Online Appendix of

Intertemporal Labor Supply Substitution?
Evidence from the Swiss Income Tax Holidays

By Isabel Martínez, Emmanuel Saez, and Michael Siegenthaler

A.1 Betwixt Assessments

In this section, we describe betwixt assessments carried out to deal with large changes in economic situation under the old system and how they interact with the transition. Betwixt assessments were done only when changes were permanent, which is defined as a change in work status lasting at least 2 years. Starting to work for a short period (less than 2 years) or stopping work temporarily (less than 2 years) would not trigger a betwixt assessment. As such, temporary extensive margin responses carried out during the tax holiday are not affected by betwixt assessments.

Incentives created by betwixt assessments. Under the old system and during the tax holidays, when a person had a permanent change in employment situation, or moved permanently to a different canton during a tax period, the system adopted a temporary pay as you earn taxation (betwixt assessment) until the end of the period. Let us examine in detail how this affects incentives for permanent entry, permanent exit, or migration.

Permanent entry. Suppose the tax period is 1995/1996 and a person had not worked in 1993/1994 and started working on July 1st, 1996 for 2000 CHF/month. In this case, there is no taxation in 1995 and the first half of 1996 (as the reference period 1993/1994 has zero earnings). In the second half of 1996, there is a betwixt assessment where the person is taxed based on her current new earnings, annualized to 2000×12=24,000 CHF. This assessment lasts for 6 months only (so that half of an annual tax on 24,000 CHF is due). In 1997/1998, the person is taxed based on her annualized income of 24,000 CHF from 1996 (i.e., the reference earnings for the 1995/1996 are taken to be the annualized earnings when the person was working). Earnings from 1997/1998 will then be taxed in 1999/2000, etc. Therefore, in the old system, new entry earnings were doubled taxed, first as pay as you earn and then during the regular next period of taxation.

Entering during the tax holiday triggers a betwixt assessment exactly as in the old system but, in contrast to the old system, there would be no double taxation during the next period. Hence, the tax holiday also reduces the tax burden on the entry margin but it is less salient as only the second and future layer of taxation is removed. Empirical analysis (not reported) shows that the tax holiday has no significant impact on entry decisions.

Permanent exit. Symmetric incentives are created along the exit dimension.[43] Let us consider the most common case of retirement. Suppose a person earns 2000 CHF/month up to July 1, 1996 and then retires with a pension of 1000 CHF/month. In 1995 and the first half of 1996, the tax is based on average earnings of 1993 and 1994. In the second half of 1996, the person is taxed pay as you earn

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[43]Under the old system, death extinguishes tax liability so that income made during one's last tax period is never taxed (and income earned during the tax period preceding death is only partly taxed while the person is still alive in her last tax period). We do not study this aspect as most people stop working well before death and death while still working is typically an unexpected event.

based on annualized pension income of 12×1000=12000 CHF. In 1997/1998 the tax will also be based on 12,000 CHF of annual pension income from the second half of 1996. Hence, initial pension income is also double taxed. This implies that the earnings while working made in 1995 and the first half of 1996 are never taxed in the old system (and the earnings for 1993/1994 are only taxed for 1.5 years out of 2, hence bear only 75 percent of the normal tax burden). Effectively, the old system created a tax holiday for earnings made in the tax period when leaving the labor force (and a partial tax holiday for the period before leaving the labor force). Therefore, the best strategy is to have high earnings (e.g. earn overtime or get bonuses) just before retirement.[44] Empirical analysis (not reported) of earnings prior to retirement suggests that retirees had indeed high earnings in their last tax period in the old system (using the new system as a control group).

Exiting during the tax holiday triggers a betwixt assessment exactly as in the old system. Therefore, pre-retirement earnings are taxed exactly the same in the old system and during the tax holiday transition. The only difference is about the treatment of pension income. In the old system, pension income in the first period of retirement is taxed twice while it is taxed only once during the tax holiday. We do not have access to pension income data to analyze responses of pension benefits.[45]

Migration to another canton. Migration to another canton also triggered a betwixt assessment under the old system. I.e., tax liability in the canton of origin stopped and was replaced by pay as you earn on a annualized basis in the new canton of residence. This means that earnings in the canton of origin was partially tax exempt while initial earnings in the new canton of residence would be doubled taxed. Moving during the tax holiday also triggered a betwixt assessment. As a result, riding the tax holiday waves by moving from canton to canton to follow the blank years was not a winning strategy. After the first move, the taxpayer would be assessed on her current income and hence would not benefit from the tax holiday anymore. Therefore, the tax holiday actually reduces incentives to move during a tax holiday. Our data are consistent with a reduction in migration during the tax holiday as expected from the tax incentives we have described but these effects are quantitatively small and not significant econometrically.

Intensive responses. A large and permanent change in earnings (conditional on working) could also trigger a betwixt assessment if specific restrictive conditions were met (see below). In such cases, the new earnings were taxed twice under the old system (pay as you earn during the betwixt assessment and retrospectively in the next tax period) and only once during the tax holiday. However, this reduction in the tax burden might not have been very salient to taxpayers.

How did betwixt assessments work in practice?   Next, we provide details on how such betwixt assessments worked and were administered and how this impacts our analysis.

