from other Swiss universities is as large as 38%. Since the non-Swiss are less attached to the Swiss labor market, overall employment rates are lower at other Swiss universities compared to those at the UZH.

#### Figures 37

**Differences across 12 Swiss universities** Finally, we compare labor market outcomes across universities. In Table 3 we look at the raw earnings difference of graduates, separately for all the 12 Swiss universities. For ease of comparison, we set the Swiss-wide average to unity, the bars indicate the deviation of a particular university from the Swiss average.

Just like before, we focus on mean log earnings as our earnings measure. Average earnings among all Swiss graduates amounted to 68,306 CHF in year 1 and 86,940 CHF in year 4 after graduation. Consistent with Figure 33 above, the earnings of UZH graduates are very close to the Swiss average, both in year 1 and in year 4 after graduation. Table 3 also shows that there

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<sup>31</sup>Notice the difference of the earnings *levels* documented in Figure 33 for the Swiss-universities sample to the UZH sample of Figure 2 above. Both graphs look at earnings during the year immediately following the year of graduation, though the UZH sample includes older graduates who obtained their earnings during the years 1992-2017, while in the Swiss-universities sample only earnings observations over the years 2012-2017 are considered. This reflects the trend toward lower earnings among male graduates (see the discussion in section 5.2 above).

Table 5: Relative Earnings of Graduates from Swiss Universities

<i>University</i>	<i>Earnings in t=1</i>	<i>Earnings in t=4</i>
All Unis (CHF)	68,306	86,930
Zürich	1.002	1.005
Basel	0.999	0.994
Bern	1.006	0.993
Freiburg	0.901	0.897
Genf	0.910	0.941
Lausanne	0.870	0.944
Luzern	0.854	0.875
Neuenburg	0.739	0.774
St. Gallen	1.345	1.378
Tessin	0.708	0.747
ETH Lausanne	1.103	1.062
ETH Zürich	1.164	1.123

*Notes:* Only continuously employed workers who graduated between 2012 and 2016 are considered. *Source:* AHV- and LABB-register.

are quite large differences in average earnings across universities. Highest in the ranking is the University of St. Gallen, followed by ETH Zürich and EPF Lausanne, whose graduates earn 37.8%, 12.3%, and 6.2%, respectively, above the Swiss average in year 4 after graduation. Graduates from the universities Basel, Berne, Geneva and Lausanne rank close to the Swiss-wide average, while the earnings of graduates from Fribourg and Lucerne are 10% or more below, and those of the universities Ticino and Neuchatel more than 20% below the Swiss average.

Recall that the average earnings measure here is again the mean log earnings. However, looking at mean earnings or median earnings does not change the measured differences across universities very much. In the appendix Table A.9, we show that, for instance, average earnings in year-4 amount to CHF 86,930 when we use mean log earnings; median and mean earnings are CHF 95,119 and CHF 97,318, thus somewhat higher than mean (log) earnings. However, the university ranking does not depend on the particular measure. The Appendix table also shows graduates' relative earnings in year 1 after graduation. Irrespective of the particular earnings measure used, UZH earnings rank very close to the Swiss average. Also the relative position of the other Swiss universities does not change much. Put differently, all earnings measures indicate that graduates' earnings hinge a lot upon the university from which they got their degree.

## 6.2 Results from regression analyses

The above evidence focuses on raw earnings and employment data, limiting cross-university comparisons. For instance, the University of St. Gallen is strongly dominated by graduates in

Business and Economics thus obtaining degrees which generate high earnings on the Swiss labor market. In contrast, the UZH is a “full” university which offers study programs in all areas. Swiss universities also differ in other dimensions, such as the share of females (which is high at the UZH and low in St. Gallen), and the percentage non-Swiss students. Comparing graduates’ labor market outcomes across universities needs to take these differences into account.

In what follows, we perform regression analyses similar to the regression model (1) that we implemented for UZH graduates. More specifically, the regression we run on earnings for all Swiss university graduates are (variants of) the following OLS regression

$$y_{ic\tau} = X_i\eta + \alpha_c + \beta_\tau + \gamma_F + \delta_U + \varepsilon_{ic\tau}. \quad (2)$$

For simplicity, we use the same notation here as we used in regression model (1) above for the UZH sample. The main difference between models (1) and (2) is that, in the latter, we include university fixed effects,  $\delta_U$ , in addition to the variables and fixed-effects we also included in model (1). Clearly, the university fixed-effects are of primary interest as they capture “adjusted” earnings differences across universities, i.e. the remaining earnings differences once we control for differences in observable characteristics.

For completeness, we list the notation for the variables and coefficients in regression model (2):

- $y_{ic\tau}$  denotes log annual earnings of individual  $i$  of birth cohort  $c$  in year  $\tau$  after graduation.
- $X_i$  is a vector of control variables: sex, nationality, age at university entry, indicators for highest degree BA, lic/MA, and Dr/PhD, respectively, and  $\eta$  is the corresponding vector of coefficients.
- $\alpha_c$  are birth-cohort fixed effects (with  $c = 1960, \dots, 1990$ ).
- $\beta_\tau$  are year-since-graduation fixed effects (with  $g = m, f$  and  $\tau = 1, \dots, 20$ ).
- $\gamma_F$  are faculty fixed effects (with  $F = ThF, RWF, WWF, MeF, Vetsuisse, PhE, MNF$ ).
- $\delta_U$  are university fixed effects (with  $U = University\ of\ Basel, Berne, Fribourg, Geneva, Lausanne, Lucerne, Neuchatel, St.Gallen, Ticino, Zurich, ETHZ, EPFL$ ).
- $\varepsilon_{ic\tau}$  is an error term (mainly capturing unobserved heterogeneity).

**Differences in graduates’ earnings across Swiss universities** As mentioned above, the raw earnings differences across Swiss universities are large. But some of these differences are clearly driven by differences in the composition of the pool of graduates that enter the Swiss labor market. The strikingly high earnings advantage of graduates from the University of St. Gallen – which amounts to almost 40% relative to the Swiss average – results from the disproportionate share of business/economics students and the low female share (only 1 in 3 St. Gallen graduates is female, compared to 1 in 2 in the Swiss average).

Table 6: Regression Results: Graduates from Swiss Universities

	(1)	(2)	(3)	(4)	(5)	(6)
	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)	ln(earnings)
Female	-0.154*** (0.004)	-0.152*** (0.004)	-0.154*** (0.004)	-0.126*** (0.004)		
Non-Swiss	0.010* (0.005)	0.037*** (0.005)	0.030*** (0.005)	0.031*** (0.005)	0.031*** (0.005)	0.031*** (0.005)
Entry Age	-0.001* (0.000)	-0.007*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
Degree (baseline lic-MA)						
-BA	-0.297*** (0.006)	-0.261*** (0.006)	-0.289*** (0.006)	-0.285*** (0.006)	-0.285*** (0.006)	
-Dr	0.238*** (0.004)	0.233*** (0.005)	0.247*** (0.005)	0.206*** (0.005)	0.206*** (0.005)	
University FE	✓	✓	✓	✓	✓	✓
Birth Cohort FE	X	✓	✓	✓	✓	✓
Time Since Graduation FE	X	X	✓	✓	X	X
Gender-specific Time Since Graduation FE	X	X	X	X	✓	✓
Faculty FE	X	X	X	✓	✓	X
Faculty-Degree FE	X	X	X	X	X	✓
<i>N</i> (Person – years)	106,409	106,409	106,409	106,409	106,409	106,409
<i>n</i> (Individuals)	43,303	43,303	43,303	43,303	43,303	43,303
adj. <i>R</i> <sup>2</sup>	0.117	0.127	0.150	0.182	0.182	0.184

Standard errors in parentheses, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Notes: The dependent variable is the log of annual earnings. The regression is based on all graduates who obtained their highest degree from a Swiss university during 2012-2016 with earnings observations during years 2012-2017. Only individuals who are continuously employed on the Swiss labor market and who are no longer enrolled in a Swiss university are considered in the regression. Source: AHV- and LABB-register.

The estimated university fixed-effects,  $\delta_U$ , measure the earnings differences across universities once we account for these observable characteristics. In Figure 38 we show these effects relative to average earnings of graduates from all Swiss universities. Interestingly, it turns out that controlling for observable characteristics improves the UZH ranking: UZH graduates earn 1.3% more than the Swiss average. Also, the overall ranking changes somewhat: ETHZ graduates achieve the highest pay, followed by St. Gallen- and EPFL-graduates. The UZH ranks at position 4, and is 3.5 p.p. and 4.8 p.p. ahead of Lucerne and Fribourg, respectively, who rank on positions 5 and 6.

Figure 38

There are several reasons why the UZH moves up in the earnings ranking, once we account for the composition of the student pool. At the UZH, the percentage females is above and the share of the non-Swiss is below the Swiss average. Because females earn substantially less than males and the non-Swiss earn somewhat more than the Swiss, the UZH moves up when accounting for these differences. Another reason is that the share of graduates with BA degree is substantially higher at the UZH (15.4%) than the Swiss average (10.1%), while the percentage doctorates is somewhat below average (20.3% compared to 22.0%).

**The gender gap at UZH vs other Swiss universities** Finally, we want to highlight the differences in the gender earnings gap among graduates from the UZH compared to other Swiss universities. Female and male students chose very different study programs with females being underrepresented in study programs that yield higher pay on the labor market. In order to check whether the UZH gender gap is larger or smaller than the Swiss average, we interact the female dummy with an UZH dummy. Figure 39 shows the result graphically.

Figure 39

The gender gap among UZH graduates is equal to 13.7% and somewhat higher than it is (on average) across the other Swiss universities (11.3%). Notice that the gender gap calculated here reflects the earnings difference between females and males during the first years after graduation. During these years, the gender gap is still relatively small (and builds up in the later years, see for instance, Figure 29 above).

## 7 Conclusions

The study breaks new ground by linking UZH student register data as well as data from longitudinal Swiss education register (LABB) to the Swiss social security data (AHV) to explore how UZH fare on the Swiss labor market. Linking these data sources provides with an informative data set to shed detailed light on the labor market success of UZH graduates.

Our basic conclusion is that UZH graduates do well on the Swiss labor market. In 2015, the average employed UZH graduate earned almost 60% more than the average employed Swiss worker. The data do not indicate that UZH graduates have severe problems finding a suitable job on the Swiss labor market. The majority of those not employed on the *Swiss* labor market are non-Swiss students returning back home or making a career elsewhere; and only few draw unemployment insurance benefits.

While average earnings are high, the data indicate high earnings inequality among UZH graduates. In particular, there are large differences across graduates from different faculties. MeF and WWF graduates earn 20% more than the average UZH student, while PhF, ThF and VSF earn 20% below the UZH average. Earnings of RWF graduates are somewhat above and those of MNF graduates somewhat below the UZH average.

UZH students do also relatively well compared to students from other Swiss universities. UZH graduates earn slightly more than graduates from the other Swiss universities. Their earnings are 1.3% higher than the Swiss average. In terms of earnings achieved on the Swiss labor market, UZH graduation ranks fourth – after ETHZ, Uni St. Gallen and EPFL.

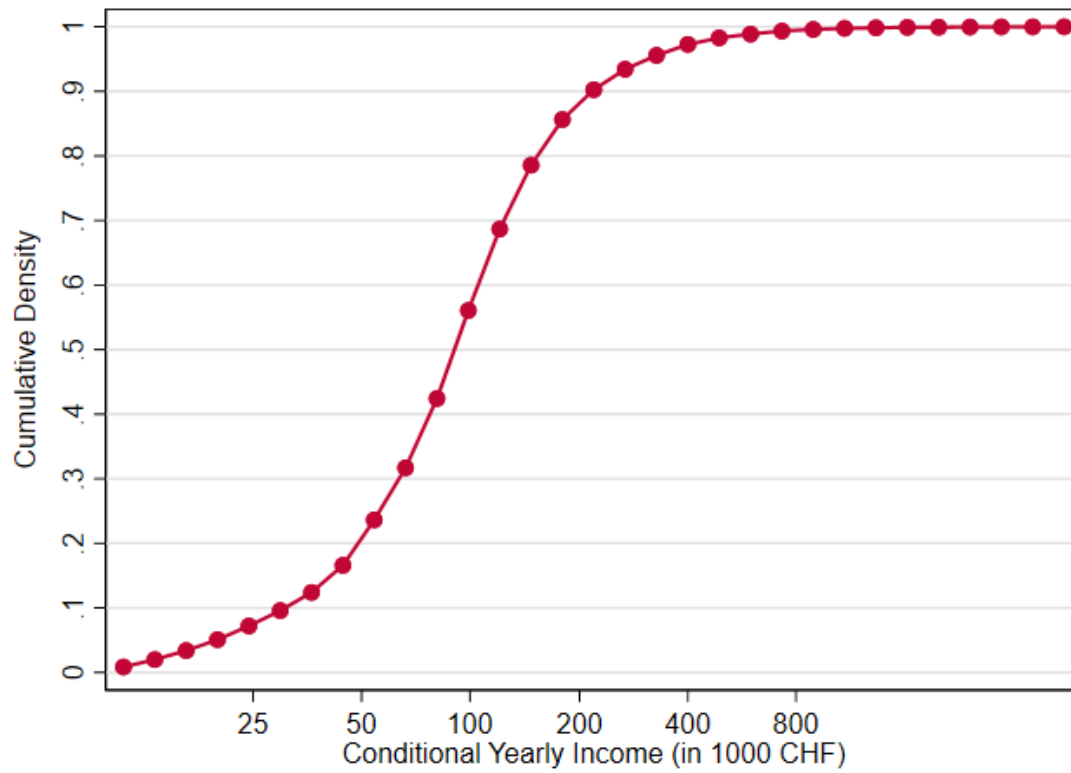
We also document that there are huge differences in earnings between female and male UZH graduates. While the earnings gradient of male graduates is steeply rising between years 1 and 10 after graduation, the earnings gradient of females flattens 4 years after graduation. 10 years after graduation, the gender earnings gap is 50%. Somewhat more than half of this gap is due to women working fewer hours. The remainder of the difference reflect females' study choices and/or a glass ceiling.

Finally, longer-term comparisons reveal that females UZH graduates catch up to those of males, but convergence is slow. Equally strikingly is the fact the earnings of male UZH did not keep pace with earnings growth in the aggregate economy. At any given year since graduation, (inflation-adjusted) earnings of cohorts born in the 1980s are 3% *below* the earnings of cohorts born in the 1960s. Had the earnings of UZH graduates shifted up *pari passu* with 1% per-capita income growth of Switzerland, we would have expect the earnings of the 1980s cohorts to be 20% *higher* than those of the 1960s cohorts.



