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# Back to work: the effect of a long-term career interruption on subsequent wages in Switzerland

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## Abstract

This paper measures the effect of a long-term career interruption on wages after re-employment. Using data from the Swiss Household Panel (SHP) and a fixed effects estimation method allows us to account for time-constant unobserved heterogeneity. We find a significant wage penalty of about 7% in the first year after re-employment if a worker takes up a job with the same characteristics as the job previously held. This wage penalty finally vanishes after 5 to 6 years. Conducting subsample analyses for men and women, we uncover underlying heterogeneity of the effect. Compared to women, men tend to suffer more from a long-term career interruption, both in terms of a higher wage penalty during the first year of re-employment and a larger subsequent recovery time. Our findings support the assumption that human capital depreciation is not the only reason for wage penalties after re-employment.

**Keywords:** Career interruption, Re-employment, Wage, Fixed effects, Switzerland

## 1 Introduction

Since 2019, the Skilled Workers Initiative has been established as an integral part of the Swiss labor market policy. The government's target is to satisfy the growing demand for skilled workers by a better exploitation of the domestic labor force potential. This implies, for example, a reintegration of economically inactive people into the labor market (Swiss Federal Council, 2018). But back at work, what are the individual economic consequences of a non-employment spell? Or in other words, what is the price we have to pay for a time off?

To answer these questions, previous research has either analyzed the consequences of a non-employment spell as such or focused on a specific type of career interruption. This paper belongs to the former strand. However, since the group of non-employed people naturally consists of individuals who are not working for different reasons, the results of this paper are also linked to studies investigating earnings after a specific form of interruption.

One reason for not working is unemployment. This often implies not only a temporary burden but also negative impacts on future income. The wage penalty for the long-term unemployed is thereby considerably larger than for people who are unemployed for only a short period. As people keep working, however, there seems to be a partial recuperation of wages (e.g., Gregory & Jukes, 2001; Nickell, Jones, & Quintini, 2002). Yet, long-term unemployment is not the only type of a career interruption which has been found to cause considerable wage decreases. Motherhood-related breaks can be similarly followed by wage drops that tend to grow with the length of the interruption. However, these negative earnings effects typically recover over time (e.g., Lalive & Zweimüller, 2009; Napari, 2010). A somewhat different conclusion is drawn by previous research on sick leaves. An interruption due to bad health can imply deep long-term scars[1] for future wages (e.g., Andersen, 2010; Boden, 2006).

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[1]Following the terminology of Ellwood (1982), labor market returners are denoted as scarred if they keep earning less than their continuously employed counterparts, even after several years in re-employment.

These insights are also reflected by the literature on the topic which does not distinguish between different reasons for career interruptions (e.g., Mincer & Ofek, 1982; Mortelmans & Frans, 2017; Spivey, 2005). Overall, it has been found that a longer period of non-employment is associated with a larger wage penalty, which is particularly pronounced among men. One explanation for this heterogeneity is that career breaks, especially due to caring responsibilities, tend to be more socially accepted for women, whereas men are more strongly stigmatized for a time off work (e.g., Albrecht, Edin, Sundström, & Vroman, 1999; Mortelmans & Frans, 2017; Theunissen, Verbruggen, Forrier, & Sels, 2011). In the general discussion about wage consequences of long-term non-employment spells, there are, however, various arguments involved. Besides negative signaling effects, previous research has identified human capital depreciation as a major driver for wage penalties after re-engagement (Mincer & Ofek, 1982). Furthermore, decreasing reservation wages are considered to be an important cause for lowering actual earnings (Addison & Portugal, 1989).

Concerning Switzerland, evidence on wage effects of long-term non-employment is scarce. In that respect, this paper mostly relates to previous research investigating wage consequences of long-term unemployment (Djurdjevic, 2005; Ecoplan, 2013; Liechti, Morlok, & Siegenthaler, 2020; Sheldon, 1999). In line with major findings for other countries, these studies indicate a significantly negative effect which can persist for several years.

This paper contributes to the literature as it investigates the effect of a long-term non-employment spell on future wages in a short- and long-term perspective for Switzerland. Furthermore, it takes up the heterogeneous findings for men and women by conducting gender-specific analyses. Using data from the Swiss Household Panel (SHP) allows us to measure the effect of long-term non-employment spells on hourly wages. In contrast to the above-mentioned studies for Switzerland, this enables us to control for part-time work.

In line with theoretical expectations, our results indicate a large wage penalty in the first year following re-employment if a worker finds a job with the same characteristics as the one previously performed. This wage penalty vanishes after about 5 to 6 years. Performing subsample analyses, we detect a relatively larger negative effect on men's wages which is quite persistent whereas we find women's wages to soon catch up with the earnings of their counterparts who have not just left a long-term non-employment spell. Our results therefore highlight the importance of other effects besides human capital dynamics.

The remainder of this paper is structured as follows. The next section provides a comprehensive review of relevant literature to date. Section 3 deals with economic theory on the topic. Section 4 presents the identification strategy and the econometric model. Afterwards, in Section 5, we introduce the data, the working sample and discuss the construction of the main variables used in the empirical analysis. The results are presented in Section 6. The last section concludes.

## 2 Previous research

Many people experience career breaks at some point during their professional lives. However, the group of non-employed people is strongly heterogeneous and the drivers for a time off work are various. Whereas some people experience non-employment due to personal issues, others are hit by external developments. Sectoral and technological changes as well as major political, economic, and health crises can urge many workers to stay out of the labor force for a while.

### 2.1 Job loss and unemployment

Early studies that investigated the effect of a job loss on subsequent earnings have primarily focused on displaced workers, trying to ensure the exogeneity of an unemployment event. However, based on available data, they could often only compare in-work income before and after workers were displaced.[2] The problem with this approach lies in its necessary assumption of zero earnings growth if the displacement had not taken place, which is hardly convincing. It was in the early 1990s that first studies used control groups to measure the effect of job displacement. Using administrative US data and a fixed-effects estimation, the seminal study of Jacobson, LaLonde, and Sullivan (1993) investigated the change in earnings for displaced workers relative to those who were not displaced. Today, there exists a vast literature for various countries on this topic applying similar methods as Jacobson et al. (1993). It has been generally found that workers face significant earnings losses after displacement which tend to decline over time. However, the losses usually persist for a number of years (see, e.g., Couch, 2001; Couch & Placzek, 2010; Eliason & Storrie, 2006; Hijzen, Upward, & Wright, 2010; Schmieder, Von Wachter, & Bender, 2010). This result has also been confirmed for Switzerland: Based on a survey of displaced industrial workers, Oesch and Baumann (2015) found that people who re-started working experienced an average hourly wage penalty of 2.5% 2 years after displacement.