Origins. The betwixt assessment was added to the tax code in the 1950s, about 10 years after the introduction of the federal income tax law in 1940. The goal was to adjust taxes downward faster when income fell (as the tax adjustment had a two year lag in the system). Therefore, the betwixt system

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[44]The timing of exit along the extensive margin is actually neutral. Exiting early in the period implies that the previous tax period earnings are almost fully exempt. Exiting late in the period implies that the current tax period earnings are exempt. Empirically, we find no effect on the timing of retirement during the tax period in the old system. The old system also encouraged people to have initially low retirement benefits.

[45]There is relatively little scope for individuals to control the level of their defined benefits pensions. However, there is more flexibility in how individuals choose to receive their defined contributions benefits from their individual pension fund accounts: they can choose the pre-defined annuity, which is taxed as income, or cash-out the capital, which is taxed with a separate one-time tax at payout. Bütler and Ramsden (2017) study the role of taxation in individual annuitization decisions.

is geared toward *decreases* in income rather than *increases* and is generally initiated at the request of taxpayers as the tax administration does not receive real time information on income changes (recall there is no withholding at source nor third party reporting for earnings in Switzerland). The view was that betwixt adjustments should remain the exception. The list of causes, which allowed for a betwixt assessment, was defined and the provision was to be applied restrictively.

Triggers causing a betwixt assessment. A mere reduction or increase in income alone was not a sufficient condition for a betwixt assessment. The betwixt assessment was applied when the underlying structure of the income changed. Acceptable reasons listed in Art. 45 DBG were: a) divorce or permanent separation, b) permanent and substantial changes of the underlying basis of livelihood as a result of taking or giving up work or change of occupation, and c) inheritance. The federal and cantonal courts specified Art. 45 b) further in many verdicts. The occupational change needed to be substantial and of "far-reaching structural" nature (e.g., BGE 115 Ib 11, 1989; Entscheid Steuerrekurskommission des Kantons Basel-Landschaft Nr. 99/1996). Examples include change of occupation into a completely different field, where the knowledge and skills from the former job are no longer of substantial value, or if the income is determined by substantially different criteria (e.g., going from a fixed salary to a piece rate or a revenue participation) and evolves differently (BGE 115 Ib 11, 1989). This included the change of the main activity (see below) between employment and self-employment. In this case, the magnitude of the income change was of no importance, since the change was structural in nature (BGE 115 Ib 11, 1989; BGE 101 Ib 398 ff., 1975). In any case, the change needed to be permanent in addition to meeting one of the conditions laid out above. The fact that cumulative requirements had to be met for a betwixt assessment means that during the tax holidays especially intensive margin responses would typically not trigger a betwixt assessment.

Provisions with respect to the magnitude of the change in income. Since the objective of betwixt assessments was to reduce hardship, legal practice evolved further mainly around cases of income reductions. To keep the number of betwixt assessments low, over time courts added minimal criteria, by which the income had to change in order to qualify for a betwixt assessment. For the federal tax and the majority of cantons, income needed to fall by at least 20 percent (33 percent in Wallis, 25 percent in Bern and Basel-Landschaft). Most cantons required in addition that the change exceeded some nominal threshold (3000 to 20,000 CHF; Facts, Nr.6/1998 "So sparen Sie bei Ihren Steuern", p. 56 ff.). This implies that increases in income of up to 20 percent (and much more, as is laid out below) were possible during the tax holidays without triggering a betwixt assessment. Furthermore, as Känzig, the leading scholar in the field noted in his reference handbook (Känzig, 1982, p. 799), such income limits were not to be taken for sufficient conditions in cases of increases in income. The wish of the legislator had been to ease hardship by the means of betwixt assessments. In the case of an increase in income, which is what we study, there was no hardship to be eased.

What did permanent mean? Betwixt assessments were only done if the income change was permanent. Juridical practice could vary, such that depending on the canton a change was deemed permanent if it lasted more than typically 24 months. In the canton of Aargau even a case where someone took up or gave up the main employment for up to five years was not seen as permanent change (Beer, 1979, p.58). In a case related to unemployment, the canton of Basel-Landschaft adhered to 24 months for a change to be permanent, a ruling which was confirmed by the federal court in 1996 (in: Gerichts- und Verwaltungspraxis des Kantons Zug 1997/98, p. 15). If it was unclear whether a change in employment would be permanent or not, tax authorities reverted to what was usual in that case. Irregular or non-permanent jobs like assistant teacher, temporary help or replacements for someone were seen as non-permanent activities in nature (Känzig, 1982, p. 778). It was therefore possible to take up several,

small short-term jobs during the tax holiday to exploit the tax-free years. If ex-ante it could not always be determined with certainty whether a new employment would be of permanent nature, there was no urge for the tax authorities to answer this question right away. It was always possible to do a betwixt assessment if ex-post a change turned out to be permanent and substantial.

No betwixt assessments for professional mobility. Professional changes within the same field such as promotions, up- and downward professional mobility, expansion of professional activities, taking or giving up some professional activities (e.g., running a second restaurant, sitting on the board of a company, becoming a partner of a private company), or a simple change of job from one employer to another were not deemed as changing the structure of the income generating process (BGE 115 Ib 11, 1989; (Känzig, 1982, p. 790)). Related changes in income averaged out over time and they were taken into account under the regular, past-based tax system–albeit with a delay of several years. Examples include an employee who founded his own incorporated company where he was the sole employee. The canton of Basel-Landschaft did not deem this change as qualifying for a betwixt assessment, as the taxpayer was technically still an employee and he had not changed profession or the field of work (BStPra 4/1998, 198-205).