## Figures

Figure 1: THE EARNINGS DISTRIBUTION OF UZH GRADUATES IN 2015



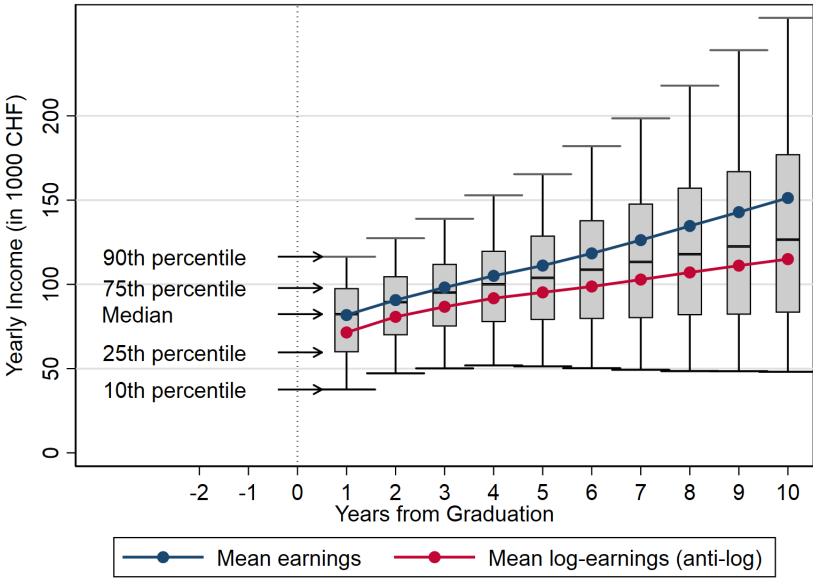
*Notes:* The figure shows the cumulative distribution of AHV-taxable earnings in 2015. Only continuously employed workers born 1960-1990 who obtained their highest degree from the UZH are considered (n=37,334). All earnings are measured in 2019 CHF. Data source: AHV-, UZH- and LABB-register.

Figure 2: MEAN (LOG) ANNUAL EARNINGS, BY YEAR SINCE GRADUATION



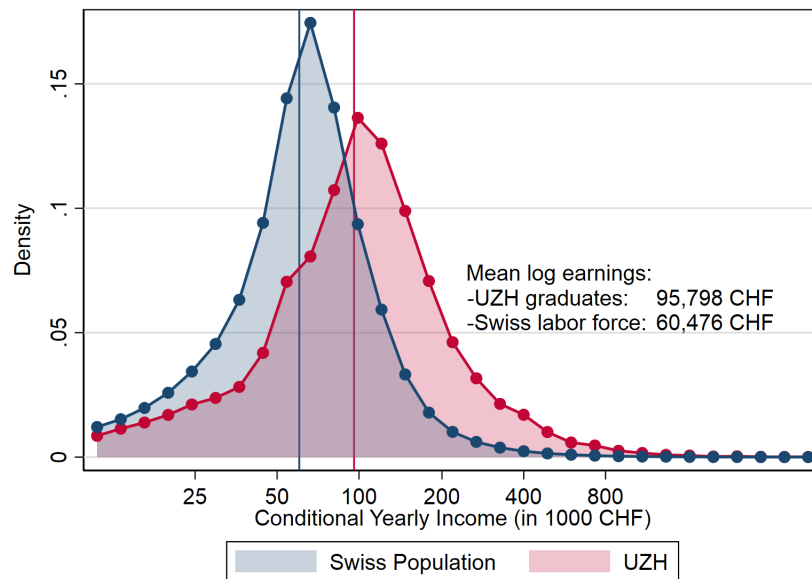
Notes: : The figure shows average yearly AHV-taxable earnings of continuously employed workers born 1960-1990 during the years 1992-2017. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observation without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 3: EARNINGS DISPERSION AMONG UZH GRADUATES, BY YEAR SINCE GRADUATION



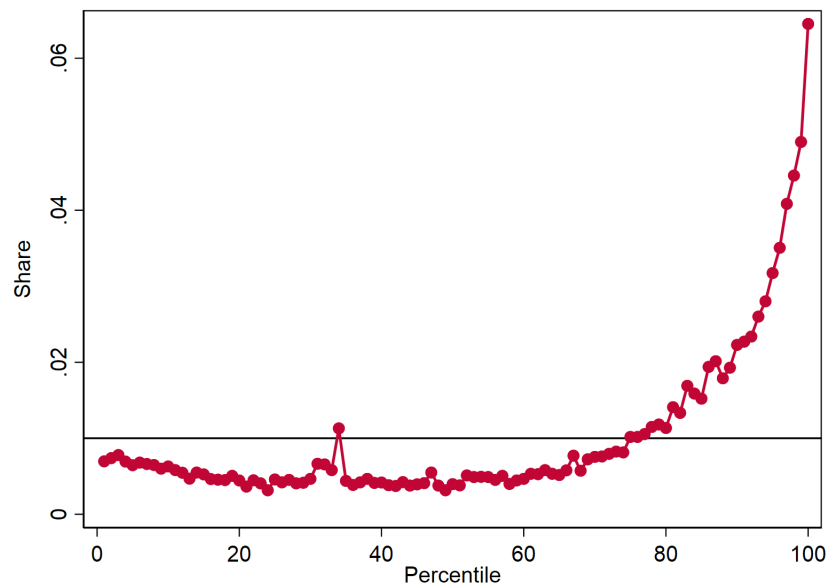
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers born 1960-1990 during the years 1992-2017. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). Data source: AHV-, UZH- and LABB-register.

Figure 4: THE 2015 EARNINGS DISTRIBUTION OF UZH GRADUATES AND ALL SWISS WORKERS



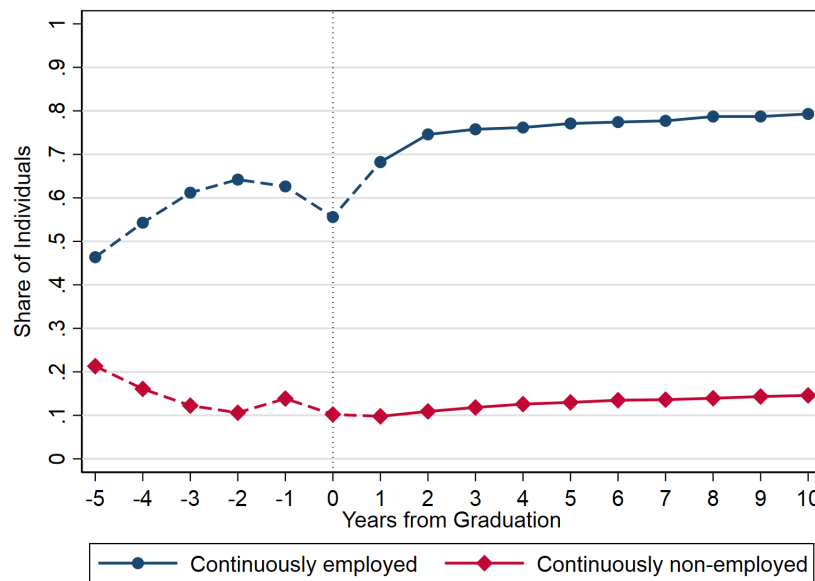
Notes: The figure shows the frequency distribution of AHV-taxable earnings in 2015. Only continuously employed workers born 1960-1990 are considered (n=37,334 for UZH graduates; n=2,767,101 for all Swiss workers). All earnings are measured in 2019 CHF. Data source: AHV-, UZH- and LABB-register.

Figure 5: UZH GRADUATES IN THE 2015 SWISS EARNINGS DISTRIBUTION



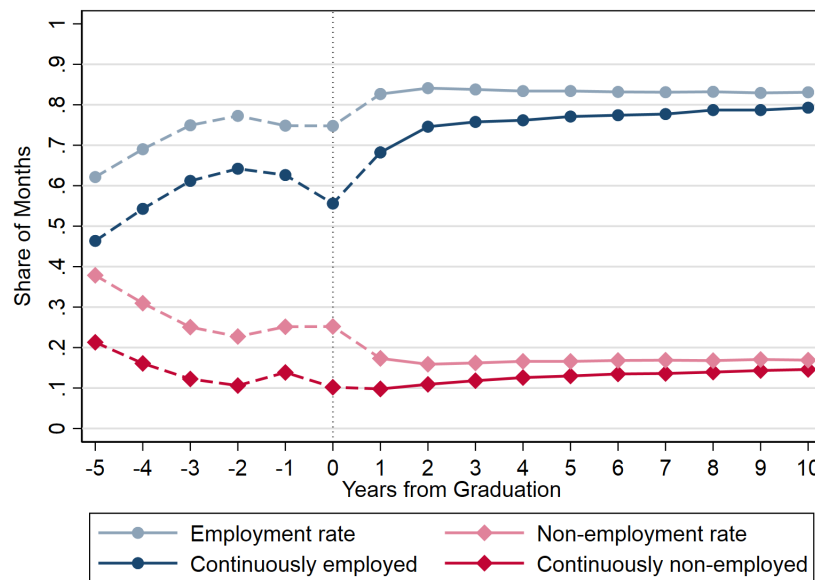
Notes: The figure shows the frequency of UZH graduates in the percentiles of the overall distribution of AHV-taxable earnings in 2015. Only continuously employed workers born 1960-1990 are considered (n=37,334 for UZH graduates; n=2,767,101 for all Swiss workers). All earnings are measured in 2019 CHF. Data source: AHV-, UZH- and LABB-register.

Figure 6: SHARE OF CONTINUOUSLY EMPLOYED AND NON-EMPLOYED, ALL UZH GRADUATES



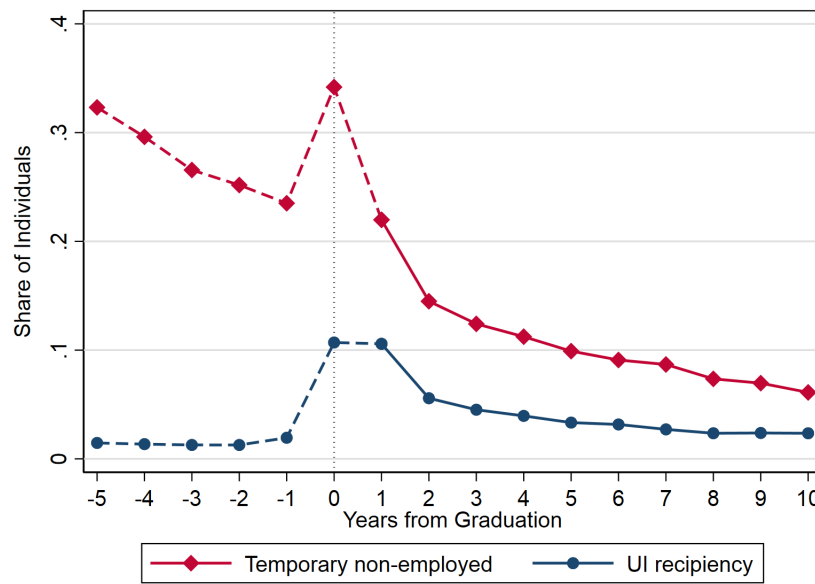
Notes: The figure shows the share of the continuously employed and the share of continuously non-employed (= employed or non-employed in each month of the calendar year) among UZH graduates. The shares are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 7: EMPLOYMENT AND NON-EMPLOYMENT RATES, ALL UZH GRADUATES



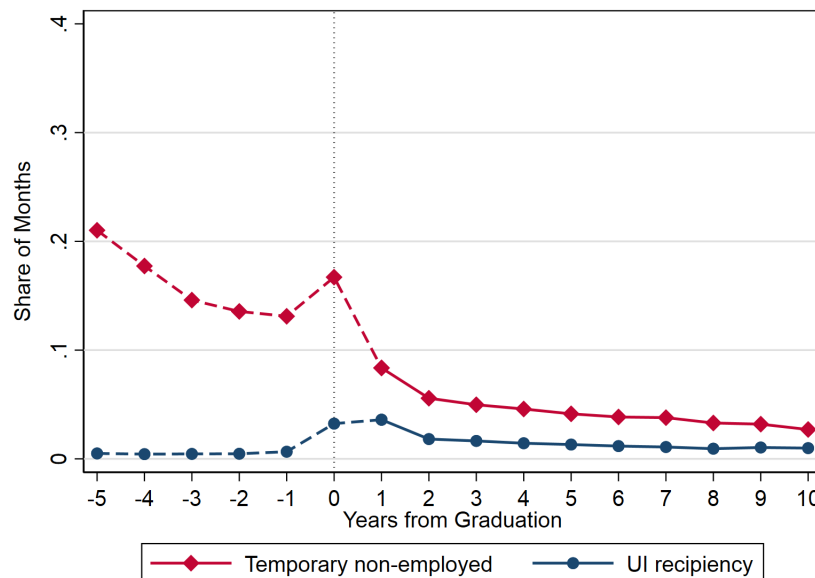
Notes: The figure shows the average employment rate (= average #months employed / 12) among all UZH graduates; and the percentage continuously employed (= share of individuals employed all 12 months of the year) among all UZH graduates. Similarly, for non-employment. The graphs are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 8: SHARE OF TEMPORARILY NON-EMPLOYED AND UI BENEFIT RECIPIENTS



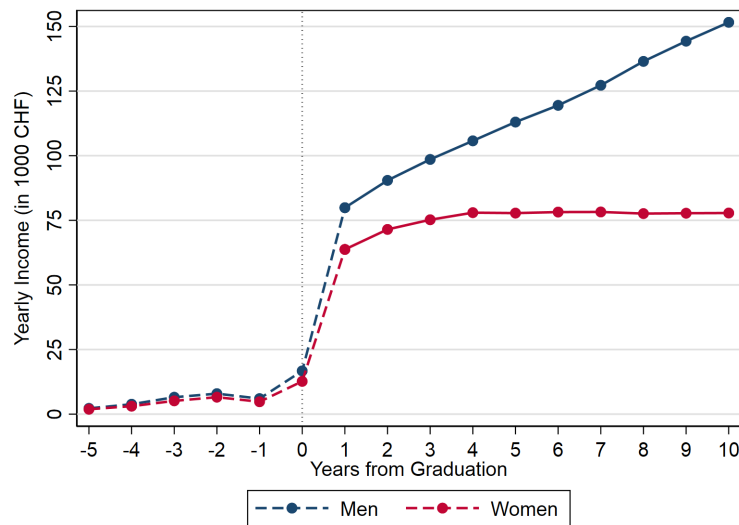
Notes: The figure shows the percentage UZH graduates who were temporarily non-employed or UI recipients in the respective year. (An individual is “temporarily non-employed” if he or she was non-employed at least 1 month but less than 12 months during the respective year.) The graphs are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 9: TEMPORARY NON-EMPLOYMENT AND UI RECIPIENCY RATES