[2]Many researchers relied on data from the Displaced Worker Survey which is a supplement to the American Current Population Survey (see, e.g., Addison & Portugal, 1989; Gibbons & Katz, 1991; Podgursky & Swaim, 1987; Topel, 1990). However, the Displaced Worker Survey uniquely provides information about workers who experienced a displacement.

Another strand of the literature focuses more strongly on investigating the effect of unemployment duration on people who resume working. Using different estimation methods, these studies vastly agree that there is a significantly negative effect of additional time in unemployment on earnings in various countries (e.g., Gangl, 2004; Gangl, 2006; Gregory & Jukes, 2001; Nickell et al., 2002; Protsch, 2008).

For Switzerland, several studies similarly investigated the wage effect of unemployment for people who return to work. Most of them relied on register data from the information system for placement and labor market statistics (AVAM), the unemployment offices payment system (ASAL), and the social security system (AHV) (e.g., Djurdjevic, 2005; Ecoplan, 2013; Sheldon, 1999). Although analyzing different time horizons and employing different econometric approaches, these studies similarly found a strong negative wage effect of long-term unemployment[3].

Whereas Sheldon (1999) did not yet control for time-constant unobserved heterogeneity, Ecoplan (2013) took account of this possible confounder by controlling for workers' income previous to unemployment (see also Heckman, 1981). Investigating the wage effect of long-term unemployment, Ecoplan (2013) found that a career interruption lasting 1 to 2 years leads to an average wage penalty of 22%. An unemployment spell of 2 to 5 years implies a drop of even 30%. Although the wage penalty partly recovers, the authors found a wage scar for at least 3 years after re-employment. Djurdjevic (2005) added to these findings by highlighting that married and more than 30-year-old women with at least one person to care for are at higher risk to be trapped in a lower paid job. This result is likely to be an indication that mothers, leaving the labor market for a while, often return as part-time workers. However, although linking data from AVAM/ASAL and AHV allows to obtain detailed information about registered unemployed people and their future income, there is no way to figure out if people re-enter the labor market as part-time or full-time employees. Therefore, based on these data, it is not possible to determine whether an observed earnings decrease is due to a lower hourly wage or due to a lower number of working hours.

The same issue faced also Liechti et al. (2020) using data from AHV, register-based population censuses (STATPOP), and structural surveys (SE). However, in contrast to the above-mentioned studies for Switzerland, they also included people who did not return to work in their analyses, by considering them with a wage of zero. They found a permanent average earnings decrease of about 28% for long-term unemployed people compared to those having spent only 4 to 11 months in unemployment.

### 2.2 Motherhood

A related strand of the literature digs deeper into income effects of motherhood since women, in contrast to men, often experience strong wage reductions after the birth of children. Controlling for individual fixed effects and variables like work experience and job choices, there often remains an unexplained wage difference between women with and women without children: In the US, Britain, Germany, and Switzerland, its magnitude is estimated to lie between approximately three to ten percent per child (e.g., Budig & England, 2001; Gangl & Ziefle, 2009; Glauber, 2007; Harkness, 2016; Killewald & Gough, 2013; Oesch, Lipps, & McDonald, 2017). This has led to the conclusion that the motherhood wage penalty is driven by various factors including employers' discrimination, social norms, opting for family-friendly jobs, and work interruptions.

There exists a vast literature investigating the effects of these different drivers for the motherhood wage penalty (see Cukrowska-Torzewska & Matysiak, 2020 for a recent meta-analysis). Hence, only a particular strand of this research focuses on motherhood-related career breaks which tend to lower wages at re-engagement.

To address this issue, many researchers analyzed the impact of family policies and related reforms on future earnings of mothers (see also Olivetti & Petrongolo, 2017). For several countries, it was found that more time in motherhood-related career breaks, for example due to less subsidized child care, or longer parental and maternity leaves, can decrease future earnings of mothers (see, e.g., Lalive & Zweimüller, 2009; Lequien, 2012; Nix & Andresen, 2019; Ruhm, 1998; Schönberg & Ludsteck, 2014; Thévenon & Solaz, 2013). The reason behind this effect is that these policy measures exogenously influence the time at which mothers can or have to resume working.

These findings raise the question of how long a long-term motherhood-related career break affects future wages. Based on Finnish panel data and using mothers without children as a control group, Napari (2010) found that a career break of up to 2 years impacts wages only in the first year after re-engagement. For mothers taking a break of 3 years or longer, the effect remains significant also after 3 years following the return to work. However, the wage penalty decreases rapidly from 11% in the first year to 4% in the third year, pointing towards a further recovery. The idea of a time-limited impact is similarly supported by Lalive and Zweimüller (2009). Investigating an extension of the parental leave in Austria from one to two years, the authors found an earnings

[3]In Switzerland, someone is defined as long-term unemployed if the period of unemployment lasts 12 months or more.

decrease for mothers in the first three years after giving birth but not in the years after.

### 2.3 Sick leave

Another important driver for non-employment is bad health which is, as the previously presented types of career breaks, often related to lower future earnings. Several studies found that the income of individuals having experienced a sick leave is lower than the income of comparable workers who have not (e.g., Boden & Galizzi, 2003; Markussen, 2012; Rayce, Christensen, Hougaard, & Diderichsen, 2008).

To a great extent, it is the severity of sickness which drives these losses. Many injuries and illnesses are minor and therefore require only little time off work. Such health issues do not at all or hardly affect earnings (Hansen, 2000). In contrast, a high degree of sudden permanent disability can force a long-term career interruption and heavily decrease an individual's skills. This can strongly reduce earnings for a long period of time or even for a lifetime (Boden, 2006; Reville, Boden, Biddle, & Mardesich, 2001).

While there exists a vast literature discussing factors influencing the duration of sick leave (e.g., Butler, Baldwin, & Johnson, 2001; Butler & Worrall, 1985; Cheadle et al., 1994; Johansson & Palme, 2005; Steenstra, Verbeek, Heymans, & Bongers, 2005), there are only few studies which examine the effect of the duration of sick leaves on future earnings. One of these studies was conducted by Boden and Galizzi (1999). Relying on US injury data from workers' compensation records and matched wage records, they found that additional days off work decreased post-leave earnings considerably. The importance of duration dependence has also been supported by Campolieti and Krashinsky (2006), using Canadian survey data of workers with permanent impairments.

Hansen (2000) and Andersen (2010) contributed to this literature by exploiting policy reforms as instrumental variables for health-related absence. However, in contrast to Hansen (2000) who only investigated the impact of short-term sick leaves, Andersen (2010) also considered longer-term interruptions. She made use of a policy change in Denmark which altered the sick leave reimbursement rate such that municipalities' incentives to get sick-listed people back to work increased. She concluded that an increase of sick leave by 1 month decreases yearly earnings up to 2 years later by around five percent on average.