No betwixt assessments for changes in secondary employment. Taking or giving up a secondary employment or secondary professional activity ("Nebenerwerb", "Nebenserwerbstätigkeit", "activité lucrative accessoire", "activité annexe") did not qualify for a betwixt assessment, even if this change was permanent (BGE 110 Ib 313, 1984). Examples include an employee in hospitality who sporadically also earned money in real-estate trade. The latter was deemed a secondary activity and when he gave up this activity, the tax authorities did not grant him a betwixt assessment, because his main activity in hospitality had not changed (Entscheid der Steuerrekurskommission des Kantons Basel-Landschaft Nr. 6/1996). Similarly, taking or giving up a seat in a company board did not qualify for a betwixt assessment, even though the change in income from such activities could be substantial and was permanent. The distinction between main and secondary occupation was not primarily drawn according to the relative income these activities generated, but according to the time dedicated to them (Beer, 1979, p. 57 ff. with specific examples for Bern and Aargau). Therefore, the main activity of a full-time employee who ran her own business on the side, was her employment, even if the business generated higher income. This distinction between main and secondary activity allowed taxpayers, who already had a job, to start up their own business or take up a second job on the side and fully exploit the tax holiday.

Betwixt assessments only for substantial changes in the level of the main employment. In some instances, cantons did apply betwixt taxation in response to changes in employment with the same job, usually only the main job. This was the case if changes in the level of employment were substantial, such as going from part-time to full-time employment. Relevant again was not the change in income, but the percentage change in employment. For instance, the canton Basel-Landschaft saw a change from 80 percent employment (approx. 34 hours/week) to 50 percent (21 hours/week) as not substantial enough for a betwixt assessment. The relative change in employment had to be at least 40 percent (and not 37.5 percent as in this case; Entscheid der Steuerrekurskommission des Kantons Basel-Landschaft Nr. 99/1996). In the canton of Bern, betwixt taxation was done if the absolute change in employment percent was at least 50 percentage points. Doubling employment from 40 percent to 80 percent was therefore possible without triggering a betwixt assessment (Berner Zeitung, 18.11.1999, "Rat in der BZ", p. 32.). Especially for those already in the labor market it was therefore possible to have substantial increases in income through increases in labor supply during the tax holiday, without being taxed.

The case of secondary earners. For secondary earners, changes in labor supply at the intensive margin were not usually cause for a betwixt assessment. In line with the considerations above, what mattered

were the hours supplied and not the change in income. The case was more complicated for secondary earners who had been permanently out of the labor force and took up a job. Occasional, irregular jobs were not a cause for a betwixt assessment (Berner Zeitung; 30.09.1999, p. 29, "Rat in der BZ"). Examples would include working three months as substitute teacher, helping out in a nearby restaurant one summer etc. Also, incidental help in the spouse's business was not a cause for a betwixt assessment (Känzig, 1982, p. 779). Taking up a sideline but regular and permanent job–even with a limited amount of hours–was cause for a betwixt assessment in most cantons (e.g., Bern, Schaffhausen, Basel-Landschaft) but not in all (e.g., Aargau; Beer, 1979; BGE 102 Ia 352). Taking up a main job was cause for a betwixt assessment (Känzig, 1982, p. 779). Therefore, extensive margin responses of second earners were only possible to some limited degree if the new job was permanent (lasting typically 2 of more years).

How and when was a betwixt assessment done? A betwixt assessment was done (i) automatically, when the tax authorities knew that the conditions for a betwixt assessment were met (e.g., when registering as self-employed or as a new wage earner, when retiring and applying for the public pension, or when moving between cantons with a prae-numerando system). In some cantons taxpayers were requested to inform the tax authorities about changes in employment during the tax period. Tax authorities also systematically ran information campaigns for labor market entrants in vocational schools about the importance of informing the tax administration when taking up the first job, in order to avoid large tax bills due two or three years later. (ii) the taxpayer requested a betwixt assessment (e.g., when becoming unemployed, respectively after being unemployed for an extended period of time of at least 12 months and claiming a substantial, permanent change in her income). (iii) ex-post, after filing the tax return. In the latter case, the tax liability was corrected ex-post. This was for example the case when a formerly non-working spouse permanently entered the labor force. Note that tax administrations have no access to the social security earnings data. They could therefore not check income or the number of employers in the social security data, in case someone took up a second job, for example.

What income was subject to a betwixt assessment? It was always only the new income stream causing a betwixt assessment, which was taxed pay as you earn. In case of the spouse entering the labor force, only his or her income was affected; the spouse's and any other incomes were still facing standard retrospective taxation. Following the same logic, if a single taxpayer had several income sources (e.g., labor and capital incomes), only the income stream which met the conditions for betwixt taxation was taxed pay as you earn.

How did tax administrations know whether to do a betwixt assessment during the reform? The reform caused blank years, and for these no regular tax return was collected. However, all cantons required to fill out a special, shortened tax return (sometimes together with a brief questionnaire) in the first year under the new system, i.e., right after the tax holiday had ended. The purpose was to detect extraordinary incomes earned during the tax holidays, such as lottery gains or extraordinary compensation like bonuses or gratification payments not foreseen in the contract and not usually paid out in prior and/ or future years (on the treatment of bonuses, also see court ruling StGE BL Nr. 69/2002, September 13 2002).