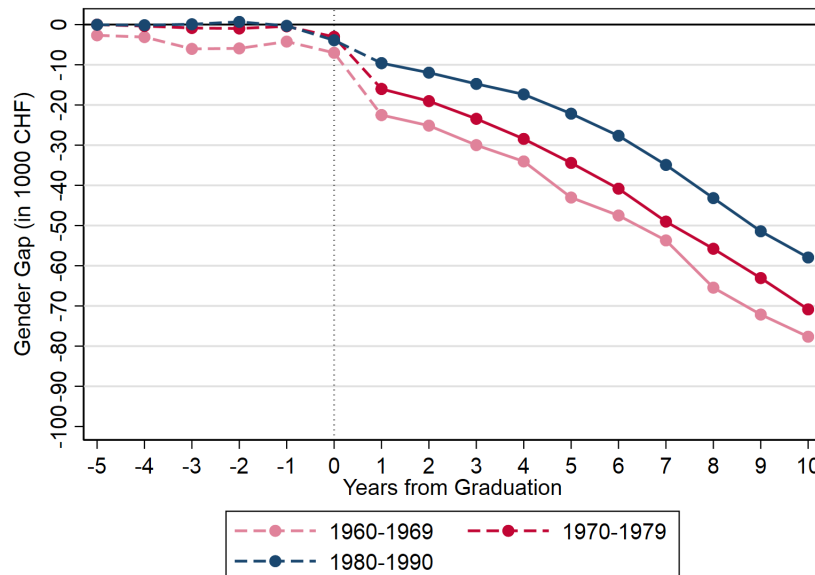
Notes: The figure shows the temporary employment rate (= #months employed / 12) among all UZH graduates. The temporary non-employment rate is the product of (i) the fraction of months spent in non-employment by individuals who were employed at least 1 month but less than 12 months during the respective year times the (ii) percentage of temporarily non-employed individuals. The UI reciprocity rate is the share of months in which individuals received UI benefits. The graphs are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 10: EARNINGS OF FEMALE AND MALE UZH GRADUATES, BY YEAR SINCE GRADUATION



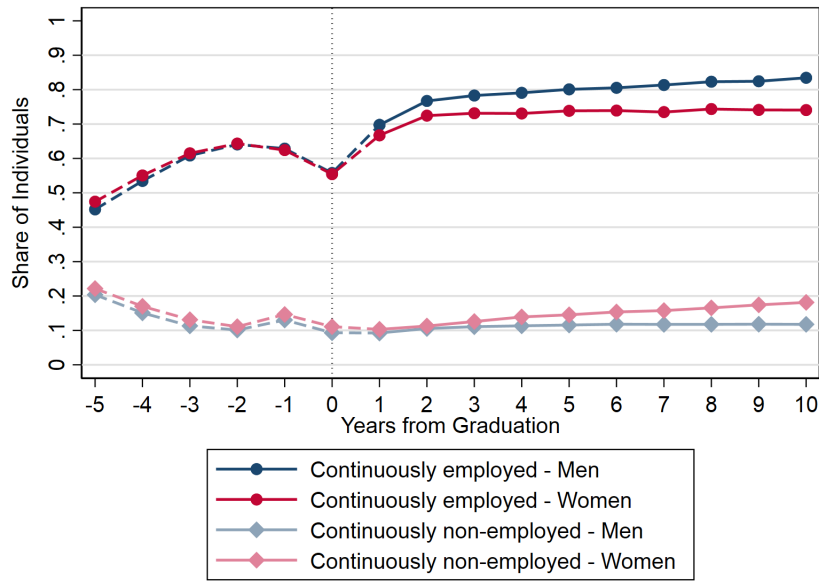
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers born 1960-1990 during the years 1992-2017. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observation without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 11: EARNINGS DIFFERENCES (FEMALE - MALE), UZH GRADUATES, BY COHORT



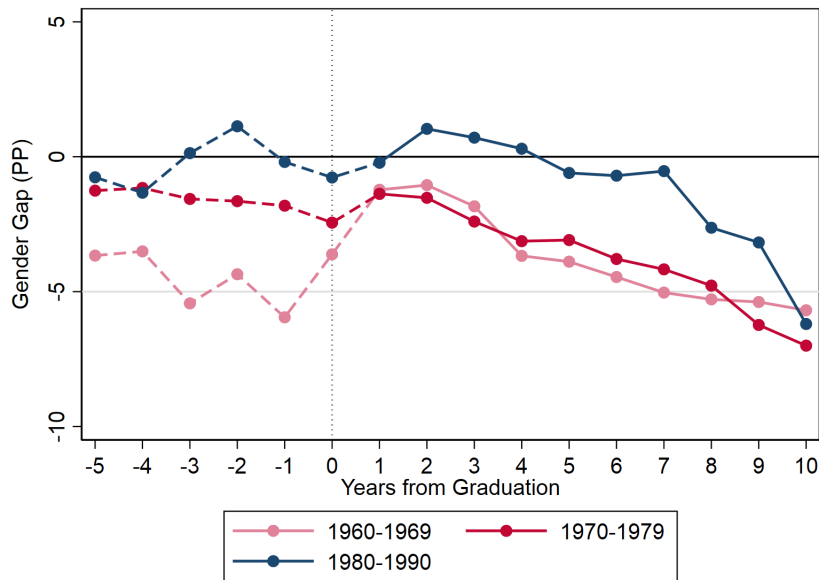
Notes: The figure shows the absolute difference in average yearly AHV-taxable earnings of continuously employed female and males, by cohorts. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observation without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 12: GENDER DIFFERENCES IN THE SHARE OF CONTINUOUSLY EMPLOYED GRADUATES



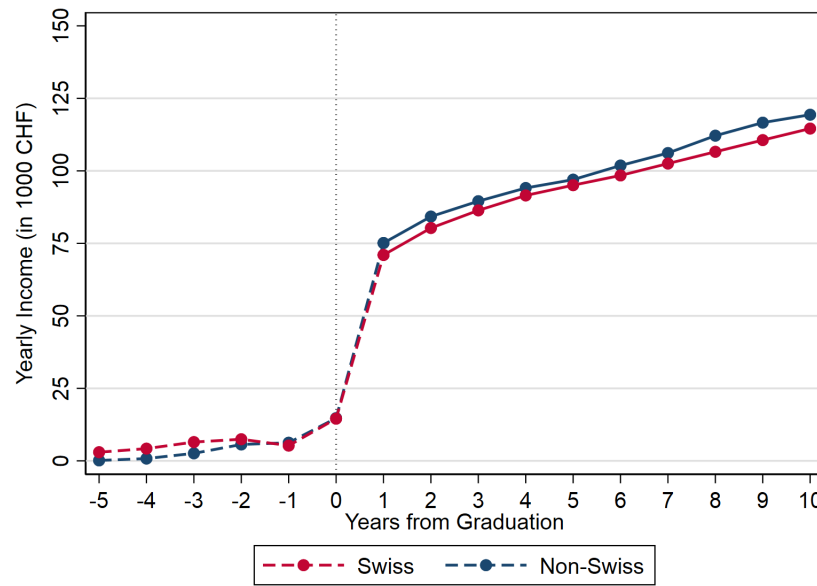
Notes: The figure shows the share of the continuously employed and the share of continuously non-employed (= employed or non-employed in each month of the calendar year) among UZH graduates. The shares are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 13: THE GENDER GAP IN EMPLOYMENT AMONG UZH GRADUATES, BY COHORT



Notes: The figure shows the percentage-point difference between females and males in the share of the continuously employed among UZH graduates. The shares are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

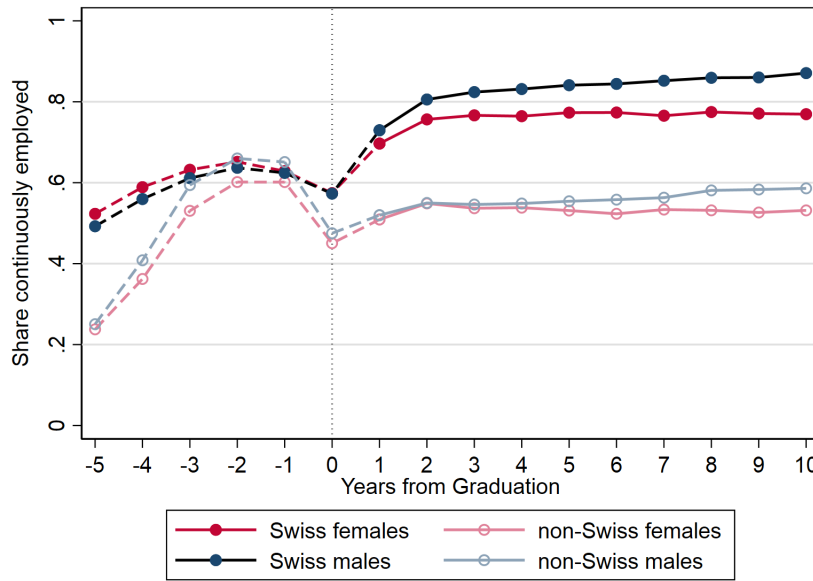
Figure 14: EARNINGS OF SWISS AND NON-SWISS GRADUATES



Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers born 1960-1990 during the years 1992-2017. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to  $t = 0$  all person-year observations are included (for person-year observation without any earnings, we set log earnings to zero). From  $t = 1$  onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

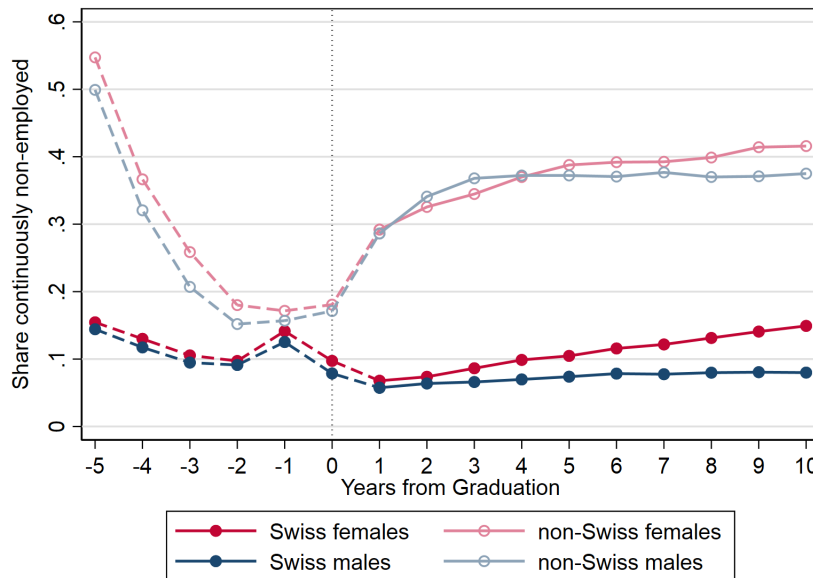


Figure 15: PERCENTAGE CONTINUOUSLY EMPLOYED, BY GENDER AND NATIONALITY



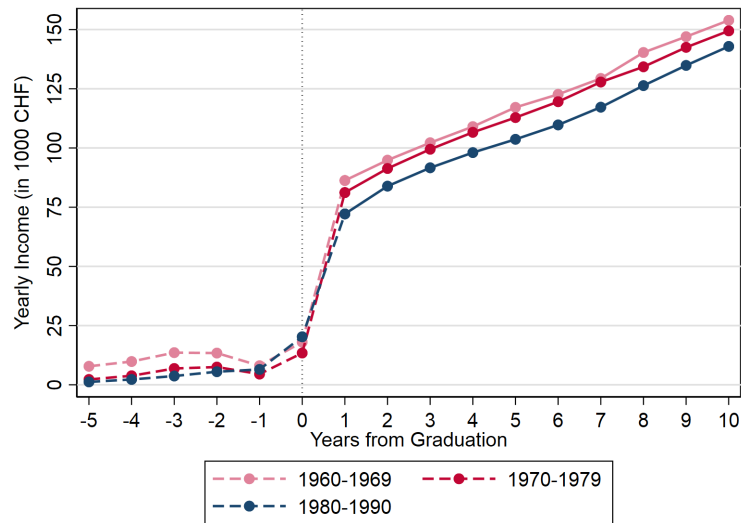
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year) among different groups of UZH graduates. The shares are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 16: PERCENTAGE CONTINUOUSLY NON-EMPLOYED, BY GENDER AND NATIONALITY



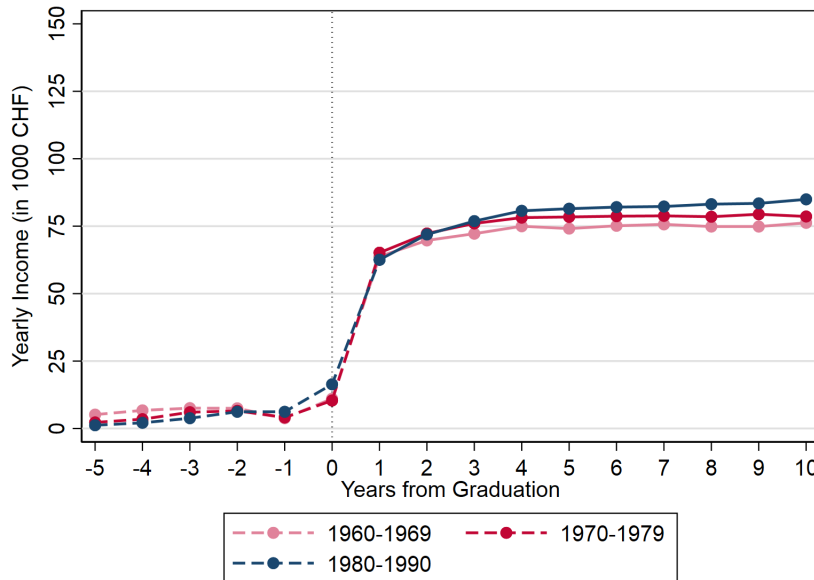
Notes: The figure shows the share of the continuously non-employed (= non-employed in each month of the year) among different groups of UZH graduates. The shares are based on cohorts born 1960-1990 during the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 17: EARNINGS OF MALE UZH GRADUATES, BY COHORT