### 2.4 Career interruptions in general

In sum, the results for the above discussed specific groups of long-term non-employed individuals are largely reflected in the estimated average effect of a career break on future wages. In an early study, Mincer and Ofek (1982) found for example that wages at re-engagement are significantly lower per additional year of non-employment than at the time of labor market withdrawal. They moreover observed a relatively rapid wage growth during the first five years following re-employment. However, the authors only considered women in their estimations.

Later panel studies estimated wage effects for both men and women (e.g., Light & Ureta, 1995; Mortelmans & Frans, 2017; Spivey, 2005). Overall, the results indicate that men's wages at re-employment suffer more strongly from a non-employment spell than women's wages. Furthermore, they vastly agree on a considerable rebound effect of women's wages such that they are able to catch up to their continuously employed counterparts after several years. For men, there exist diverging results on subsequent wage recovery. Mortelmans and Frans' (2017) findings for Belgium suggest a long-lasting negative income effect in contrast to women. Evidence for the US is mixed: Whereas Spivey (2005) found that wages also greatly recover for men, Light and Ureta's (1995) results indicate long-term wage penalties for men contrary to women. However, these conflicting findings for the US have to be considered with caution. Light and Ureta (1995) as well as Spivey (2005) used data from the National Longitudinal Survey and estimated similar regression specifications based on work experience variables. But compared to Light and Ureta (1995), Spivey (2005) used a sample that contains more complete information over a longer time span on individuals' work histories, which she deems to be a major reason for receiving different results.

All in all, previous research on career breaks suggests that a long-term absence from work reduces future earnings significantly before they eventually start to build up again. However, these income dynamics seem to differ depending on the type of the interruption and the person experiencing it.

## 3 Economic theory

There exist different economic theories which give predictions about the development of wages following a non-employment spell. The most prominent approach to think about wage adjustments provides the human capital theory. The main idea is that, over the years, a worker acquires several skills which is usually reflected by a growing wage (Becker, 1964; Mincer, 1974). However, a part of these skills is likely to be firm-specific. Changing the employer therefore often results in a partial loss of productivity. This implies that the initial wage offered by another employer is likely to be lower as he will only remunerate the productivity of the transferable skills. Yet, some skills are transferable, they tend to diminish (at least partly) during a career break which

translates into an even lower wage at re-employment. At this point, however, the depreciation of human capital is stopped and skills start to build up again. The initial wage drop should therefore decrease the longer the worker stays employed.

Apart from human capital, imperfect information and stigma effects tend to influence wages (Vishwanath, 1989). The reason for this is rooted in the limited knowledge of an employer about a job applicant's productivity. This means the employer has to rely on signals to gather more information. Such a signal might well be a previous career interruption which is rather perceived as negative since it may stand, in some cases, for only limited career commitment or low productivity. Thus, the employer will tend to initially offer a lower wage compared to the one he would propose to someone who is not exiting a long-term non-employment spell. Only with a longer tenure the employee is able to reveal his true commitment and productivity which, perchance it is higher than the employer initially assumed, leads to a pay raise.

But also from a job seeker's perspective, a long period of non-employment is likely to cause uncertainty. The longer the search period, the more sharply job seekers reduce their reservation wages to become more likely to find a job (Mortensen, 1986). The same assumption seems also applicable to economically inactive persons who were out of the labor force for a while and expect their chances on the labor market to have therefore decreased. They might similarly tend to apply for jobs which are below their skill level and be less confident in wage negotiations. Thus, upcoming doubts about finding a job can also contribute to a wage loss at re-engagement. This might however recover as people, back at work, are likely to re-accumulate self-confidence which positively affects occupational aspirations (Gordon, 1972).

Hence, the human capital, signaling, and reservation wage theory imply that career interruptions impact future wages, which is in line with empirical evidence. These theories consider the influence of the pure incidence of becoming non-employed, the length of the non-employment spell, and the tenure after re-engagement as being important aspects for the individual wage development.

According to these theories, which are commonly applied in related literature, we expect to find a negative effect of long-term non-employment spells on future wages which diminishes as workers remain employed. The strength of the underlying mechanisms is thereby likely to depend on the nature of the career break, which may occur more frequently within certain population groups. Additionally, the same type of career break can cause different wage effects depending on socio-economic characteristics. Based on results from earlier studies, we expect to find a stronger average wage penalty for men than for women. Previous literature explains this heterogeneity by highlighting signaling as an important mechanism (e.g., Albrecht et al., 1999; Mortelmans & Frans, 2017; Theunissen et al., 2011). As women are rather expected to experience a career break, especially due to caring responsibilities, they tend to be less stigmatized than men taking a time off work.

## 4 Estimation strategy

Among other factors, it is commonly expected that unobserved worker characteristics influence both wages and career interruptions. Hence, accounting for individual heterogeneity is important to identify the causal effect of non-employment on future wages. Following Jacobson et al. (1993) and related studies on the topic, we therefore rely on a fixed effects estimation strategy. Specifically, we estimate the effect of a long-term non-employment spell on the wage received following re-employment. As a first step, we investigate if there is a wage penalty for a worker who reported to be non-employed during one year or more in the *previous* interview wave. In a further analysis, we look at how the re-employment wage evolves as the worker continues reporting to be employed. More precisely, we look at the remaining effect after two, three, ..., six interview periods, if we have not defined the interviewee as non-employed since he has returned to work. This allows us to see if there indeed exists a long-lasting wage scar or whether the effect diminishes over time.

We estimate the following fixed effects model:

$$w_{it} = \alpha_i + \lambda_t + \rho D_{it-j} + \boldsymbol{X}_{it}^{'}\boldsymbol{\beta} + \boldsymbol{Z}_{it-j}^{'}\boldsymbol{\gamma} + \varepsilon_{it},$$
$$i = 1, ..., N, \quad t = 1, ..., T, \quad j = 1, ..., 6 \qquad (1)$$

$w_{it}$ represents our dependent variable, the natural logarithm of the real hourly net wage at time $t$ for individual $i$.[4] Our main variable of interest, $D_{it-j}$, is a dummy variable taking the value of one if an individual entered the current employment spell via a long-term work interruption which he lastly reported $j$ periods ago. $\boldsymbol{X}_{it}^{'}$ is a vector of individual and job specific controls. Precisely, it contains the variables age, age squared, children, sector, firm size, type of job, and dummies for being married, working part-time, and having a fixed-term work contract. $\boldsymbol{Z}_{it-j}^{'}$ represents a vector of lagged variables, namely the $j$th lags of a dummy which serves as a proxy to indicate the

[4]Wages are deflated using the Consumer Price Index (OECD, 2020). They are measured in 2010 prices.

final period of an individual's education[5] and of a dummy for individuals who report to have visited at least one further education course in the last twelve months. $\alpha_i$ represents time-invariant individual characteristics, i.e., individual fixed effects, and $\lambda_t$ denotes wave fixed effects. The idiosyncratic error is determined by $\varepsilon_{it}$.