How were extraordinary incomes during the tax holiday and betwixt assessments different? Extraordinary incomes were subject to a separate tax during the tax holiday. This was done mainly to avoid tax avoidance through income shifting. In contrast to a betwixt assessment, however, only the part exceeding ordinary income was taxed. For example, a self-employed who had some extraordinary income from self-employment, e.g. a windfall gain, only paid the annual tax on the extraordinary part, but not on her whole income from self-employment. This means that if taxpayers tried to increase their income in response to the tax holiday, it was always only the part deemed as extraordinary which was taxed ex-post, ordinary income remained taxed. Betwixt taxation on the other hand affected the whole income

stream, e.g., all income from self-employment when changing from employee to self-employed.

Measurement of self-employment income. Employees pay social security contributions pay as you earn with direct withholding at source. Therefore, the reporting of wage earnings to social security has always been done fully independently of the income tax system and hence is not affected by the tax holiday reforms we are studying. In contrast, for self-employment income, contributions to social security were and are based on self-employment income as reported in the federal income tax return. Tax authorities must communicate the self-employment income information to the cantonal social security agencies. Due to the biennial nature of the old income tax system, self-employment incomes in the social security records appear as constants over two years for most self-employment income (exceptions were cases of betwixt assessments, see below). What follows applies only to self-employment income.

Old system. Like the income tax system, the social security system was of retrospective character for self-employment income in the old system. As a result, assessment period and contribution period were not identical. In addition, in order to leave enough time for reporting from the tax authority to the social security administration, social security contributions were assessed with a one year lag compared to the federal income tax liability. Therefore, self-employment income earned in 1995/1996 would be reported for tax purposes in 1997/1998, and in the social security system for years 1998/1999.

This resulted in a lag of three years between actually earning income from self-employment and the year for which social security contributions were due. The social security register data records self-employment income not in the year it was actually earned, but in the year the corresponding contributions were due. This means that the entries we observe in year 1998/1999 reflect average self-employment income earned in 1995/1996.

As the assessment of social security contributions for self-employment income was based on tax returns, whenever tax authorities applied a betwixt assessment, i.e., a temporary pay as you earn assessment, this carried over to the assessment of social security contributions. The social security office, did not apply their own betwixt assessment of social security compensations, but simply used the income information from the betwixt income tax assessment as the base. For the social security office, it was of no importance whether reported income came from a betwixt or regular tax assessment.

New system. Following the changes in the income tax system, the social security system changed to a pay as you earn system also for self-employment earnings. In contrast to the income tax system, the change in the social security system, which is organized at the national level, took place at the same time in all cantons in 2001. Starting in 2001 contributions for self-employment income are due for the year the income was earned. Since self-employment income can often not be determined on a monthly basis, the self-employed make quarterly installments of their social security contributions and get a final assessment in the upcoming year(s), as soon as the definitive assessment of the federal income tax is available. Importantly, since 2001 self-employment income in the social security registers always refers to the year it was earned, not the years it was assessed.

Social security contribution holiday in 1999 and 2000 for self-employment income. The change in 2001 in turn created a social security contribution holiday for self-employment income in 1999 and 2000: incomes earned in 1999 and 2000 were never the base for any social security calculations on self-employment income. This social security holiday would otherwise have taken place in the year prior to retirement: upon entering retirement, contributions end, hence self-employment earnings during the two years prior to retirement were never the base for any social security contributions.

The social security holiday for self-employed overlapped with the tax holiday of 20 cantons. Therefore, for these 20 cantons, we do not have the actual self-employment income during the tax holidays

(unless, they got a betwixt assessment, which, however, we cannot identify from the data). In the three cantons that changed late, with tax holidays in 2001 and 2002, tax authorities had to separately collect information on self-employment income during the tax holiday to report these incomes to the social security administration (AHI-Praxis 3/2000, p.107 ff.; Art. 218 Abs. 6 DBG and Art. 69 Abs. 6 StHG). For these cantons, we do therefore have the actual self-employment income earned during the tax holidays. In the three cantons that adopted the annual pay as you earn tax system prior to 2001, tax administrations also had to collect information on earnings from self-employment during the tax holiday ex post and report it to the social security offices (AHI-Praxis 3/2000, p. 108). Using this information, the social security offices emulated the biennial retrospective system to ensure equal treatment of social security contributions across cantons. This is why we still observe the strong biennial pattern in self-employment incomes in all cantons until 2000. Because social security earnings records for self-employment income had a lag of two to three years, we can analyze the response of these incomes to the tax holiday in the canton of Zurich and Thurgau, despite the missing records for 1998. For self-employment incomes, what is missing, are the actual incomes of 1995.

A.2 Data Description

We are using several data sources for our empirical analysis.

A.2.1 Matched SSER-Census Data

We use a novel, matched data set in our main empirical analyses. The dataset combines the Swiss population censuses with social security data that tracks the entire labor market history of the population of Switzerland. More specifically, our data set is based on a merge between the register-based population census of Switzerland as of December 2010 (via a social security number) and 100 percent of the social security earnings records (SSER) from the Old-Age and Survivors' Insurance (OASI, AHV in German), covering the period 1981–2012. We further match data from the population censuses in 1990 and 2000. These older population censuses did not contain a social security number. They can thus not be merged directly to the SSER. However, the censuses were matched with the register-based census in 2010 using probabilistic methods based on sex, date of birth, marital status, nationality, religion, place of residence and other variables in the course of the "Swiss National Cohort" project.[46]

Figure A5 illustrates our dataset. The underlying sample is everyone that ever generated an entry in the SSER between 1981 and 2010 and that still lives in Switzerland in 2010. Because almost everybody generates a record at some point in his or her life because contributing to the old age insurance is mandatory from age 18 onward, our data set contains 98 percent of the permanent population age 18 or older in 2010 (6.29 million of 6.42 million permanent residents in 2010). The merged dataset also contains information from the census 2000 for 5.18 million individuals (83 percent of the sample) and from the census 1990 for 4.34 million individuals (69.1 percent). As is illustrated by the figure, our dataset does not contain information on individuals that lived in Switzerland in 1990 or 2000 and that emigrated or died before 2010. We also do not have the census 2000 information in our linked dataset for 7.9 percent of individuals that participated in the census 2000 and in principle still live in Switzerland in 2010. The reason is that for certain individuals participating in the census 2000, there was no unique probabilistic match between the census 2000 and the census 2010 (see Spoerri et al., 2010, for a discussion of the reasons).