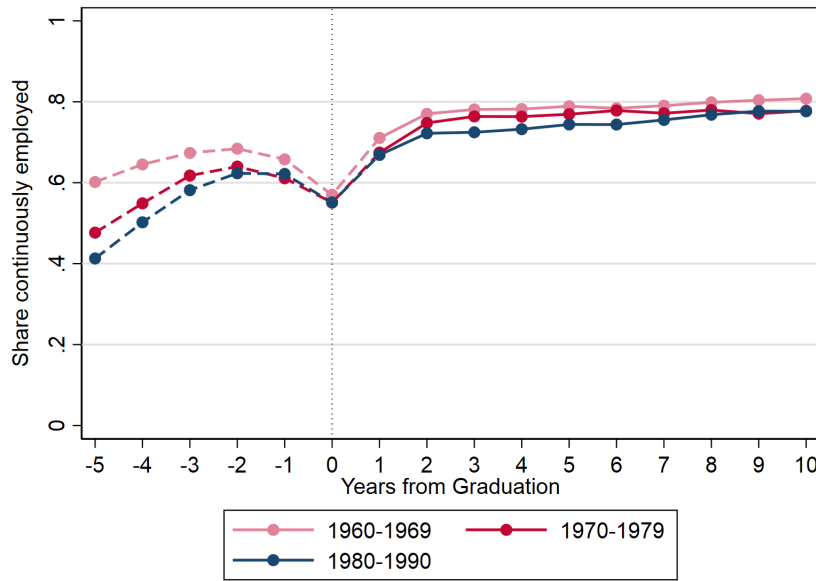
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed male workers, by cohort. Only UZH graduates who obtained their highest degree from the UZH are considered (n=15,393). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observations without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 18: EARNINGS OF FEMALE UZH GRADUATES, BY COHORT



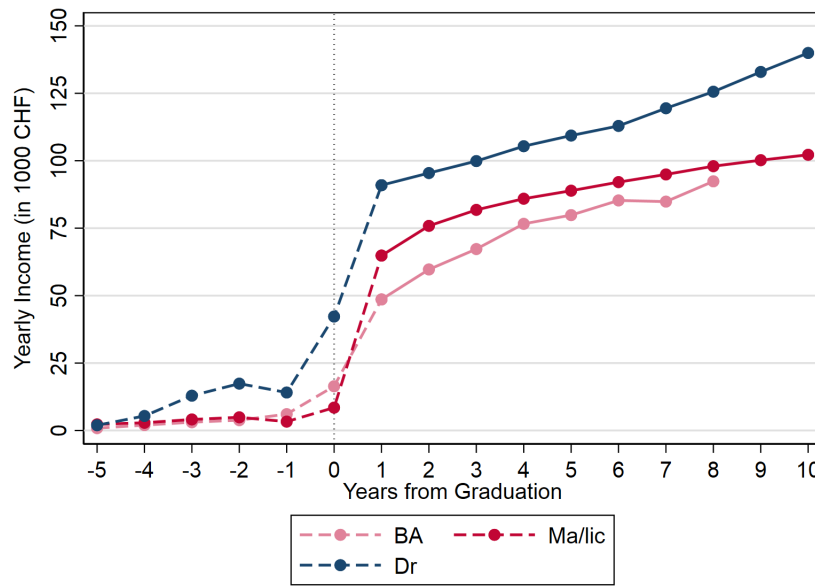
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed female workers, by cohort. Only UZH graduates who obtained their highest degree from the UZH are considered (n=14,981). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observations without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 19: PERCENTAGE CONTINUOUSLY EMPLOYED, BY BIRTH COHORT



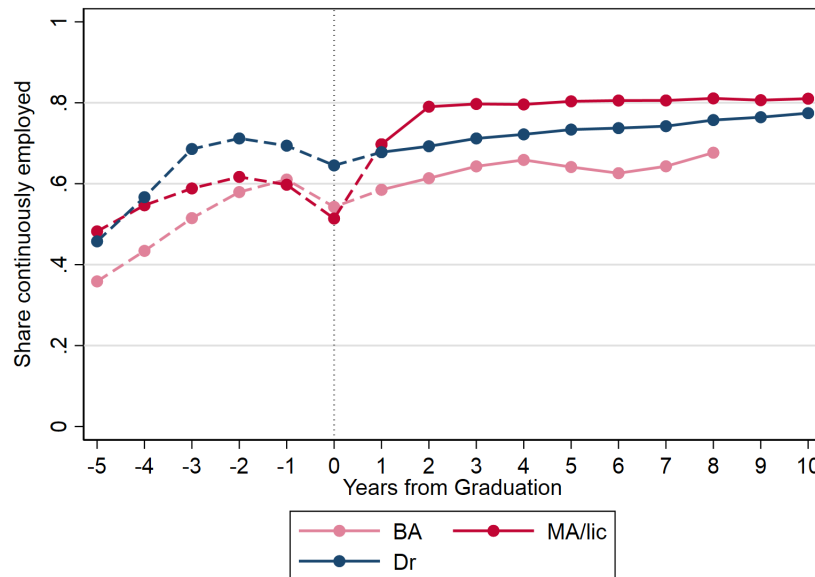
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year) for different cohorts. The shares are based on the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 20: EARNINGS OF UZH GRADUATES, BY HIGHEST DEGREE



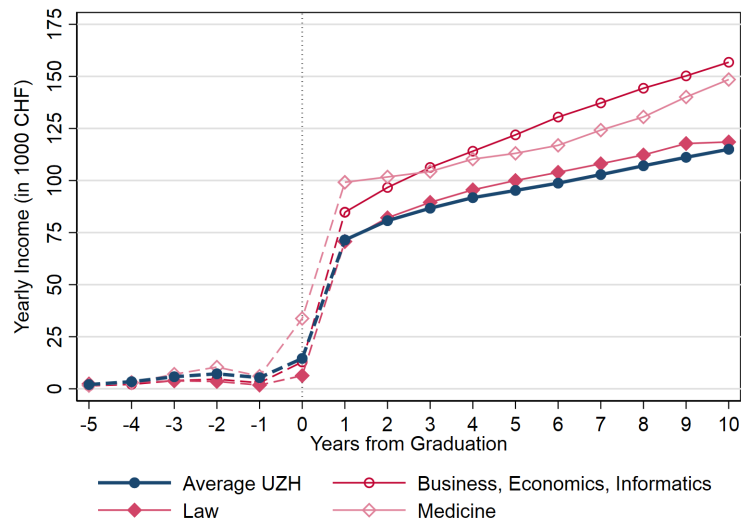
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers, by highest degree. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observations without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 21: PERCENTAGE CONTINUOUSLY EMPLOYED, BY HIGHEST DEGREE



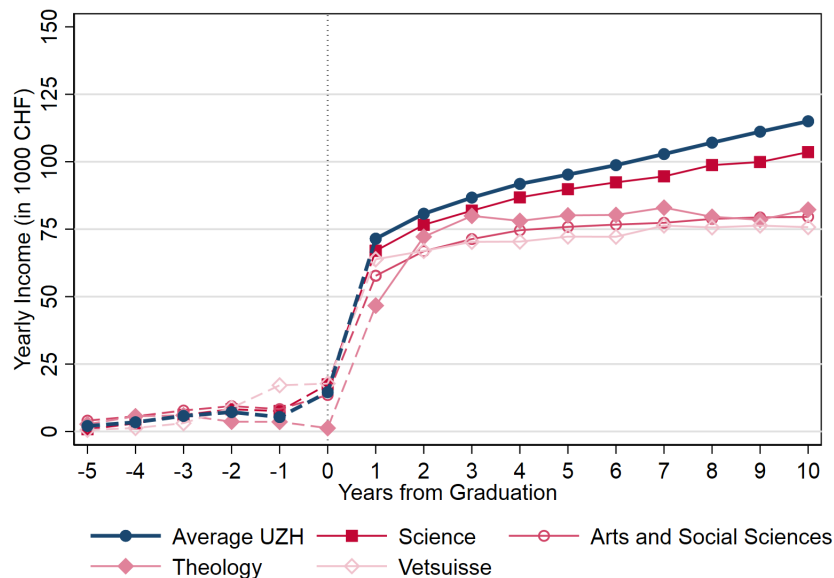
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year), by highest degree. The shares are based on the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 22: EARNINGS OF UZH GRADUATES, BY FACULTY (MeF, RWF, WWF)



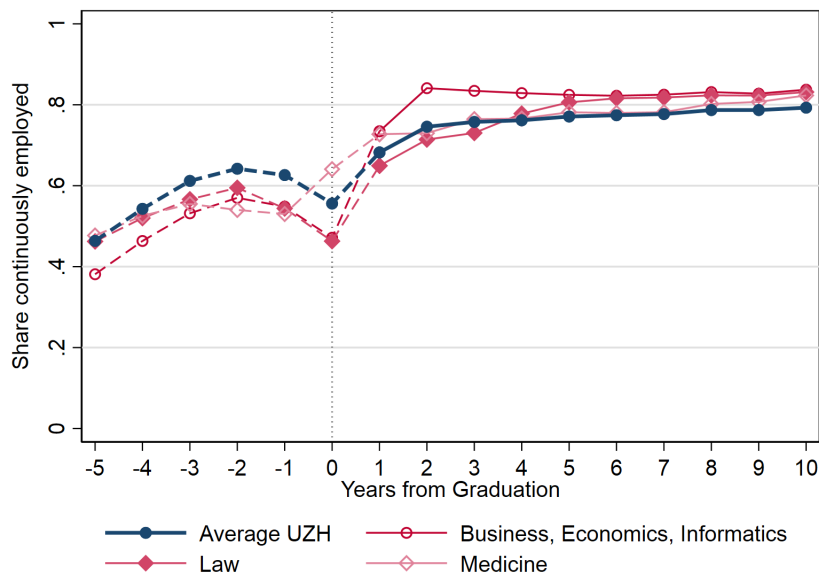
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed graduates from different faculties. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observations without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 23: EARNINGS OF UZH GRADUATES, BY FACULTY (MNF, PhF, ThF, VSF)



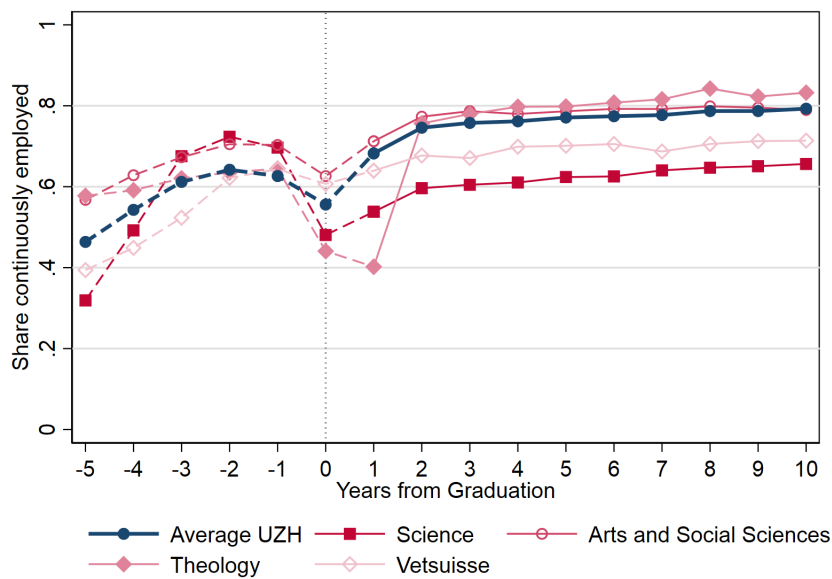
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed graduates from different faculties. Only UZH graduates who obtained their highest degree from the UZH are considered (n=30,374). All earnings are measured in 2019 CHF. Up to t = 0 all person-year observations are included (for person-year observations without any earnings, we set log earnings to zero). From t = 1 onwards only graduates with positive earnings in each single month in the respective calendar year are considered. The idea is to show both (i) how much students earn during their studies and (ii) the earnings of regularly employed workers after they have finished their studies. Data source: AHV-, UZH- and LABB-register.

Figure 24: EMPLOYMENT OF UZH GRADUATES, BY FACULTY (MeF, RWF, WWF)



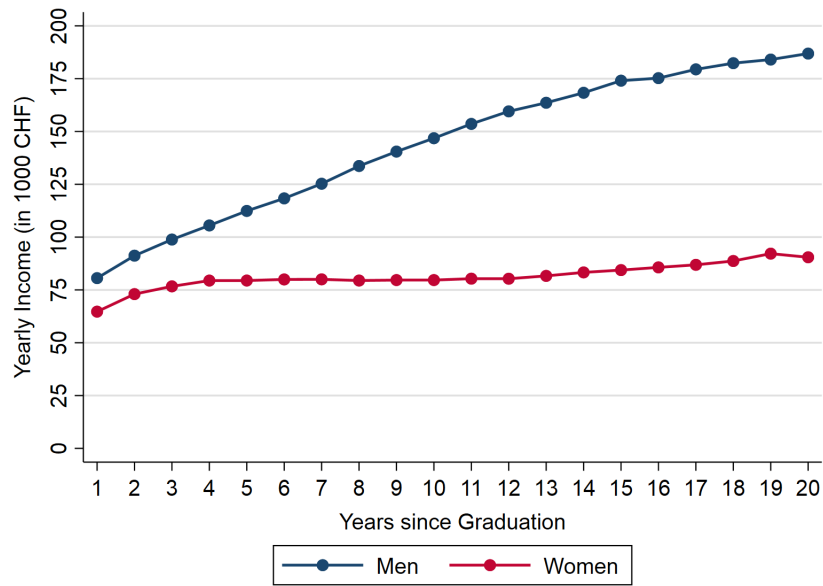
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year) for graduates from different faculties. The shares are based on the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 25: EMPLOYMENT OF UZH GRADUATES, BY FACULTY (MNF, PhF, ThF, VSF)



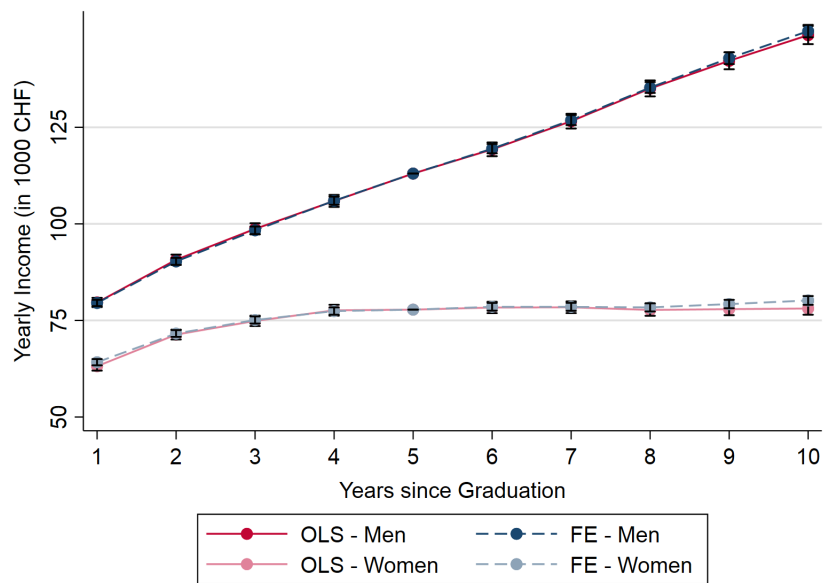
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year) for graduates from different faculties. The shares are based on the years 1992-2017. Only workers who have obtained their highest degree from the UZH are considered (n=36,371). Data source: AHV-, UZH- and LABB-register.