We can equally formulate our model in deviations from individual means since this is mathematically equivalent to treating individual effects as parameters to be estimated (Angrist & Pischke, 2009, p. 223–224). First, we need to calculate individual averages:

$$\overline{w}_i = \alpha_i + \overline{\lambda} + \rho\overline{D}_i + \overline{\boldsymbol{X}}_{\boldsymbol{i}}'\boldsymbol{\beta} + \overline{\boldsymbol{Z}}_{\boldsymbol{i}}'\boldsymbol{\gamma} + \overline{\varepsilon}_i. \quad (2)$$

Subtracting then Eq. (2) from Eq. (1) yields:

$$w_{it} - \overline{w}_i = \lambda_t - \overline{\lambda} + \rho\left(D_{it-j} - \overline{D}_i\right) + \left(\boldsymbol{X}_{\boldsymbol{it}} - \overline{\boldsymbol{X}}_{\boldsymbol{i}}\right)'\boldsymbol{\beta} + \left(\boldsymbol{Z}_{\boldsymbol{it-j}} - \overline{\boldsymbol{Z}}_{\boldsymbol{i}}\right)'\boldsymbol{\gamma} + \left(\varepsilon_{it} - \overline{\varepsilon}_i\right). \quad (3)$$

Looking at Eq. (3), it becomes obvious why we are able to control for individual fixed effects, $\alpha_i$. Deviation from means simply removes them.

At the same time, we have to accept that there might exist some time-varying influences on wages for which we cannot control in this setting. For example, someone who became unemployed might have lost part of his self-confidence, motherhood might lower the priority of climbing the career ladder and a person who has experienced serious health issues, might be less resistant to stress and show a reduced performance. Unfortunately, a fixed effects estimation fails to control for these changes and we have to acknowledge this shortcoming in our analysis.

## 5 Data

The following analyses are based on data from the first 19 interview waves of the Swiss Household Panel (SHP) which has been conducted since 1999. The SHP is an annually repeated panel study in Switzerland which re-interviews the same households over time. The main goal of the SHP is to observe social change and living conditions in Switzerland (Voorpostel et al., 2018). The surveys contain various questions on the individual and household level relating to a large range of variables such as, e.g., income, education, health, and happiness.

### 5.1 Main variables and working sample

In the SHP, an individual's current labor status can be either constructed using responses to related questions, or by deriving the variable from the occupation stated in a grid questionnaire, which is considered the less reliable method (Voorpostel et al., 2018). We therefore define someone to be employed if he has been working for pay during the week previous to the interview or if he has a job although he did not work in the week before the interview. If this is not the case, we distinguish the individual as non-employed.[6] Furthermore, a person is defined as long-term non-employed if that person has never been employed during the last 12 months. Unfortunately, non-employed interviewees are not asked whether they changed their labor status from out of the labor force to unemployed (or vice versa) since the last interview. This hinders us from imputing one of these labor statuses for the previous 12 months and thus from distinguishing between economic inactivity and unemployment in the following analyses.[7]

A different issue arises when creating our dependent variable. In Switzerland, employees can assert a claim to receive family allowances.[8] The allowances, paid per child, do not depend on job characteristics and are regulated at a cantonal level (Federal Social Insurance Office, 2020). As they are paid together with the wage, people often include them when reporting their salary. However, it is only since 2004 (wave 6), that SHP survey respondents are asked whether they have included family allowances in their declared wage. In this case, these supplements were deducted later again. In earlier interview waves, no such adjustment was made, which is why we only rely on wage data from wave 6 on. Besides this correction, the SHP team conducted plausibility checks and related measures to construct monthly net wages (Kuhn, 2010). Together with information about the percent of full-time worked and contractual working hours per week, this variable forms the basis to construct our dependent variable, the real hourly net wage.

However, we do not calculate hourly wages for all individuals in our sample. For example, we do not construct hourly wages for self-employed individuals since these are usually difficult to correctly determine (see also Arulampalam, 2001). We proceed in the same way for people working in their family company, in their own

[5]This dummy equals one if an individual is currently in education (but not in further education) and reports to be not in education anymore in the following interview wave.

[6]Only where we cannot derive the labor status this way, we rely on information from the household grid.

[7]The SHP allows to accurately differentiate with help of related questions whether someone is unemployed or out of the labor force at the time of the interview. However, someone who is out of the labor force is likely to first enter unemployment before finding a job. On the other hand, it is common that a person who is unemployed chooses to be out of the labor force for a while before looking for a job again (Layard, Layard, Nickell, & Jackman, 2005), e.g., due to further education.

[8]The same counts for self-employed, economically inactive people with modest income, and agricultural workers (Federal Social Insurance Office, 2020).

firm, in a protected atelier for handicapped persons or in armed forces. Furthermore, we do not measure hourly wages of people working in more than one job. The reason is that the SHP only provides information about job characteristics and type of employment for the main occupation (see also Kuhn, 2010). Additionally, we set age restrictions to our sample: We estimate the effect of a long-term interruption on re-employment wages for people who have not yet reached the official retirement age in Switzerland. This means, we only consider women until the age of 63 and men until the age of 64 in our analysis. Furthermore, we do not construct hourly wages for workers below age 20 in order to rule out apprentice wages (see also Ecoplan, 2013).

Similar to the SHP team, we finally perform plausibility checks. In case of obvious problems, we set the hourly wage to missing.[9] Moreover, to get rid of potential outliers, we do not consider wages of people who work less than 1 day a week and exclude wage information from observations in the first and last percentile of the hourly wage distribution. Finally, we end up with a sample of 7573 people which is used in our main estimation.

### 5.2 Descriptive statistics

In our sample, there is a larger share of women among the employed individuals who terminated a long-term career interruption since their previous interview, than among those who did not (see Table 1).[10] This is not surprising since in Switzerland, there are more women than men who are registered as unemployed or out of the labor force (Federal Statistical Office, 2020a, b). Furthermore, people having entered current employment via a recent long-term non-employment spell are on average younger and less likely to be married than those who were previously employed. They have on average less children but about the same number of children between the age of 0 and 17 living in the same household. This is in line with the, on average, lower age of the group having recently terminated a long-term non-employment spell. At the same time, these individuals have less often attained tertiary education and are more likely to work in jobs which only require a limited skill level and specialization.