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[46]Spoerri et al. (2010) contains an extensive discussion of this data linkage.

Figure A6 shows the share of individuals aged 20–60 present in our SSER-census data relative to the actual population aged 20–60 in a given year. The latter data are taken from the official population statistics of the Federal Statistical Office. Our data covers 98 percent of all individuals aged 20–60 in 2010. As we move back in time, the sample coverage of persons aged 20–60 gets slightly smaller because certain individuals that lived in Switzerland in these earlier years died or emigrated and hence are not in the 2010 census. The figure shows that our matched data set contains 92 percent of all individuals aged 20–60 living in Switzerland in 2000. For 92 percent of these individuals, we have data from the census 2000.

In the SSER data, employed and self-employed individuals generate one record per job per year that details the starting and ending month of an employment relationship along with the total earnings over that time period. For example, a person with two different employers and also some self-employment income would generate three records.[47] Finally, the register also contains contributions of non-employed individuals (e.g. students) because contributions to the old-age scheme are mandatory from age 20 onward until reaching the statutory retirement age. The statutory retirement age was 65 for men throughout our sample period. For women, it was increased from 62 to 63 in 2001 and to 64 in 2005 as part of the 10th OASI reform implemented in 1997. Besides the retirement age, the reform increased compulsory coverage of non-employed married and widowed women below retirement age, who had been exempt from annual contributions towards the OASI before.

In Figure A7, we compare the employment rate of 20 to 64 year-old Swiss men and women in our data with the employment rate of these groups according to the SLFS (Swiss labor force survey). We observe that the employment rates are slightly higher in our data than they are in the SLFS. The likely reason is that the employment rate in the SLFS refers to the second quarter of each year, while we define a person as employed in a given year if she or he has positive earnings in at least one month of the year.

While the data cover the near universe of the population of Switzerland, the matched data set has some disadvantages, too. First, the earnings records in 1998 are incomplete. The share of wage earners for which records are missing is about 5 percent because of data failure in some local social security offices (see the discussion below). Second, the register-based census 2010 does not contain information on some variables of interest normally available in census data such as schooling/education, occupation, or number of children. Such information are only available for individuals for which we could match the censuses in 1990 or 2000. For the relatively small number of individuals that we were unable to match to the census data in 2000, we only observe the characteristics of individuals as of 2010. This is a concern for characteristics that can change over time, especially an individual's place of residence, marital status and immigrant status or citizenship. The census provides information on how these characteristics changed in the past, allowing us to reconstruct the information for years prior to 2010. Nevertheless, we have to impute some of the data points making a set of assumptions. We discuss how we exploited the various variables in the census datasets in order to construct the three variables below.

Missing records in 1998. The earnings records in the year 1998 are incomplete. About 5 percent of all records are missing. Figure A8 illustrates this. The reasons for the missing observations are not entirely clear. According to statisticians of the compensation office, the missing records most likely arise because one of the IT pools, which are responsible for delivering the earnings records of several equalization funds (*Ausgleichskassen*) to the federal equalization fund collecting the data, had IT problems at the time. As one IT pool handles several equalization funds, several equalization funds

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[47]Moreover, the data contain individual records for unemployment benefits and disability pensions as well as income compensation allowances in the event of military service or maternity.

have missing records in 1998. The problem is that some cantons are more heavily affected by the missing data problem than others. For example, descriptive analyses suggest that the cantonal equalization funds of the cantons of St. Gallen and Fribourg were strongly affected. The problem with the missing records remained unnoticed at the time because statistics that are based on the earnings records were only published in odd years. Inquiries revealed that it would be impossible to try to recover the missing records as of today. The reason is that many affected workers are retired by now. The equalizations funds discard the data for retired workers. In the event study micro-approach, we thus discard observations from 1998 to ensure that our analysis is not affected by this data problem. For aggregate time series, we re-estimate each series by year and group in a refined sample that excludes all compensation offices affected by the 1998 missing data. We then impute 1998 values in the full data assuming that the 1998 value relative to the average of 1997 and 1999 is the same in the refined sample as in the full sample.

Missing records in certain compensation offices in certain years. In a few cases, there are also compensation offices in which the records for a year other than 1998 are missing. These are usually smaller compensation offices with a small number of affiliated workers. We identified these cases by looking at detailed time series of employment rates by canton and subgroups of the population. They always lead to a large drop in the aggregate employment rate of a specific subgroup in just one year within employment rate series that are usually very smooth. In total, we identified 14 cases of missing data. Each of these cases is somewhat different. For instance, the missing data may only affect self-employment spells or only affect individuals from certain cantons within the same compensation office. In order to keep as many individuals in the sample as possible, we thus treated each of these cases separately. In general, we identified the subgroup of individuals that is likely to be affected by the problem, and then discard all spells from these individuals altogether. Due to this data cleaning, we drop 3 percent of all individuals from the analysis sample.