Figure 26: EARNINGS BY YEARS SINCE GRADUATION (REGRESSION RESULTS)



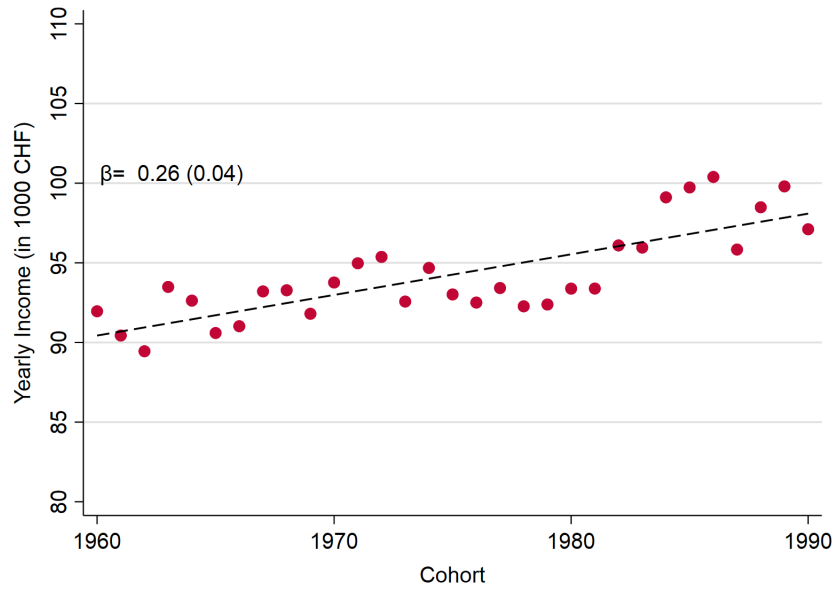
Notes: The figure shows the predicted value from the regression of column 7 in Table 4, when we set all regressors, except the years-since-graduation fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

Figure 27: EARNINGS PREDICTIONS FROM OLS- AND FIXED-EFFECTS REGRESSIONS



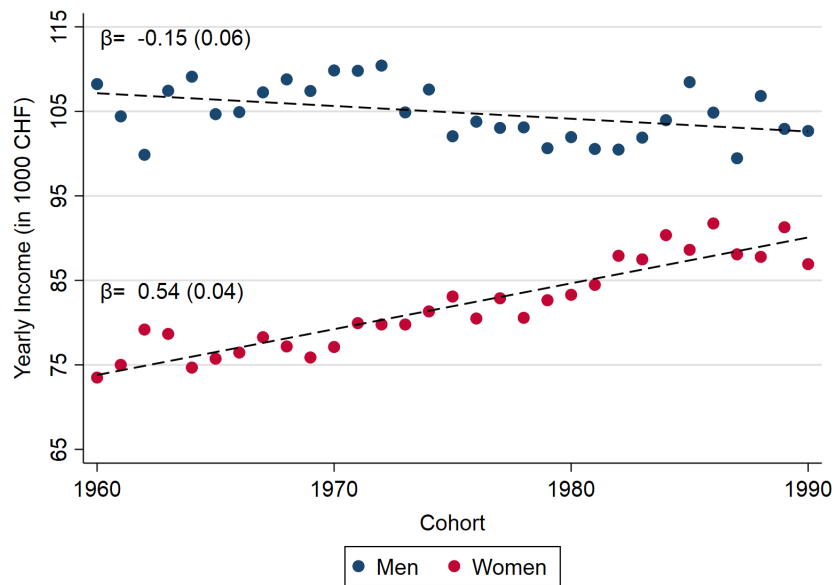
Notes: The figure shows the predicted value from an individual fixed effects model with time-to-graduation dummies to the OLS regression of column 7 in Table 4, when we set all regressors, except the years-since-graduation fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

Figure 28: EARNINGS TRENDS BY BIRTH COHORT (REGRESSION RESULTS)



Notes: The figure shows the predicted value from the regression of column 6 in Table 4, when we set all regressors, except the birth-cohort fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

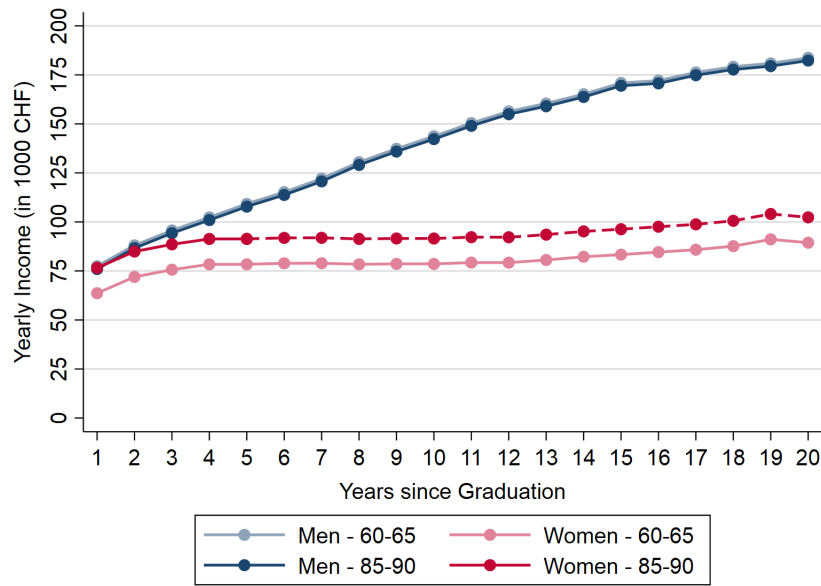
Figure 29: EARNINGS TRENDS BY BIRTH COHORT (REGRESSION RESULTS), BY GENDER



Notes: The figure shows the predicted value from the regression of column 7 in Table 4, when we set all regressors, except the gender-specific birth-cohort fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

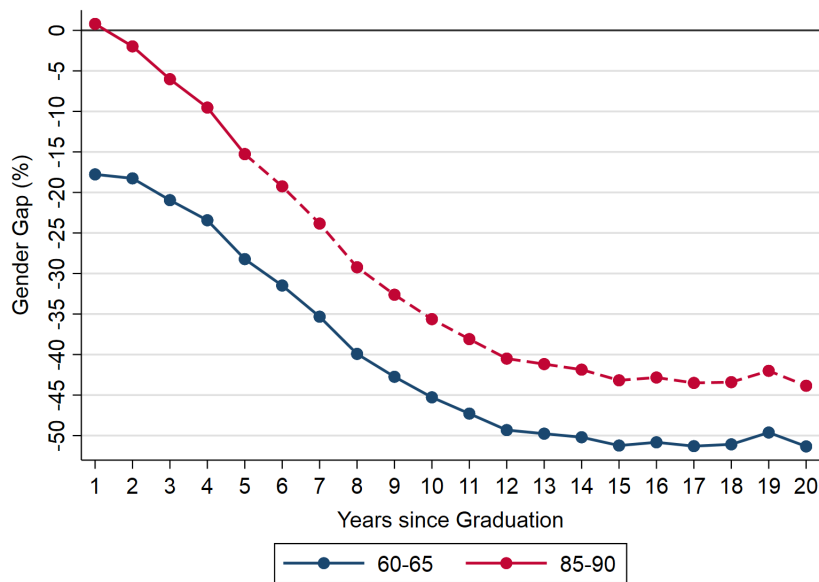


Figure 30: SHIFT IN EARNINGS PROFILES ACROSS COHORTS (REGRESSION RESULTS)



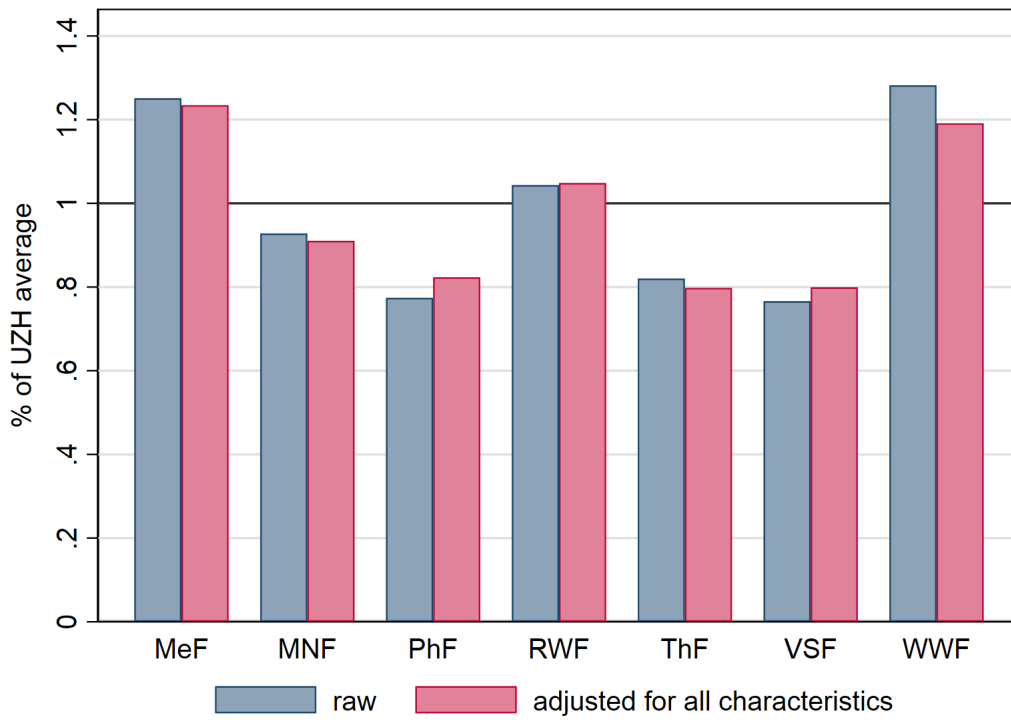
Notes: The figure shows the predicted value from the regression of column 7 in Table 4, when we set all regressors, except the years-since-graduation fixed effects and the relevant birth-cohort fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

Figure 31: PREDICTED SHIFT IN THE GENDER GAP: BIRTH COHORTS 1985-90 VERSUS 1960-65



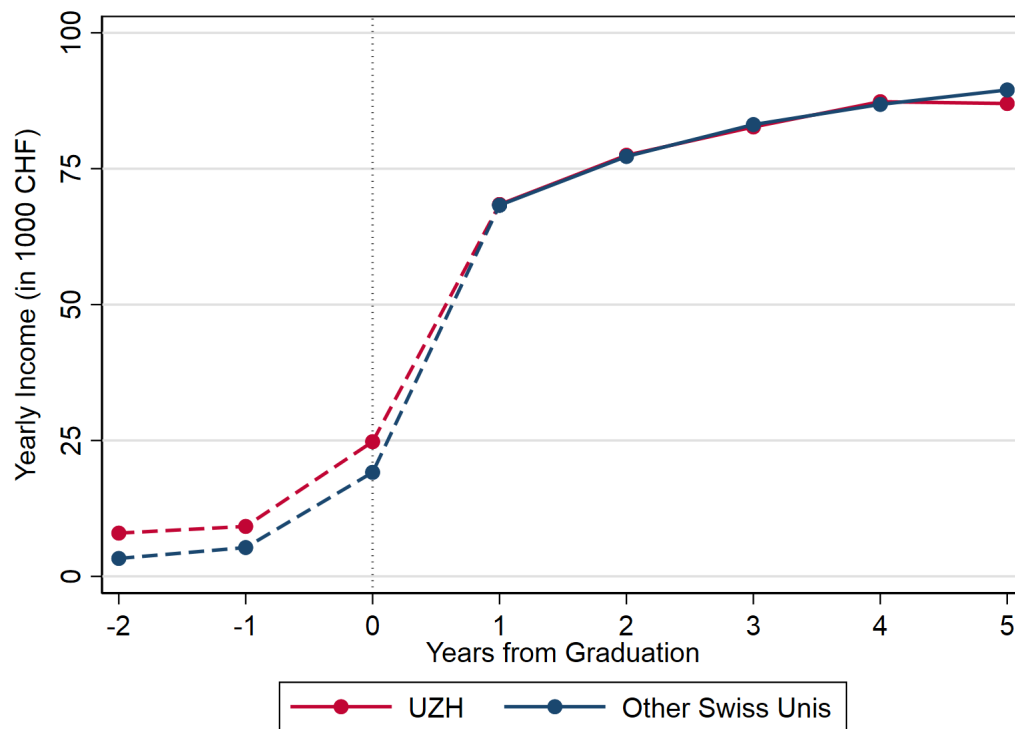
Notes: The figure is based on the difference (male-female) in predicted values from the regression of column 7 in Table 4, when we set all regressors, except the years-since-graduation fixed effects and the relevant birth-cohort fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

Figure 32: EARNINGS DIFFERENCES ACROSS FACULTIES (RAW AND ADJUSTED)



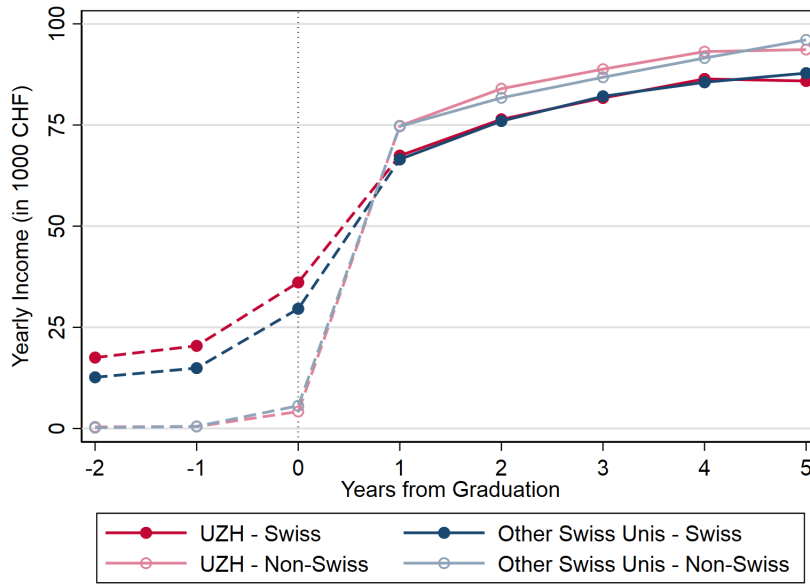
Notes: The figure shows raw earnings differences (blue bar) and the predicted values (red bar) from the regression of column 7 in Table 4 with faculty- and degree-fixed-effects instead of faculty-degree-fixed-effects, when we set all regressors, except the faculty fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV-, UZH- and LABB-register.