In terms of job-specific characteristics, workers who recently terminated a long-term interruption tend to work in smaller firms, and earn on average about 13 CHF less per hour. They are more frequently hired on a fixed-term contract and have on average shorter working weeks compared to workers who did not. Consistent with the last point, they are also more likely to be part-time employed. These differences are of substantial size and significant at the 1% level. Furthermore, we find that people who recently exited a long-term non-employment spell work more often in fields like wholesale, retail, and repair or services associated to real estate, renting, computer, and research. They are also more likely to be employed in the hospitality industry or in health and social services. On the other hand, they work less often in manufacturing, education, financial intermediation, and insurance, compared to workers who were previously employed. However, the overall distribution across sectors is similar for both groups.

## 6 Results

### 6.1 The effect in the short run

First of all, we analyze whether there is indeed a wage penalty for someone who is currently employed, but reported to be non-employed for 1 year or more in the *previous* interview wave. We thereby compare the estimated effect suggested by different models. The results in the first column of Table 2 stem from an estimation of Eq. (1) for $j = 1$, however, without including individual fixed effects, $\alpha_i$. Instead, we estimate a pooled OLS regression controlling only for our observable variables. We find that the wage for somebody who has just experienced a long-term interruption and takes up a job with the same attributes as his former one, is about 18% lower compared to the wage he would have earned without this incident. As soon as we additionally account for time-constant unobserved heterogeneity, the effect reduces to about 7%, but remains highly significant.[11] This is vastly in line with our expectation that worker characteristics can affect wages and career interruptions: Assuming that people with less desirable traits for employers (e.g., lower ability, motivation or commitment) tend to be more frequently long-term non-employed and earn on average less, implies a negative omitted variable bias which affects our pooled OLS estimate. Hence, comparing the results of the different models shows the necessity to include individual fixed effects in our regression.

[9] We exclude wage information if a survey respondent reports to work more than 50% of full-time but spends less than 18 h per week at work or reports to work less than 50% of full-time but spends more than 25 h per week at work. We do the same for people who declare to work 100% but work less than 36 h or more than 50 h per week. (The Swiss Federal Statistical Office considers workloads of at least 36 h per week as full-time work (Federal Statistical Office, 2017). 50 hours are the maximum weekly working time according to Swiss labor law.)

[10] The descriptive analysis is based on person-year observations. Therefore, an individual may appear more than once in the sample.

[11] If we leave out the control variables for characteristics of the new job (i.e., part-time, fixed-term contract, firm size, sector, type of job) in the fixed effects estimation, we find a slightly larger wage penalty of about 8.6%. This suggests that the wage loss is for some people larger as they (only) find jobs with attributes which are lower paid on the labor market.

**Table 1** Descriptive statistics of employed people by recent labor market history, means

| | Reported long-term career interruption in previous interview | | |
|---|---|---|---|
| | **Yes** | **No** | **Difference** |
| Personal characteristics | | | |
| Female | 0.67 (0.47) | 0.50 (0.50) | 0.17 (0.03)[a] |
| Age | 36.24 (12.72) | 43.85 (11.37) | -7.61 (0.62)[a] |
| Married | 0.42 (0.49) | 0.58 (0.49) | -0.16 (0.03)[a] |
| Children | 1.02 (1.20) | 1.38 (1.23) | -0.36 (0.07)[a] |
| Children in household (0 to 17 years) | 0.70 (0.96) | 0.68 (0.99) | 0.02 (0.05) |
| Tertiary education | 0.22 (0.42) | 0.30 (0.46) | -0.07 (0.03)[a] |
| Job and workplace characteristics | | | |
| Fixed-term contract | 0.30 (0.46) | 0.06 (0.23) | 0.25 (0.01)[a] |
| Part-time work | 0.65 (0.48) | 0.39 (0.49) | 0.26 (0.03)[a] |
| Weekly hours | 26.91 (13.03) | 34.88 (10.00) | -7.97 (0.55)[a] |
| Hourly wage (CHF) | 25.82 (12.86) | 38.88 (14.97) | -13.06 (0.82)[a] |
| Firm size | | | |
| 1-9 employees | 0.26 (0.44) | 0.13 (0.34) | 0.13 (0.02)[a] |
| 10-49 employees | 0.31 (0.46) | 0.27 (0.44) | 0.04 (0.02) |
| 50-99 employees | 0.10 (0.31) | 0.12 (0.33) | -0.02 (0.02) |
| 100-499 employees | 0.20 (0.40) | 0.24 (0.43) | -0.04 (0.02)[c] |
| ≥ 500 employees | 0.13 (0.33) | 0.23 (0.42) | -0.11 (0.02)[a] |
| Type of job | | | |
| High skilled white collar | 0.47 (0.50) | 0.60 (0.49) | -0.13 (0.03)[a] |
| Low skilled white collar | 0.36 (0.48) | 0.24 (0.43) | 0.11 (0.02)[a] |
| High skilled blue collar | 0.06 (0.24) | 0.10 (0.30) | -0.04 (0.02)[b] |
| Low skilled blue collar | 0.11 (0.32) | 0.06 (0.24) | 0.05 (0.01)[a] |
| Sector | | | |
| Agriculture, hunting, forestry | 0.01 (0.12) | 0.01 (0.09) | 0.01 (0.01) |
| Manufacturing | 0.11 (0.31) | 0.16 (0.36) | -0.05 (0.02)[b] |
| Construction | 0.04 (0.19) | 0.04 (0.20) | -0.00 (0.01) |
| Wholesale, retail; repair motor vehicles, household goods | 0.14 (0.35) | 0.11 (0.32) | 0.03 (0.02)[c] |
| Hotels and restaurants | 0.05 (0.21) | 0.02 (0.14) | 0.03 (0.01)[a] |
| Transport, storage, communication | 0.06 (0.23) | 0.06 (0.24) | -0.00 (0.01) |
| Financial intermediation, insurance | 0.04 (0.19) | 0.07 (0.26) | -0.03 (0.01)[b] |
| Real estate, renting, computer, research | 0.16 (0.36) | 0.11 (0.31) | 0.05 (0.02)[a] |
| Public administration, national defence, compulsory social security | 0.07 (0.26) | 0.09 (0.29) | -0.02 (0.02) |
| Education | 0.07 (0.26) | 0.11 (0.31) | -0.03 (0.02)[b] |
| Health and social work | 0.19 (0.39) | 0.16 (0.37) | 0.03 (0.02)[c] |
| Other community, social and personal service activities | 0.05 (0.21) | 0.05 (0.22) | -0.01 (0.01) |
| Other sectors | 0.01 (0.11) | 0.01 (0.11) | 0.00 (0.01) |
| Final period of education in previous year | 0.14 (0.35) | 0.04 (0.20) | 0.10 (0.01)[a] |
| Further education in previous year | 0.20 (0.40) | 0.39 (0.49) | -0.19 (0.03)[a] |
| # Person-year observations | 338 | 31,610 | |

*Source:* Swiss Household Panel (SHP), own calculations

Standard deviations are in parentheses. The sample corresponds to the sample used in the estimation of Eq. (1) where $j = 1$. [a] significant at the 1% level, [b] significant at the 5% level, [c] significant at the 10% level.