Dropping these individuals does not affect any of the aggregate results presented in the paper. In a few cases, it slightly increases the precision of the estimates.

Place of residence. The different censuses provide various pieces of information on an individual's place of residence in a given year:

- Register-based census in 2010

  - Municipality of residence in 2010

  - Year a person moved to the municipality in 2010

  - Municipality of residence in 2009, 2008 and 2005 (incomplete)

  - Municipality of residence before the one in 2010

- Census 2000

  - Municipality of residence in 2000

  - Municipality of residence in 1995

- Census 1990

  - Municipality of residence in 1990

  - Municipality of residence in 1985

We exploit all of these variables in order to assign individuals to the places they live in a given year. In case the information is inconsistent, we always prefer the information from a newer census wave. The list of variables makes clear that we know individual's place of residence for a large share of the population in certain benchmark years (i.e. 2010, 2009, 2008, 2005, 2000, and so on). Figure A9.A illustrates this. In 2000, for instance, the place of residence is known for 93 percent of individuals in our sample. The first assumption when imputing locations is to assume that individuals stayed in the municipality of residence throughout the entire period if the municipality of residence does not change between in two consecutive benchmark years (e.g., 2000 and 2005). As shown in Figure A9.A, this assumption reduces the share of missing information on place of residence substantially. The next step is to assign (random) moving years if our data shows that a person moved between two consecutive benchmark years from one place to another. The final step in the imputation is to assign individuals to the last known place of residence for all years where the data is missing.[48]

We evaluated the accuracy of our imputation exploiting the fact that the SSER data contain identifiers of cantonal unemployment agencies if an individual receives unemployment benefits. Since the unemployed are assigned to cantonal agencies based on their canton of residence, we can compare the imputed canton of residence of registered unemployed with the canton of their unemployment agency. Figure A9.B provides a summary of the results of this accuracy test. It shows the share of correctly assigned cantons of residence for individuals for which we actually know the canton of residence due to the information in the censuses is around 98 percent throughout period. Most importantly, when we consider our full sample that also includes individuals for which we imputed places of residence, the accuracy remains high, around 90-95 percent over the period.

Immigrant status. Information on the residency status of immigrants is important in our analysis because immigrants only pay taxes in Switzerland if they either have a residency permit C or obtained the Swiss citizenship. The different census datasets contain several variables that allow us reconstructing whether a person pays taxes in Switzerland in a given year.

- Register-based census in 2010

    - Nationality in 2010

    - Year of immigration to Switzerland (in case a person is foreign born)

    - Residency permit in 2010

- Census 2000

    - Nationality in 2000

    - Year of naturalization

    - Residency permit in 2000

- Census 1990

    - Nationality in 1990

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[48]Two comments on this assumption are in order. First, the problem of missing information on the place of residence is smaller for older individuals, as individuals usually become more settled, the older they get. Second, the assumption is not as strong for the imputation of canton (rather than the municipality) of residence, because only 26 percent of the observed moves in our data occur across cantons.

– Residency permit in 1990

All individuals that are Swiss nationals and that are born in Switzerland are considered to be Swiss nationals in all years. Similarly, for a large share of the foreign born in the sample, we can reconstruct with certainty whether they were Swiss or not in a given year using the information on the year of naturalization from the census 2000.[49] The main question to answer is then whether a foreigner had a residency permit C in a given year. We first consider a foreigner to have a C permit throughout the sample period if he or she has a C permit in 1990 and/or in 2000. For the remaining individuals, we impute the missing information on the immigrant status in the years before 2010 using the year of arrival in Switzerland (reported in the 2010 census). In particular, we assume that an immigrant has a permit C or gained the Swiss passport if he or she lived in Switzerland for at least 10 years. Figure A10 provides the motivation for this approach using data from the 2010 census. Ten years after immigration 86 percent of all foreign born have a C permit or a Swiss passport. Moreover, we know the residence status in 2010. We can thus reassign individuals that are thought to be either Swiss citizen or C permit holders in 2010 which in fact are not.

Marital status.   Marital status is an important variable as it affects both the potential labor supply response and the tax rate faced by individuals due to joint filing. The census datasets provide the following information on marital status:

- Register-based census in 2010

    - Marital status in 2010

    - Year when the marital status changed

    - Year of separation (if applicable)

- Census 2000

    - Marital status in 2000

    - Year when the marital status changed

- Census 1990

    - Marital status in 1990

Figure A11 illustrates how we imputed the marital status based on the variables listed above. The figure focuses on the population aged 20–60 in a given year. Line (1) shows the number of individuals for which the marital status is known with certainty. The figure shows that the share of individuals with known marital status is 91 percent in 2000 and 100 percent in 2010. The share is smaller for years that are further away from the *next* census year. Line (2) builds on the census information but imputes missing data *between* these benchmark years. The main assumptions are the following. First, we assume no change in the marital status for the years in-between the census years if the status is unchanged between two census years. Second, if a person is single, widowed, or divorced in 1990 (2000) and married in 2000 (2010), we assume that the marital status did not change until the year of marriage as observed in the census 2000 (2010). Vice versa, if a person is married in 1990 (2000) and widowed, separated, or divorced in 2000 (2010), we assume that they were married until last date of change in the marital

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[49]We also consider someone as Swiss throughout our sample period if the year of naturalization is missing but a person is Swiss according to the censuses in 1990 and/or 2000.

status in 2000 (2010). Third, for individuals with no information from the census 1990, we assume that everyone that married between 1990 and 2000 was single before, and that every divorce or widowhood between 1990 and 2000 was preceded by a marriage which started at the average marriage age (men: 30, women: 29).