Figure 33: EARNINGS BY TIME SINCE GRADUATION, UZH VS OTHER SWISS UNIVERSITIES



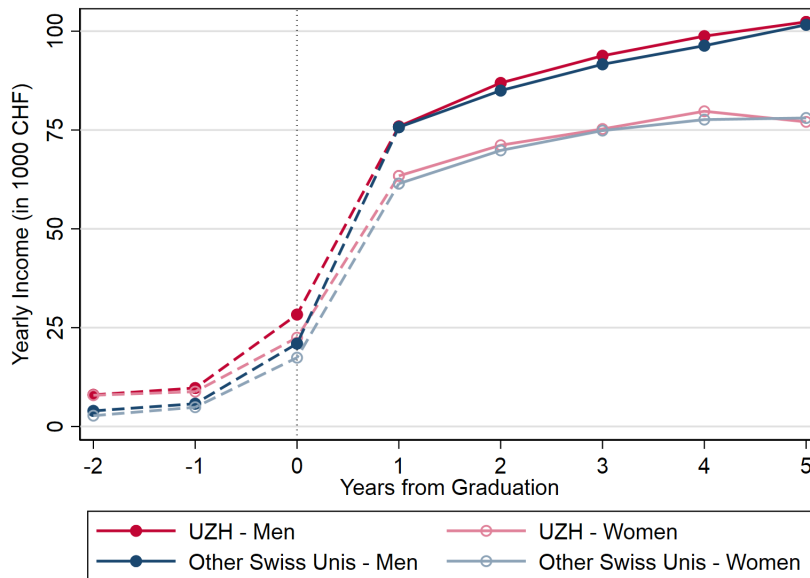
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers of graduation cohorts 2012-2016 who are no longer enrolled in a university by the end of the observation period (2017). All earnings are measured in 2019 CHF. Up to  $t = 0$  all graduates who finished their studies between 2012 and 2016 are included. From  $t = 1$  onwards only graduates with positive earnings in each single month in the respective year are considered. Data source: AHV- and LABB-register.

Figure 34: EARNINGS BY TIME SINCE GRADUATION, BY NATIONALITY



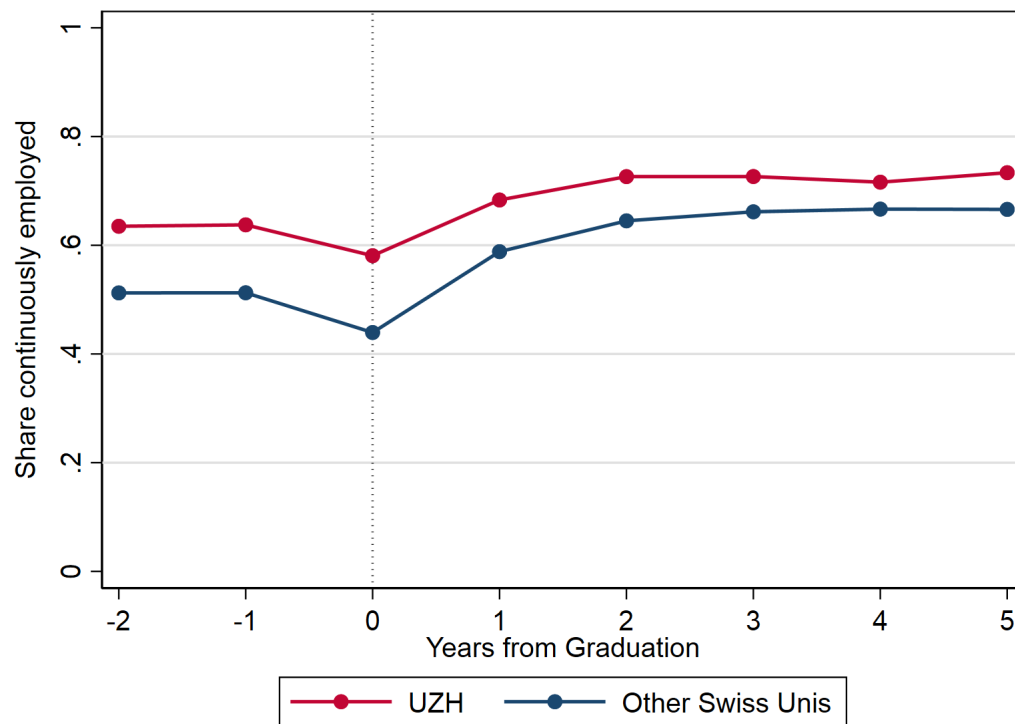
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers of graduation cohorts 2012-2016 who are no longer enrolled in a university by the end of the observation period (2017). All earnings are measured in 2019 CHF. Up to  $t = 0$  all graduates who finished their studies between 2012 and 2016 are included. From  $t = 1$  onwards only graduates with positive earnings in each single month in the respective year are considered. Data source: AHV- and LABB-register.

Figure 35: EARNINGS PROFILES BY GENDER, UZH VS OTHER SWISS UNIS



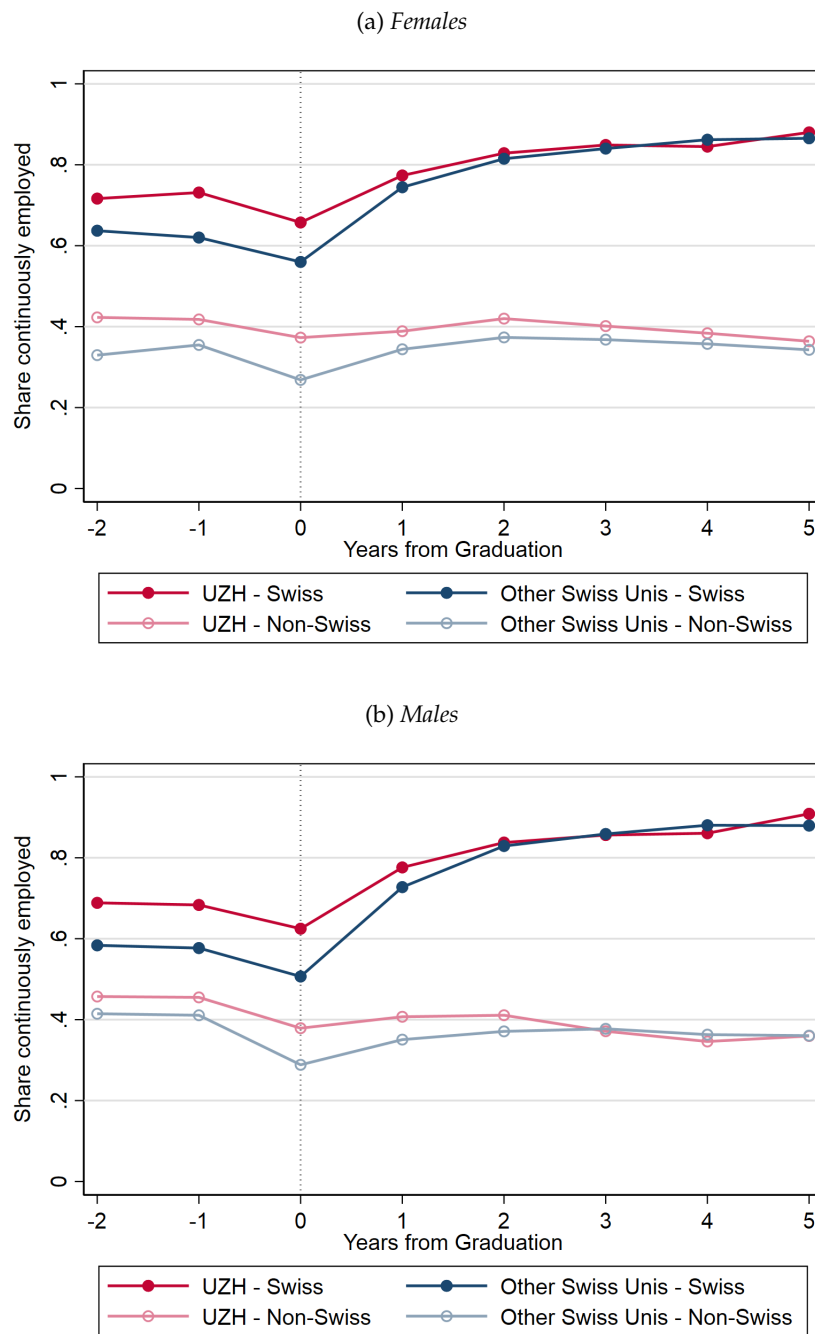
Notes: The figure shows average yearly AHV-taxable earnings of continuously employed workers of graduation cohorts 2012-2016 who are no longer enrolled in a university by the end of the observation period (2017). All earnings are measured in 2019 CHF. Up to  $t = 0$  all graduates who finished their studies between 2012 and 2016 are included. From  $t = 1$  onwards only graduates with positive earnings in each single month in the respective year are considered. Data source: AHV- and LABB-register.

Figure 36: CONTINUOUS EMPLOYMENT, UZH GRADUATES VS OTHER SWISS UNIS



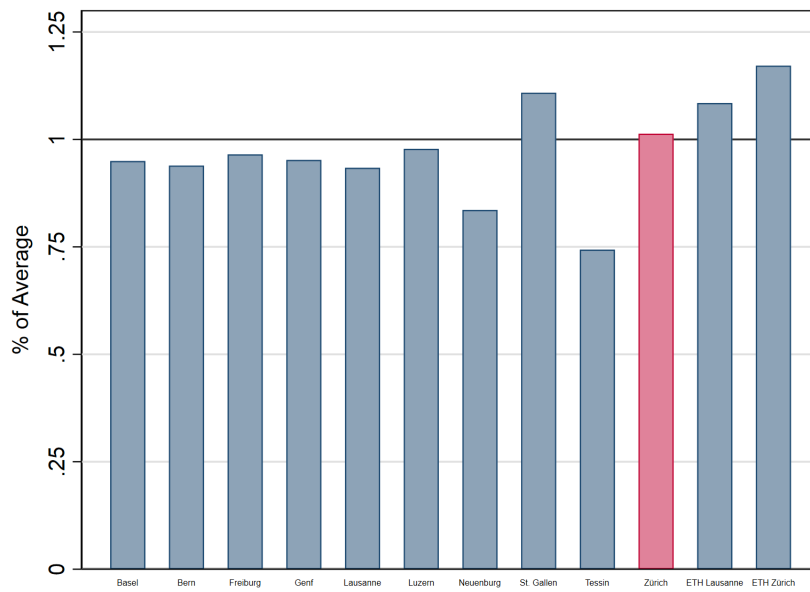
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year) for Swiss university graduates. The shares are based on the years 2012-2017. Only workers who are no longer enrolled in a study program are considered (n=76,808). Data source: AHV- and LABB-register.

Figure 37: EMPLOYMENT BY NATIONALITY AND GENDER, UZH VS OTHER SWISS UNIS



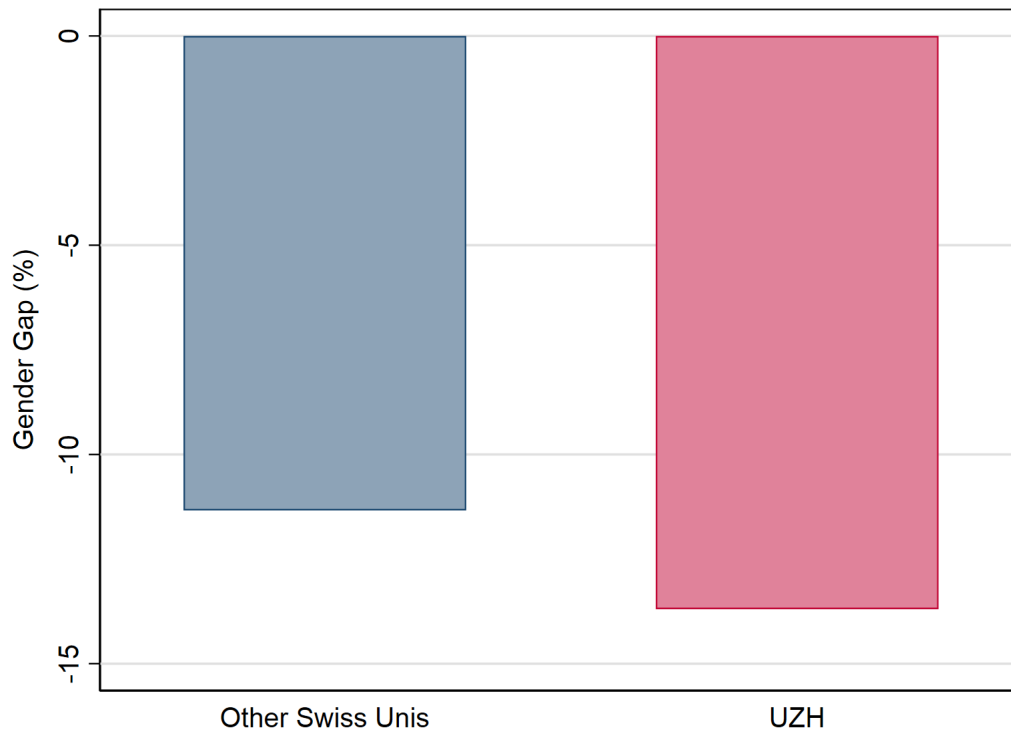
Notes: The figure shows the share of the continuously employed (= employed in each month of the calendar year) for Swiss university graduates. The shares are based on the years 2012-2017. Only workers who have are no longer enrolled in a study program are considered (n=76,808). Data source: AHV- and LABB-register.

Figure 38: ADJUSTED EARNINGS DIFFERENCES AMONG GRADUATES, SWISS UNIVERSITIES



Notes: The figure shows the predicted value from the regression of column 6 in Table 5, when we set all regressors, except the university fixed effects, to their sample mean values. The dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV- and LABB-register.

Figure 39: THE ADJUSTED GENDER EARNINGS GAP, YEARS 1-4 AFTER GRADUATION



*Notes:* The figure is based on a regression similar to the one of column 6 in Table 4, but where we use a female dummy (instead of gender-specific time to graduation fixed effects) and a female dummy interacted with an UZH indicator. The two bars are obtained when we set all variables, except the two gender dummies, to their sample mean. Dependent variable is the log of annual AHV-taxable earnings of continuously employed workers. Data source: AHV- and LABB-register.