**Table 2** Short-run estimates of log real hourly wage equations

| | Pooled OLS | Fixed effects |
|---|---|---|
| First lag long-term non-employed | − 0.181[a] (0.027) | − 0.072[a] (0.013) |
| First lag final period of education | 0.031[a] (0.010) | 0.031[a] (0.006) |
| First lag further education | 0.055[a] (0.005) | 0.014[a] (0.003) |
| Part-time | − 0.116[a] (0.007) | 0.040[a] (0.005) |
| Fixed-term contract | − 0.253[a] (0.016) | − 0.188[a] (0.006) |
| Type of job (base is high skilled white collar) | | |
| Low-skilled white collar | − 0.253[a] (0.008) | − 0.055[a] (0.007) |
| High-skilled blue collar | − 0.245[a] (0.011) | − 0.056[a] (0.012) |
| Low-skilled blue collar | − 0.385[a] (0.014) | − 0.037[a] (0.013) |
| Firm size (base is 10–49 employees) | | |
| 1–9 employees | − 0.064[a] (0.010) | − 0.017[a] (0.006) |
| 50–99 employees | 0.026[a] (0.009) | 0.012[b] (0.005) |
| 100–499 employees | 0.042[a] (0.009) | 0.014[a] (0.005) |
| ≥ 500 employees | 0.112[a] (0.009) | 0.016[a] (0.005) |
| Observations with long-term career interruption indicated in previous wave | 338 | 338 |
| Total observations | 31,948 | 31,948 |

Source: Swiss Household Panel (SHP), own calculations
The following controls are not shown: age, age$^2$, married, children, sector and wave dummies. Standard errors are in parentheses. They are clustered at the individual level for the first column (pooled OLS regression), for the second column (fixed effects regression) standard s.e. are reported. [a] significant at the 1% level, [b] significant at the 5% level

Furthermore, we find that, on average, working on a fixed-term contract reduces the hourly wage considerably and significantly, whereas being previously in education or professional training has a more modest but still significantly positive effect on earnings. Moreover, our results suggest that high-skilled white collar workers earn significantly more than low-skilled white collar workers and blue collar workers. Controlling for individual fixed effects allows to interpret this wage difference as a premium, which one obtains for the fact of working in a high-skilled white collar job. Consistent with previous literature, our results also suggest that larger firms tend to pay higher wages (e.g., Idson & Oi, 1999).

Depending on which model we estimate, we find that part-time workers have on average either a significantly lower or a significantly higher hourly wage than full-time workers. The latter result supports the findings of previous studies for Switzerland (e.g., Oesch et al., 2017; Schmid, 2016). This change of sign, as soon as we account for individual fixed effects, is to a large part driven by controlling for gender. This is not surprising, since women work more often in part-time jobs and at the same time women's wages are, on average, lower than men's wages.

### 6.2 The effect in the long run

As a next step, we investigate how the effect develops over the years. This means we measure the effect of a long-term non-employment spell on the wage received on average 2, 3, …, 6 years after the interruption was terminated, conditional on the individual having reported to be employed in each interview since then.

Estimating our fixed effects model (1) separately for $j = 2, \ldots, 6$, we see that the wage penalty remains basically stable for the first three interview periods, before it continuously decreases and finally vanishes over time. After six interview periods (on average 6 years)[12], the effect of a long-term career interruption is not significant anymore (see Table 3). This suggests that, on average, in the first approximately 3 years after re-employment the wage growth is similar to the one of a comparable worker who has not experienced the same incident, before it gets relatively stronger so that the returner's wage catches up again.

These results are in line with our expectations. Depreciated human capital, negative signaling effects, and lower reservation wages can cause a sharp wage penalty after a long-term non-employment spell. However, during the years after re-engagement, as skills rebuild, stigmatization decreases and occupational aspirations increase, wages tend to catch up again.

[12]Not every SHP participant is re-interviewed exactly after twelve months. However, on average the interviews take place in a twelve-month cycle.

**Table 3** Long-run estimates of log real hourly wage equations

| Waves after interruption (= *j*): | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Lag *j* long-term non-employed | − 0.084[a] (0.013) | − 0.086[a] (0.013) | − 0.055[a] (0.013) | − 0.019[c] (0.012) | − 0.003 (0.012) |
| Lag *j* final period of education | 0.020[a] (0.006) | 0.004 (0.006) | 0.001 (0.006) | − 0.007 (0.006) | − 0.008 (0.007) |
| Lag *j* further education | 0.008[a] (0.003) | 0.005 (0.003) | 0.001 (0.003) | − 0.007[b] (0.003) | 0.001 (0.003) |
| Part-time | 0.041[a] (0.005) | 0.046[a] (0.006) | 0.048[a] (0.006) | 0.039[a] (0.006) | 0.037[a] (0.007) |
| Fixed-term contract | − 0.176[a] (0.007) | − 0.184[a] (0.008) | − 0.176[a] (0.008) | − 0.156[a] (0.009) | − 0.131[a] (0.010) |
| Type of job (base is high skilled white collar) | | | | | |
| Low-skilled white collar | − 0.061[a] (0.008) | − 0.049[a] (0.009) | − 0.035[a] (0.009) | − 0.038[a] (0.009) | − 0.044[a] (0.010) |
| High-skilled blue collar | − 0.061[a] (0.013) | − 0.068[a] (0.014) | − 0.071[a] (0.015) | − 0.061[a] (0.015) | − 0.034[c] (0.018) |
| Low-skilled blue collar | − 0.054[a] (0.014) | − 0.052[a] (0.015) | − 0.071[a] (0.016) | − 0.066[a] (0.017) | − 0.063[a] (0.018) |
| Firm size (base is 10–49 employees) | | | | | |
| 1–9 employees | − 0.019[a] (0.006) | − 0.015[b] (0.006) | − 0.012[c] (0.007) | − 0.009 (0.007) | 0.004 (0.008) |
| 50–99 employees | 0.011[b] (0.005) | 0.013[b] (0.006) | 0.015[b] (0.006) | 0.017[a] (0.006) | 0.023[a] (0.006) |
| 100–499 employees | 0.011[b] (0.005) | 0.008 (0.005) | 0.004 (0.006) | 0.008 (0.006) | 0.011[c] (0.006) |
| ≥ 500 employees | 0.015[a] (0.005) | 0.017[a] (0.006) | 0.010[c] (0.006) | 0.010[c] (0.006) | 0.011[c] (0.006) |
| Observations with long-term career interruption indicated *j* waves ago | 315 | 287 | 277 | 324 | 246 |
| Total observations | 27,361 | 23,376 | 20,183 | 17,893 | 14,997 |