For the remaining observations—those with no data from the censuses 1990/2000—, it is only possible to reconstruct the history of the marital status up to the last change as observed in the census 2010. Prior to that event, we impute the status assuming that the change in civil status recorded in the data is the only one that ever took place.[50] In our scenario, everyone was single before getting married and every divorce or widowhood was preceded by a marriage which started at the average marriage age (men: 30, women: 29). Before that age, individuals who are divorced in 2010 are assumed to have been single. For dissolved same-sex partnerships we assume that they started no earlier than the average marriage age but always later than 2006, and that before that, the person was always single. These assumptions allow assigning a marital status to almost everyone in the sample throughout the entire period 1990–2010 (i.e. close 100 percent of the sample aged 20 to 60, see Figure A11). We drop the very few individuals for which the marital status is unknown from our analysis sample.

A.2.2 Wage Structure Surveys (LSE)

The Swiss Federal Statistical Office (FSO) has conducted the Swiss wage structure surveys (*Lohnstrukturerhebung* LSE) every two years since 1994. They are a stratified random sample of private and public firms with at least three full-time-equivalent workers from the manufacturing and service sectors in Switzerland. Excluded are (i) public sector employees in municipalities (until 2006), (ii) agricultural workers, and (iii) apprentices and interns. The surveys cover between 16.6 percent (1996) and 50 percent (2010) of total employment in Switzerland. Participation is mandatory. The surveys contain extensive information on the individual characteristics of workers and provide reliable (employer-reported) information on hours worked per worker. Moreover, they provide detailed information on the wage components of each worker, providing, among others, detailed information on bonus payments per worker.

We focus on Swiss nationals and foreign nationals with residency permit C aged 20–60. We drop a small number of observations with missing information on gender, nationality, and civil status. Moreover, we exclude public sector employees (workers from NACE rev. 1.2 two-digit industries 75, 80, and 85) since the public sector is not covered comprehensively in the surveys before 2006. One issue with these data for our analyses is that they only provide the geographical location of the work location and not the residence location. This creates measurement error for individuals who do not live in the same canton they work. We address this problem by excluding zip codes where more than 25 percent workers stem from one of the other groups of cantons relevant in the analysis. Approximately 10 percent of all observations in the surveys are dropped due to this restriction. The commuting patterns by zip code are computed from the census in 2000.

We consider the following outcomes:
- Hours of work per worker per month: Hours of work are employer-reported and refer to the month of October in each year. Hours worked refer to contractual (i.e. normal) hours worked for workers with monthly wages (4 1/3 times weekly working time) and to actual hours worked for workers paid by the hour.
- Hourly wages: Hourly wages refer to the month of October in each year. They are computed by

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[50]Note that we need the information on separated but not (yet) divorced individuals because they are taxed as singles.

dividing the sum of regular gross wage earnings in October plus 1/12 of a possible 13th monthly wage payment by hours of work per worker. Wage rates thus incorporate regular pay but exclude overtime and variable pay components (e.g. bonuses). We winsorize the lowest and highest 0.25 percent of wages to reduce the influence of outliers.

- Earnings: Earnings refer to gross labor earnings in 2010 CHF in October of each year, including social security contributions. Earnings include regular monthly wages and overtime and other variable pay components (e.g. bonuses). We winsorize the lowest and highest 0.25 percent of earnings to reduce the influence of outliers.

- Bonuses: Includes bonus payments, premiums, profit shares paid out to employees and other non-regular wage payments to the worker for the entire year of the survey.

A.2.3 Labor Force Survey (SLFS)

The Swiss Labor Force Survey (SLFS) is the equivalent of the US Current Population Survey. In the period of interest, this survey was conducted in the second quarter of each year. It includes about 17,000 individuals (approximately 0.5 percent of households) before 2002 and about 50,000 (1.5 percent) from 2002 onward. We focus on Swiss nationals and foreign nationals with residency permit C aged 20–60. These data also provide information on hours of work. The main drawback relative to our main data is a very small sample size (the full population data is about 100 times larger). As a result, most of the series produced with the labor force survey are very noisy compared to the population-wide data. Another drawback is that most variables are self-reported introducing significant measurement error as well.

We consider the following outcomes:

- Employment rate: fraction of people employed in the second quarter of each year as a share of the permanent population (refers to employment in the week before the survey)
- Earnings: total annual labor earnings, self-reported
- Hours of work per week: Hours effectively worked in week before the survey (refers to all jobs held), self-reported
- Hourly earnings: annual labor earnings divided by 51 times self-reported normal weekly working hours

A.2.4 Income Tax Rates Data

None of the above micro data sets includes individual's tax rates. We therefore merge the statutory tax rate for a given income in a given municipality to these data. Income tax rate data have been collected and made available by Parchet (2018) for this project. The data set is based on average effective tax rates on gross income published by the Federal Tax Administration for the 800 (approximately) largest municipalities. These tax rates are defined as shares of the consolidated cantonal, municipal and church tax liability in gross annual income for different categories of taxpayers (unmarried, married without children, married with two children, retired) and gross income classes (from CHF 10,000 to CHF 1,000,000). Parchet (2018) has collected the municipal tax multipliers for all municipalities between 1983 and 2014 and, using the fact that intra-cantonal differences in consolidated tax rates are almost entirely due to municipal tax multipliers, has estimated the total average tax rate for all municipalities and taxpayers.