## Appendix 1: Descriptive Statistics, UZH Graduates

Table A.1: Graduates' Raw Earnings, MALE UZH Graduates

	Mean log earnings	Median earnings	Mean earnings
All	112,486	113,093	133,899
Swiss	112,424	113,086	133,901
Non-Swiss	113,051	113,187	133,884
Born in 1960s	119,685	119,390	145,808
Born in 1970s	113,555	114,478	133,386
Born in 1980s	94,244	99,408	105,207
BA	74,211	86,030	88,517
Lic/MA	103,495	107,125	118,849
Dr/PhD	132,068	127,166	161,272
MeF	138,435	128,417	168,211
MNF	97,286	101,953	108,836
PhF	86,456	94,772	99,602
RWF	120,210	122,913	150,160
ThF	93,938	108,281	104,677
VSF	98,013	105,465	115,265
WWF	125,812	123,107	144,877
Person-years	105,711	105,711	105,711
Individuals	15,393	15,393	15,393

*Notes:* Only continuously employed workers born 1960-1990 during years 1992-2017 are considered. Only observations by individuals no longer enrolled in a university study program, during years 1-10 after graduation are considered.

Table A.2: Graduates' Raw Earnings, FEMALE UZH Graduates

	Mean log earnings	Median earnings	Mean earnings
All	74,880	84,764	88,207
Swiss	74,402	84,194	87,622
Non-Swiss	79,112	89,419	93,238
Born in 1960s	73,184	85,262	90,670
Born in 1970s	76,153	85,405	89,077
Born in 1980s	75,076	83,400	83,758
BA	59,100	71,558	71,114
Lic/MA	70,615	80,504	82,003
Dr/PhD	86,551	97,081	102,829
MeF	94,884	102,632	110,926
MNF	72,939	82,125	82,719
PhF	65,000	74,703	75,980
RWF	78,063	89,675	91,502
ThF	59,114	74,641	74,281
VSF	59,338	69,554	71,339
WWF	100,520	103,139	111,485
Person-years	88,645	88,645	88,645
Individuals	14,981	14,981	14,981

*Notes:* Only continuously employed workers born 1960-1990 during years 1992-2017 are considered. Only observations by individuals no longer enrolled in a university study program, during years 1-10 after graduation are considered.

Table A.3: Descriptives, UZH Graduates by Birth Cohort (Employment Sample,  $n=36,267$ )

Cohort	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Cohorts	36,267	.501	.157	21.7	.056	.163	.456	.326
1960	762	.381	.088	22.7	.003	.007	.474	.517
1961	827	.358	.093	22.4	.002	.010	.474	.514
1962	867	.37	.113	22.5	.002	.007	.454	.536
1963	980	.409	.121	22.7	.003	.009	.494	.494
1964	1,087	.407	.122	22.4	.004	.007	.518	.471
1965	1,100	.435	.119	22.1	.002	.005	.585	.408
1966	1,165	.443	.125	22.1	.001	.013	.613	.373
1967	1,204	.429	.118	22.1	.005	.008	.608	.379
1968	1,157	.443	.155	22.0	.005	.006	.619	.370
1969	1,112	.468	.130	22.1	.007	.014	.582	.397
1970	1,105	.464	.129	21.7	.001	.005	.542	.452
1971	1,088	.492	.145	22.0	.005	.009	.567	.419
1972	1,041	.467	.165	22.0	.009	.010	.575	.406
1973	1,074	.465	.167	22.2	.007	.020	.555	.417
1974	1,091	.481	.165	22.0	.008	.025	.555	.412
1975	1,139	.491	.164	22.1	.014	.022	.554	.410
1976	1,195	.516	.163	22.2	.012	.031	.586	.372
1977	1,248	.486	.160	22.1	.010	.030	.625	.334
1978	1,301	.535	.166	22.2	.025	.040	.620	.315
1979	1,366	.530	.174	22.0	.029	.048	.634	.289
1980	1,309	.523	.190	21.8	.028	.051	.634	.287
1981	1,302	.521	.192	21.7	.034	.074	.604	.288
1982	1,367	.572	.200	21.5	.050	.126	.546	.278
1983	1,290	.556	.195	21.4	.069	.179	.470	.282
1984	1,240	.578	.194	21.3	.094	.307	.350	.248
1985	1,191	.584	.177	21.0	.117	.383	.270	.230
1986	1,312	.560	.190	21.0	.168	.491	.133	.208
1987	1,373	.561	.185	20.7	.173	.607	.061	.158
1988	1,409	.574	.165	20.6	.209	.627	.033	.132
1989	1,279	.572	.152	20.5	.212	.693	.027	.068
1990	1,286	.608	.141	20.2	.250	.683	.015	.053

Notes: Only individuals born 1960-1990 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.4: Descriptives, UZH Graduates by Faculty (Employment Sample  $n=36,267$ )

Faculty	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Faculties	36,267	.501	.157	21.7	.056	.163	.456	.326
MeF	5,612	.491	.111	21.5	.004	.059	.054	.883
MNF	5,328	.438	.358	22.8	.025	.210	.263	.503
PhF	12,436	.656	.109	21.9	.099	.144	.629	.129
RWF	3,882	.536	.067	21.3	.017	.267	.523	.193
ThF	326	.503	.064	22.3	.064	.169	.592	.175
VSF	1,211	.695	.230	22.1	.001	.012	.099	.888
WWF	7,472	.243	.166	21.1	.073	.210	.624	.092

*Notes:* Only individuals born 1960-1990 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.5: Descriptives, UZH Graduates by Birth Cohort (Earnings Sample,  $n=30,374$ )

Cohort	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Cohorts	30,374	.493	.117	21.490	.045	.127	.509	.319
1960	725	.364	.074	22.5	.000	.004	.479	.517
1961	772	.348	.069	22.3	.003	.006	.479	.512
1962	814	.371	.093	22.3	.002	.004	.463	.531
1963	909	.410	.086	22.4	.003	.008	.506	.483
1964	1,025	.404	.099	22.3	.002	.005	.537	.457
1965	1,028	.428	.094	21.9	.001	.004	.597	.398
1966	1,090	.439	.105	21.9	.001	.008	.626	.365
1967	1,110	.422	.096	21.8	.002	.005	.631	.362
1968	1,070	.439	.130	21.8	.005	.003	.632	.361
1969	1,030	.467	.098	21.9	.004	.010	.603	.383
1970	1,025	.448	.100	21.5	.000	.003	.555	.442
1971	1,001	.486	.119	21.7	.003	.008	.575	.414
1972	956	.454	.141	21.7	.006	.007	.592	.394
1973	985	.472	.134	21.9	.005	.015	.577	.403
1974	983	.476	.129	21.7	.006	.017	.586	.391
1975	1,033	.492	.128	21.8	.010	.018	.579	.393
1976	1,081	.511	.124	21.9	.011	.027	.614	.348
1977	1,133	.486	.126	21.8	.009	.029	.655	.307
1978	1,142	.521	.125	21.8	.019	.035	.658	.288
1979	1,200	.525	.132	21.6	.027	.042	.668	.264
1980	1,154	.525	.150	21.5	.023	.042	.672	.263
1981	1,134	.520	.143	21.3	.028	.067	.652	.253
1982	1,158	.578	.143	21.1	.045	.106	.607	.242
1983	1,063	.565	.143	20.9	.052	.169	.527	.252
1984	985	.588	.133	20.7	.093	.313	.392	.202
1985	914	.593	.119	20.5	.119	.402	.305	.174
1986	954	.583	.109	20.4	.186	.527	.140	.147
1987	930	.572	.129	20.2	.181	.671	.048	.100
1988	824	.586	.101	20.2	.237	.692	.024	.047
1989	639	.603	.114	20.0	.266	.715	.006	.013
1990	507	.651	.075	19.6	.320	.671	.002	.008

Notes: Only continuously employed workers born 1960-1990 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.6: Descriptives, UZH Graduates, by Faculty (Earnings Sample,  $n=30,374$ )

Faculty	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Faculties	30,374	.493	.117	21.5	.045	.127	.509	.319
MeF	4,998	.487	.084	21.2	.000	.037	.057	.906
MNF	3,694	.433	.257	22.3	.022	.213	.328	.437
PhF	10,517	.651	.091	21.8	.078	.101	.688	.133
RWF	3,290	.530	.054	21.2	.007	.197	.591	.205
ThF	269	.472	.045	21.8	.048	.100	.688	.164
VSF	972	.674	.142	21.4	.000	.013	.110	.877
WWF	6,634	.237	.136	21.0	.064	.174	.677	.085

Notes: Only continuously employed workers born 1960-1990 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.7: Percentage BA Lic/MA Dr/PhD among UZH graduates (Employment Sample  $n=36,267$ )

	UZH	MeF	MNF	PhF	RWF	ThF	VSF	WWF
Dr/PhD								
All cohorts	.319	.906	.437	.133	.205	.164	.877	.085
1960s	.428	.939	.532	.225	.315	.157	.848	.136
1970s	.361	.930	.499	.163	.255	.237	.886	.098
1980s	.174	.794	.316	.034	.057	.050	.902	.036
Lic/MA								
All cohorts	.636	.093	.541	.789	.788	.788	.123	.851
1960s	.570	.061	.464	.770	.684	.837	.152	.864
1970s	.629	.069	.486	.822	.744	.724	.114	.891
1980s	.706	.205	.643	.772	.925	.725	.098	.805
BA								
All cohorts	.045	.000	.022	.078	.007	.048	.000	.064
1960s	.002	.000	.004	.005	.001	.007	.000	.001
1970s	.010	.001	.015	.016	.001	.039	.000	.011
1980s	.121	.001	.041	.194	.018	.225	.000	.159

Notes: Only continuously employed workers born 1960-1990 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.8: Average Study Duration, UZH Graduates by Faculty (Employment Sample  $n=36,267$ )

	UZH	MeF	MNF	PhF	RWF	ThF	VSF	WWF
	All UZH graduates							
All cohorts	8.2	9.1	7.5	9.0	8.0	9.6	8.7	6.7
1960s	9.5	10.0	8.7	10.8	9.4	10.4	9.3	7.2
1970s	8.4	8.9	7.6	9.3	8.1	9.2	8.7	6.9
1980s	6.9	7.8	6.6	7.2	6.7	7.4	7.8	6.1
	UZH graduates who never changed study program/university							
All cohorts	7.9	9.1	7.1	8.4	7.8	9.2	8.7	6.3
1960s	9.1	9.9	8.4	10.1	9.2	9.8	9.3	6.6
1970s	8.0	8.9	7.1	8.6	7.9	8.9	8.7	6.5
1980s	6.7	7.8	6.3	6.8	6.6	7.4	7.8	6.0
	UZH graduates who change study program/university at least once							
All cohorts	9.7	11.5	9.4	10.6	9.2	13.9	9.0	8.0
1960s	11.0	12.9	10.0	12.7	10.0	20.9	8.9	9.0
1970s	9.8	11.1	9.8	10.9	8.8	12.5	8.6	8.1
1980s	8.0	9.1	8.6	8.4	7.8	7.1	10.3	6.7

Notes: Only continuously employed workers born 1960-1990 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

## Appendix 2: Descriptive Statistics, Graduates from Swiss Universities

Table A.9: Graduates' Raw Earnings, by University (All Swiss Universities=1.000)

Uni	Mean log earnings	Mean earnings	Median earnings
<i>a) One Year after Graduation (t=1)</i>			
All Universities (CHF)	68,306	78,386	79,829
Zürich	1.002	1.003	0.986
Basel	0.999	1.011	1.001
Bern	1.006	0.997	0.988
Freiburg	0.901	0.888	0.909
Genf	0.910	0.961	0.948
Lausanne	0.870	0.896	0.927
Luzern	0.854	0.869	0.841
Neuenburg	0.739	0.769	0.787
St. Gallen	1.345	1.277	1.208
Tessin	0.708	0.729	0.706
ETH Lausanne	1.103	1.035	1.029
ETH Zürich	1.164	1.099	1.079
<i>b) Four Years after Graduation (t=4)</i>			
All Universities (CHF)	86,930	97,318	95,119
Zürich	1.005	1.006	1.011
Basel	0.994	1.012	1.012
Bern	0.993	0.994	0.991
Freiburg	0.897	0.869	0.877
Genf	0.941	0.951	0.956
Lausanne	0.944	0.950	0.966
Luzern	0.875	0.895	0.915
Neuenburg	0.774	0.784	0.803
St. Gallen	1.378	1.356	1.330
Tessin	0.747	0.749	0.745
ETH Lausanne	1.062	1.022	1.013
ETH Zürich	1.123	1.082	1.059

Notes: Only continuously employed workers of graduation cohorts 2012-2016 are considered. Only observations by individuals no longer enrolled in a university study program, during years 1-5 after graduation are considered.