Source: Swiss Household Panel (SHP), own calculations
The sample underlying the results in column *j* is restricted to individuals who reported to be employed in *j* interview waves since the interruption ended, where *j* equals 2, 3, …, 6, respectively. The following controls are not shown: age, age$^2$, married, children, sector and wave dummies. Standard errors are in parentheses.
[a] significant at the 1% level, [b] significant at the 5% level, [c] significant at the 10% level

### 6.3 Subsample analyses and validity checks

#### *6.3.1 Estimation for labor market attached people*

Previous literature tells us that the probability to experience unemployment at some given point in time is higher for people who were already unemployed in the past (e.g., Arulampalam, Booth, & Taylor, 2000). Assuming that this holds especially true for re-employed people with low productivity, would imply that these people have a higher probability to drop out of our sample. This is due to the fact that we only consider individuals in our estimations who keep reporting to be employed. Therefore, part of the reversion of wage losses may be caused by changes in the sample composition (see also von Wachter & Bender, 2006).

We test this suspicion by estimating Eq. (1) only for people who report to be employed in at least six interview waves in a row after the long-term interruption ended (see Table 4). However, the main estimates are not significantly different from the ones resulting from our previous analysis, using our whole working sample. Hence, we find no support for this suspicion.

**Table 4** Future wage effects of a long-term non-employment spell for labor market attached workers. Dependent variable: log real hourly wage, j waves after the interruption

| Waves after interruption (= *j*): | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Lag j long-term non-employed | − 0.057[b] (0.024) | -0.049[b] (0.020) | − 0.113[a] (0.017) | − 0.054[a] (0.015) | − 0.011 (0.013) | − 0.003 (0.012) |
| Observations with long-term career interruption indicated *j* waves ago[c] | 84 | 113 | 139 | 180 | 250 | 246 |
| Total observations | 11,079 | 12,176 | 13,135 | 14,242 | 15,088 | 14,997 |

Source: Swiss Household Panel (SHP), own calculations
The sample in column *j* is restricted to individuals who reported to be employed in *j* interview waves since the interruption ended, where *j* equals 1, 2, …, 6, respectively. Full set of control variables is: age, age$^2$, children, sector, firm size, type of job, dummies for married, part-time, fixed-term contract, lag *j* final period of education, lag *j* further education and wave. Standard errors are in parentheses. [a] significant at the 1% level, [b] significant at the 5% level.
[c] The number of observations with previous long-term interruptions is almost steadily increasing with the number of interview waves after the interruption. This is correlated with the fact that the share of people, having changed their labor market status, job or workload since the last interview, decreases during the years after a long-term interruption. The issue is that for interviewees who indicated yearly wage information and have changed their job or labor market status since the previous interview, monthly wages could not be constructed (Kuhn, 2010). Hence, we are missing wage information for these people.

**Table 5** Future wage effects of a long-term non-employment spell for workers older than 35 years. Dependent variable: log real hourly wage, *j* waves after the interruption

| Waves after interruption (= *j*): | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Lag *j* long-term non-employed | − 0.060[a] (0.015) | − 0.064[a] (0.015) | − 0.051[a] (0.016) | − 0.030[c] (0.017) | − 0.023 (0.017) | − 0.017 (0.018) |
| Observations with long-term career interruption indicated *j* waves ago | 170 | 167 | 137 | 119 | 119 | 94 |
| Total observations | 23,901 | 20,451 | 17,392 | 14,983 | 13,256 | 11,179 |

Source: Swiss Household Panel (SHP), own calculations
The sample in column *j* is restricted to individuals who reported to be employed in *j* interview waves since the interruption ended, where *j* equals 1, 2, …, 6, respectively. Full set of control variables is: age, age$^2$, children, sector, firm size, type of job, dummies for married, part-time, fixed-term contract, lag *j* final period of education, lag *j* further education and wave. Standard errors are in parentheses. [a] significant at the 1% level, [c] significant at the 10% level

#### *6.3.2 Estimation for more mature workers*

Another potential threat to validity lies in wage histories of young workers, since they are likely to not yet represent individual productivity, and thus to not correctly reflect individual heterogeneity (see also von Wachter & Bender, 2006). As starting salaries are often comparably low, we might therefore underestimate our effect of interest. If such a downward bias (in absolute terms) indeed affects our previous results, we would expect to encounter stronger negative effects of a long-term career interruption for more mature workers. To investigate this assumption, we conduct a subsample analysis including only wage data of people older than 35 years. The results show that the effect of a long-term non-employment spell is of similar strength for this, on average, older subsample: The wage penalty in the first year amounts to 6%, if a worker finds a job with the same attributes as his previous one, and fades away after about 5 years (see Table 5). Hence, there is no indication that including wages from career beginners biases our results.

#### *6.3.3 Separate estimations for men and women*

Nudged by previous literature, we want to find out whether the effect of a long-term non-employment spell differs by gender. Estimating Eq. (1) separately for men and women, it turns out that men's wages take on average considerably longer to catch up with the wages of their counterparts who have not experienced a recent long-term career interruption (see Table 6). Only after about 7 years, compared to 5 years for women, the wage effect for men is not significant anymore. The wage penalty during the first year of re-employment is about 10% if men take up a job with the same characteristics as their previous job. The loss is thus significantly larger than the one for women (6%). Hence, we find that, on average, a long-term career interruption is less damaging for women than for men, firstly because they suffer a smaller wage penalty at re-employment and secondly because they can more rapidly recover the initial loss. Our findings are therefore mainly in line with our expectations and previous literature on the topic.

**Table 6** Future wage effects of a long-term non-employment spell for men and women. Dependent variable: log real hourly wage, *j* waves after the interruption

| Waves after interruption (= *j*): | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Men | − 0.105[a] (0.019) | − 0.118[a] (0.019) | − 0.095[a] (0.020) | − 0.102[a] (0.019) | − 0.095[a] (0.017) | −0.042[b] (0.019) | −0.023 (0.019) | 0.004 (0.022) |
| Observations with long-term career interruption indicated *j* waves ago | 113 | 99 | 88 | 89 | 110 | 74 | 70 | 56 |
| Total observations | 15,936 | 13,709 | 11,768 | 10,229 | 9152 | 7731 | 6552 | 5513 |
| Women | − 0.058[a] (0.018) | − 0.065[a] (0.018) | − 0.081[a] (0.017) | − 0.032[c] (0.017) | 0.017 (0.016) | 0.012 (0.017) | 0.011 (0.019) | − 0.000 (0.020) |
| Observations with long-term career interruption indicated *j* waves ago | 225 | 216 | 199 | 188 | 214 | 172 | 160 | 119 |
| Total observations | 16,012 | 13,652 | 11,608 | 9954 | 8741 | 7266 | 6034 | 4963 |

Source: Swiss Household Panel (SHP), own calculations
The separate samples for men and women in column *j* are equally restricted to individuals who reported to be employed in *j* interview waves since the interruption ended, where *j* equals 1, 2, …, 8, respectively. As we still find a significant negative effect for men after 6 interview waves, we extended our analysis by two more periods to show that the wage recovers later in the future. Full set of control variables is: age, age$^2$, children, sector, firm size, type of job, dummies for married, part-time, fixed-term contract, lag *j* final period of education, lag *j* further education and wave. Standard errors are in parentheses. [a] significant at the 1% level, [b] significant at the 5% level, [c] significant at the 10% level

The difference between the effects cannot be explained by the standard human capital theory. Investigating the average time spent in a long-term non-employment spell of our main estimation sample indicates that women remain off work for a longer period than men, which means that women's human capital could potentially depreciate even more strongly.[13] Hence, it is likely that other mechanisms are at play. Several earlier studies suggest that this heterogeneity is driven by signaling effects (e.g., Albrecht et al., 1999; Mortelmans & Frans, 2017; Theunissen et al., 2011). By showing a past non-employment spell in their CV, men may send a signal of low productivity to future employers who in turn react with a lower wage offer. Afterwards, it takes a long time for the workers to teach their future employer(s) better. In contrast, women's time out, of course primarily due to family reasons, might not send the equivalent signal to an employer as women are traditionally seen as the ones who take a break for caring responsibilities. And generally, they do so more often than men. Hence, women should on average carry less stigma and get rid of it more quickly, which is what our results suggest.

## 7 Conclusion

Using data from the Swiss Household Panel, this paper investigates the effect of a long-term career interruption on subsequent wages. Its focus is thereby particularly set on exploring how the effect changes in the first years after re-employment. Estimating fixed effects regression models allows us to account for time-constant unobserved individual characteristics affecting both wages and the occurrence of long-term career interruptions.

Consistent with previous literature on the topic, we find a significant negative effect of a long-term non-employment spell on the wage received during the first year back in employment. Our fixed effects estimate indicates an initial wage penalty of about 7% if a worker takes up a job with the same attributes as the one previously held. Furthermore, in line with several earlier studies, we find evidence for a wage rebound effect as workers keep reporting to be employed. After approximately 5 to 6 years the effect is no longer significant. We find no indication that our results are driven by a change in the sample composition.

Our initial concern that wages at the beginning of the career might downward bias (in absolute terms) our results has not been confirmed: Restricting the sample to people aged older than 35 has not considerably changed the results.

Comparing the effect for men and women, we find that after a long-term non-employment spell women's wages catch up significantly (on average 2 years) faster to the wages of their counterparts who did not experience the same incident and also the initial wage penalty seems to be more moderate for women than for men. Hence, by conducting subsample analyses we have found underlying heterogeneity of our effect of interest which is similarly suggested by previous literature on the topic.

Our results are in line with predictions of the human capital, signaling and reservation wage theory. The general pattern of the effect of interest which we encounter equally for the initial working sample and our subsamples can be coherently explained by human capital dynamics which are different for people having just experienced a long-term work interruption and those having not (Mincer & Ofek, 1982). But also, negative stigma effects associated with a long career break (Vishwanath, 1989), such as lower reservation wages at the career re-start (Mortensen, 1986) can explain the wage trend we find.

The heterogeneous effects we detect, highlight the importance of such alternative mechanisms. The heterogeneity among the effect for men and women can be, for example, well explained by different stigmatization concerning career commitment and motivation: In contrast to men, women are rather expected to take a time off, especially due to family reasons (e.g., Albrecht et al., 1999; Mortelmans & Frans, 2017).

What remains important to mention is that, on average, the rebound effect takes place not before 3 years following the interruption. In terms of long-term unemployment in Switzerland, this implies that labor market measures should keep focusing on rebuilding individual labor market attachment and preventing longer breaks.[14] For workers themselves, who re-enter the labor market after a long-term career interruption, it is crucial to not become disillusioned about the future career: During the first years, the wage is likely to be lower than the one of comparable workmates before it eventually catches up.

Our results indicate that wage effects in Switzerland are likely to vary by the type of career interruption. According to previous findings for other countries, there exists heterogeneity among the impacts of different forms of non-employment spells on future wages. Furthermore, this seems to be again varying for men and women (e.g., Albrecht et al., 1999; Beblo & Wolf, 2002; Theunissen et al., 2011). Although there are several studies for Switzerland which focus on the effect of unemployment on future wages, evidence on the influence of other types of career breaks is scarce. Hence, it would be an interesting task for future research to further investigate the effects of different forms of non-employment spells on wages and to compare these effects, also for different population groups.

[13] Based on our observable data, we find average non-employment spells of 2.1 years for women and 1.5 years for men.

[14] These goals are already targeted by measures of the Swiss unemployment insurance (see, e.g., State Secretariat for Economic Affairs, 2018).

### Abbreviations

AHV: Alters-und Hinterlassenenversicherung, old-age and survivor's insurance; ASAL: Auszahlungssystem der Arbeitslosenkassen, unemployment offices payment system; AVAM: System der Arbeitsvermittlung und Arbeitsmarktstatistik, system for placement and labor market statistics; CHF: Swiss franc; CV: Curriculum Vitae; e.g.: Exempli gratia, for example; i.e.: Id est, that is; i.a.: Inter alia, including; OECD: Organisation for Economic Co-operation and Development; OLS: Ordinary Least Squares; SE: Strukturerhebung, structural survey; s.e.: Standard error; SHP: Swiss Household Panel; STATPOP: Statistik der Bevölkerung und der Haushalte, Population and Household Statistics

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### Author's contributions

The author(s) read and approved the final manuscript.

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### Availability of data and materials

The data of the Swiss Household Panel (SHP) that support the findings of this study are available from the Swiss Centre of Expertise in the Social Sciences FORS but restrictions apply to the availability of these data, which were used under contract for the current study, and so are not publicly available. Data are however available with authorization of the Swiss Centre of Expertise in the Social Sciences FORS. Data on the Consumer Price Index which were used in the current study are available in the OECD repository, https://data.oecd.org/price/inflation-cpi.htm.

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Competing interests

The author declares that she has no competing interests.

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