Table A.10: Descriptives, All Swiss Graduates by Cohort, (Employment Sample  $n=73,232$ )

Graduation Cohort	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All graduation Cohorts	73,232	.498	.430	21.3	.116	.603	.040	.242
2012	9,376	.497	.428	21.4	.118	.524	.072	.286
2013	10,870	.492	.431	21.4	.119	.575	.041	.264
2014	11,942	.494	.437	21.5	.112	.597	.040	.250
2015	12,823	.502	.430	21.2	.113	.616	.048	.224
2016	13,598	.505	.426	21.2	.116	.638	.024	.222
2017	14,623	.498	.427	21.2	.116	.636	.024	.224

Notes: Only workers of graduation cohorts 2012-2016 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.11: Descriptives, All Swiss Graduates by University, (Employment Sample  $n=73,232$ )

University	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Universities	73,232	.498	.430	21.3	.116	.603	.040	.242
Basel	5,882	.569	.375	21.8	.113	.523	.008	.356
Bern	7,064	.566	.267	21.3	.100	.570	.000	.330
Freiburg	4,531	.637	.300	21.3	.226	.591	.084	.098
Genf	8,327	.635	.486	21.4	.146	.607	.050	.197
Lausanne	7,245	.547	.408	20.5	.115	.733	.001	.151
Luzern	1,390	.653	.235	21.9	.145	.777	.000	.078
Neuenburg	2,330	.630	.364	20.6	.130	.743	.005	.122
St. Gallen	4,755	.303	.459	20.8	.152	.711	.012	.126
Tessin	2151	.511	.763	21.9	.131	.770	.000	.099
Zürich	11,872	.577	.307	21.6	.176	.468	.153	.204
ETH Lausanne	6,137	.275	.657	20.9	.018	.608	.000	.374
ETH Zürich	11,548	.309	.549	21.5	.027	.596	.014	.362

Notes: Only workers of graduation cohorts 2012-2016 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.12: Descriptives, All Swiss Graduates by Cohort, (Earnings Sample,  $n=43,303$ )

Graduation Cohort	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Cohorts	43,303	.508	.217	21.4	.101	.624	.055	.220
2012	7,682	.504	.216	21.4	.110	.549	.083	.257
2013	8,793	.503	.225	21.5	.107	.606	.049	.238
2014	9,407	.506	.221	21.4	.100	.631	.049	.220
2015	9,355	.511	.218	21.2	.091	.655	.059	.196
2016	8,066	.518	.203	21.2	.096	.671	.037	.195

Notes: Only continuously employed workers of graduation cohorts 2012-2016 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

Table A.13: Descriptives, All Swiss Graduates by University, (Earnings Sample,  $n=43,303$ )

University	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Universities	43,303	.508	.217	21.4	.101	.624	.055	.220
Basel	3,627	.572	.214	21.9	.097	.550	.010	.343
Bern	4,318	.574	.123	21.5	.090	.593	.000	.317
Freiburg	2,995	.647	.107	21.4	.223	.592	.100	.084
Genf	4,676	.648	.250	21.3	.110	.646	.074	.170
Lausanne	4,204	.564	.168	20.5	.079	.786	.002	.133
Luzern	822	.631	.100	22.2	.139	.775	.000	.086
Neuenburg	1,411	.631	.143	20.6	.107	.783	.008	.102
St. Gallen	2,816	.295	.239	20.9	.109	.755	.019	.118
Tessin	1,140	.512	.511	21.6	.126	.807	.000	.067
Zürich	7,849	.578	.144	21.8	.154	.451	.192	.203
ETH Lausanne	2,994	.264	.440	21.0	.006	.657	.000	.337
ETH Zürich	6,451	.305	.297	21.5	.025	.631	.020	.324

Notes: Only continuously employed workers of graduation cohorts 2012-2016 are considered. Only observations by individuals no longer enrolled in a university study program are considered.

## Appendix 3: UZH- and LABB Registers, Raw Data

Table A.14: UZH Register Characteristics

Graduation Year	n	Female	Non-Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Graduation Years	83,683	.501	.140	22.4	.136	.148	.509	.178
1983	1,316	.316	.081	22.6	.000	.000	.780	.220
1984	1,367	.345	.073	22.6	.000	.000	.789	.211
1985	1,359	.317	.071	22.2	.000	.000	.781	.219
1986	1,347	.333	.075	22.4	.000	.000	.813	.186
1987	1,466	.346	.079	22.6	.000	.000	.780	.220
1988	1,410	.337	.084	22.3	.000	.000	.804	.196
1989	1,448	.390	.077	22.5	.000	.000	.809	.191
1990	1,658	.367	.093	22.3	.000	.000	.814	.186
1991	1,605	.407	.088	22.3	.000	.000	.808	.192
1992	1,709	.414	.096	22.3	.000	.000	.799	.201
1993	1,889	.422	.103	22.5	.000	.000	.807	.193
1994	1,854	.424	.117	22.6	.000	.000	.831	.169
1995	1,849	.422	.108	22.3	.000	.000	.840	.160
1996	1,790	.441	.104	22.6	.000	.000	.803	.197
1997	1,832	.453	.107	22.9	.000	.000	.804	.196
1998	2,032	.437	.121	22.8	.000	.000	.788	.212
1999	1,679	.431	.121	22.5	.000	.000	.763	.237
2000	1,975	.481	.106	22.7	.000	.000	.828	.172
2001	1,655	.485	.116	22.9	.000	.000	.796	.204
2002	1,727	.490	.116	22.9	.000	.000	.776	.224
2003	1,747	.483	.128	22.9	.000	.000	.791	.209
2004	1,972	.519	.132	22.8	.000	.000	.802	.198
2005	2,127	.525	.132	22.8	.001	.000	.754	.202
2006	2,434	.522	.136	22.8	.005	.007	.746	.182
2007	2,447	.534	.135	22.5	.025	.032	.702	.174
2008	2,498	.532	.146	22.6	.056	.045	.659	.181
2009	2,566	.548	.157	22.5	.095	.067	.616	.169
2010	2,951	.565	.165	22.5	.154	.083	.511	.179
2011	3,008	.585	.162	22.4	.207	.151	.382	.160
2012	3,019	.582	.197	22.7	.257	.266	.246	.177
2013	3,344	.571	.203	22.6	.254	.391	.151	.171
2014	3,560	.563	.199	22.6	.258	.425	.096	.163
2015	4,152	.570	.181	22.4	.262	.428	.116	.151
2016	4,455	.582	.180	22.1	.377	.423	.014	.143
2017	5,189	.583	.178	21.7	.430	.381	.008	.140
2018	5,247	.585	.167	21.7	.443	.382	.006	.136

Notes: All graduates reported in the UZH-register are considered.

Table A.15: LABB Register Characteristics

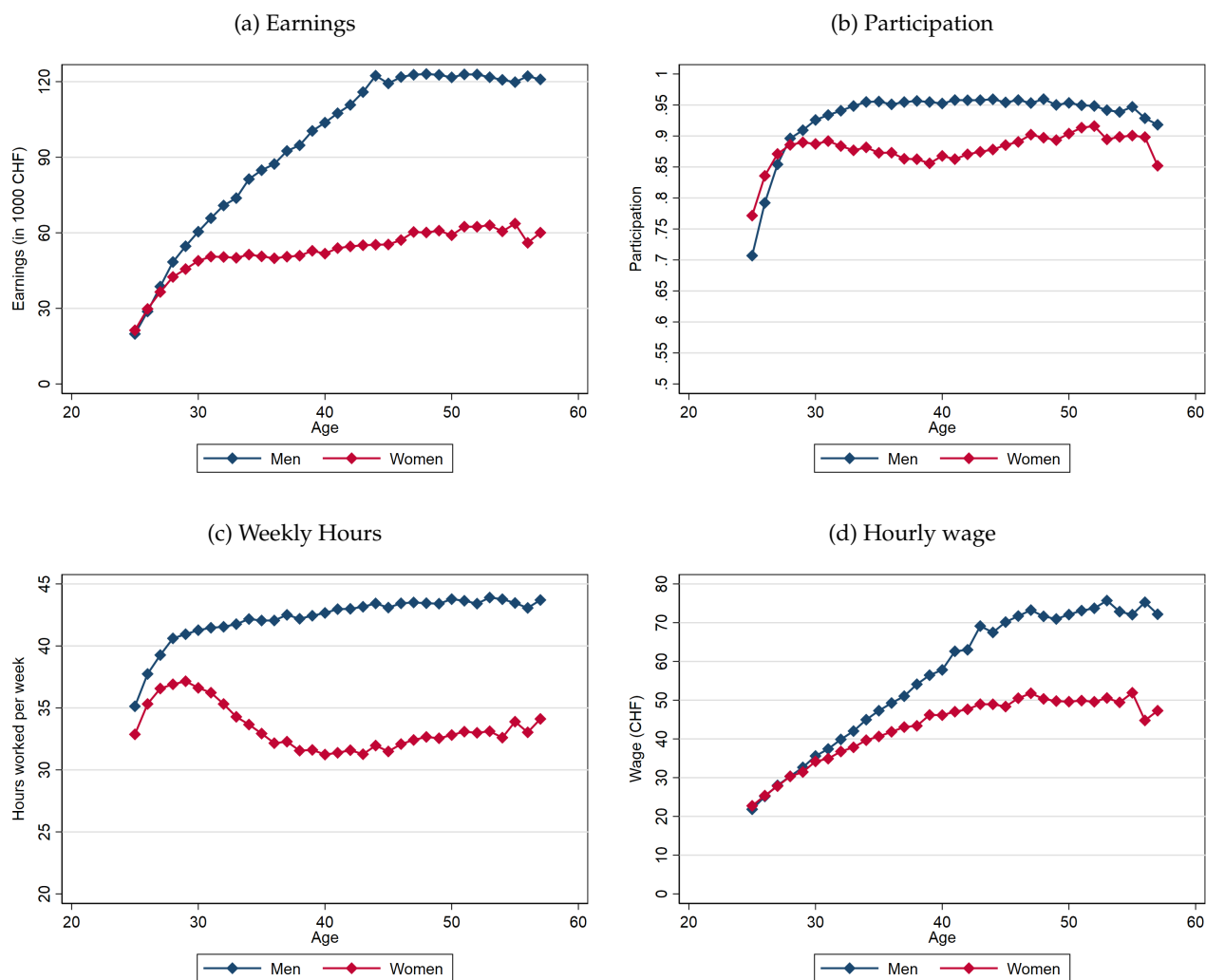
Graduation Year	n	Share UZH	Female	Non- Swiss	Entry Age	BA	MA	lic	Dr/PhD
All Years	410,725	.173	.448	.242	21.5	.144	.255	.366	.235
1983	4,720	.223	.310	.160	21.6	.000	.000	.735	.265
1984	5,253	.208	.308	.153	21.6	.000	.000	.724	.276
1985	5,336	.196	.322	.157	21.4	.000	.000	.726	.274
1986	5,551	.196	.315	.159	21.2	.000	.000	.724	.276
1987	6,118	.194	.315	.152	21.3	.000	.000	.715	.285
1988	6,533	.170	.322	.158	21.0	.000	.000	.712	.288
1989	6,506	.177	.330	.160	21.1	.000	.000	.725	.275
1990	6,835	.193	.321	.160	21.0	.000	.000	.713	.287
1991	7,006	.179	.332	.171	21.2	.000	.000	.719	.281
1992	7,473	.180	.347	.176	21.3	.000	.000	.712	.288
1993	7,903	.193	.347	.181	21.3	.000	.000	.714	.286
1994	7,949	.185	.342	.196	21.4	.000	.000	.697	.303
1995	8,197	.182	.363	.190	21.4	.000	.000	.709	.291
1996	8,360	.173	.368	.203	21.5	.000	.000	.699	.301
1997	8,742	.169	.386	.199	21.5	.000	.000	.697	.303
1998	8,854	.182	.388	.196	21.5	.000	.000	.702	.298
1999	8,910	.153	.407	.193	21.5	.000	.000	.702	.298
2000	9,187	.175	.419	.190	21.5	.000	.000	.713	.287
2001	8,966	.150	.419	.203	21.6	.001	.000	.696	.303
2002	8,914	.160	.431	.208	21.6	.001	.000	.705	.295
2003	9,155	.163	.451	.212	21.7	.003	.005	.715	.276
2004	9,516	.179	.452	.220	21.7	.012	.022	.687	.279
2005	10,274	.168	.448	.226	21.7	.034	.085	.598	.283
2006	10,394	.190	.476	.243	21.9	.060	.142	.508	.290
2007	11,296	.172	.478	.242	21.9	.100	.212	.417	.271
2008	12,103	.166	.488	.273	22.0	.115	.298	.335	.252
2009	12,202	.170	.502	.288	22.0	.134	.356	.244	.267
2010	13,134	.175	.505	.300	21.9	.138	.423	.178	.261
2011	13,941	.164	.508	.307	21.9	.148	.473	.139	.240
2012	14,873	.169	.510	.308	22.0	.153	.535	.076	.237
2013	15,802	.173	.503	.321	21.9	.160	.570	.046	.224
2014	18,133	.171	.501	.322	21.8	.169	.584	.041	.206
2015	20,803	.185	.508	.308	21.6	.210	.564	.044	.181
2016	26,184	.168	.511	.279	21.3	.340	.491	.020	.148
2017	31,913	.162	.510	.262	21.0	.430	.426	.015	.129
2018	33,689	.154	.502	.254	20.9	.447	.417	.013	.123

Notes: All graduates reported in the LABB-register are considered.

## Appendix 4: The Gender Gap in Earnings, Hours and Hourly Wages

A disadvantage of the social security (AHV) data is the lack of information on hours worked. We only observe monthly earnings but cannot decompose them into hours worked and hourly wages (or full-time equivalent earnings). This is of particular importance when comparing the earnings of female and male workers. To shed light how important this is in our context, we look at tertiary educated workers born in 1960-1990 observed in the Swiss Strukturhebung 2010-2017 (a yearly survey in Switzerland covering about 300,000 individuals per year) where we observe hours worked. These data can be linked to the AHV data. Based on these linked data ( $n=262,671$  observations), the various panels of Figure A.1 compare the age-profiles in earnings, participation, hours worked, and hourly wages of tertiary educated females and males in Switzerland.

Figure A.1: GENDER DIFFERENCES, TERTIARY EDUCATED WORKERS (*Strukturhebung* 2010-17)



Notes: The figure shows age profiles in AHV earnings, labor force participation, hours worked, and hourly wages, based on linked data from the Strukturhebung and the AHV data ( $n=262,671$ ). Only birth cohorts born 1960-1990 are included in the analysis. Data source: Swiss social security data (AHV) linked to Swiss Strukturhebung.

It turns out that the gender earnings gap is driven both by differences in hours and by differences in the hourly wage worked and hourly wage. Tertiary educated females earn 24.6% less per hour and work 20.3% fewer hours than males. In addition, there is a gap in labor force participation by 6.2 percentage points. In Table A.16 we summarize the evidence and compares the tertiary educated to less than tertiary educated workers. This comparison reveals that, compared to the less educated, tertiary educated workers have (i) a lower smaller gender gap in hours; (ii) a substantially larger gender gap in hourly wages; and (iii) a smaller gap in labor force participation.

Table A.16: Gender Differences in Labor Market Outcomes (*Strukturerhebung* 2010-17)

	Male	Female	Diff (abs.)	Diff (rel.)
<i>a) Tertiary Educated Workers</i>				
Mean log earnings	82,983	47,575	35,409	0.427
Mean earnings	117,900	67,452	50,449	0.428
Median earnings	95,195	60,531	34,664	0.364
Participation	0.927	0.870	0.057	0.062
Hours worked	42.1	33.5	8.5	0.203
Hourly wage	53.7	40.5	13.2	0.246
<i>b) Less Than Tertiary Educated Workers</i>				
Mean log earnings	55,136	29,081	26,055	0.473
Mean earnings	69,099	40,261	28,837	0.417
Median earnings	64,079	37,874	26,205	0.409
Participation	0.898	0.807	0.091	0.102
Hours worked	41.9	30.2	11.7	0.279
Hourly wage	33.6	28.4	5.2	0.155

*Notes:* Based on individuals born 1960-1990 observed in the Swiss *Strukturerhebung* 2010-2017 that could be merged to the AHV data. Outcomes are average values over the period 2010-2017.  $n = 262,671$  (tertiary educated workers);  $n = 892,435$  (less than tertiary educated workers).