Missing Cantons. Unfortunately, tax rates cannot be estimated with this method for the cantons of Appenzell Innerhoden and Neuchâtel before 2001. In the former, multipliers are not available; in the

latter, municipalities could set their own tax schedule. For these cases, predicting consolidated tax rates is not possible, nor is the estimation of the cantonal tax rate. Tax rates for these cantons are therefore missing.

Marginal Tax Rates. We linearly interpolate the tax rates in steps of 1,000 CHF between the income brackets provided in the original data. For incomes above 1 million CHF we assume a constant marginal tax rate. Our estimates of the marginal tax rate are based on the local changes in the tax rate in steps of 1,000 CHF.

Municipality Mergers. The consolidated tax rates and tax multipliers are published in real time for each municipality, as it exists in a given year. The location information we obtain from the Census data refers to the registers of municipalities as of November 2010. Since there has been an ongoing trend in mergers of small municipalities over time, it is not possible to perform a 1:1 match on the tax rate data. We therefore update the municipality codes in the tax rate data to match the municipality registers as of November 2010. Individuals living in a merged municipality, we assign the average tax rate of the merged municipalities. Individuals living in a newly created municipality, we assign the average tax rate that was applied on this territory prior to the secession.

A.3 Further Robustness Checks and Results

Aggregate time series. Table A2 presents estimates of the labor supply effects of the tax holiday based on regressions of the aggregate time series for all 5 groups of cantons on year dummies, canton group dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. OLS standard errors are reported. It expands upon the results presented in Table 2.

The estimation sample covers the years 1990–2010 (*including* 1998). The outcome in columns (1) and (3) is the share of wage earners in the population (in percent). The outcome in columns (2) and (4) is the average annual wage per employee with positive wage earnings. Columns (1) and (2) focus on men, columns (3) and (4) on women. Panel A is estimated using the full sample of adults aged 20–60. Panels B and C report effects for married individuals aged 20–60 with and without children, respectively. $\Delta\%y$ indicates the implied percent change in the outcome by dividing the estimated effect—the coefficient of the indicator of the tax holiday—by the average level of the outcome variable in the year of the tax holiday. The Frisch elasticity η^F is estimated by dividing $\%\Delta y$ by the estimated percent change in net of tax wage rates ($\%\Delta[1-\tau]$) due to the tax holiday for the respective group. $\%\Delta[1-\tau]$ is based on changes in average tax rates in column (1) and on changes in marginal tax rates in the remaining columns. For each individual, $\Delta\%[1-\tau]$ is computed based on hypothetical marginal or average tax rates on the actual income earned during the tax-free years in the tax system in place prior to the tax holidays.

Figure A13 zooms in on married women whose labor supply decisions are traditionally expected to be most elastic. This figure displays the employment rate (Panel A) and average earnings including non-workers (Panel B) for married women by year and groups of cantons from 1990 to 2010. The sample in a given year t is all female individuals aged 20–60 in year t and married in year t who are still alive and Swiss residents by 2010 (i.e., present in the 2010 Census). Married women are expected to be particularly responsive to taxes, yet, the figure does not show effects on employment or average earnings except perhaps in 1998 for the cantons transitioning early (blue series in circles). Panel B has excellent parallel trends for all series so that we can be quite confident that earnings of married women, which include both the intensive and extensive margins, responded at best very modestly to the tax holidays.

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Effects in the Labor Force Survey. Figure A15 displays various employment outcomes using the Labor Force Survey (SLFS): (a) employment rate, (b) earnings, (c) hours of work per week among employees, (d) average hourly earnings among employees. The sample in a given year t includes all individuals aged 20–60. For hours of work and hourly earnings, we restrict the sample to employees. We consider 3 groups of cantons: (1) 2 cantons which transitioned in 1999 with a tax holiday for 1998 or 1997–1998 (in blue circles). (2) 19 cantons which transitioned in 2001 with a tax holiday for 2000 or 1999–2000 (in green triangles). (3) 3 cantons which transitioned in 2003 with tax holiday in 2001–02 (in brown squares). (Former groups (1a) and (1b) and groups (2a) and (2b) have been pooled together given sample size in the survey data.) The dots corresponding to tax holidays are blanked out (as tax holidays are called blank years in French and German). The figure does not display any tax holiday effects on these outcomes. Given the noise in the series due to small sample size, this is consistent with our previous analysis using the much larger social security data and the wage structure survey.

Additional extensive margin effects. Table A3 presents estimates of the effect of the tax holiday on a set of further extensive margin outcomes constructed using our matched social security and census data. As before, the regressions are based on aggregate time series for the three main canton groups. The outcome in column (1) is the number of jobs per person employed. Distinct jobs are identified in the social security data based on an individual's number of different register entries with positive labor earnings in a given year. The outcome in column (2) is the number of months in employment per person employed during the year. The outcome in column (3) is the number of self-employed as a fraction of the total population. Finally, the outcome in column (4) is the number of persons moving into the respective canton group in a given year as a fraction of the total population (recall that the tax holidays actually reduced incentives to move during a tax holiday as they triggered a betwixt assessment with immediate pay as you earn taxation, see our discussion above). Panel A reports effects among all individuals aged 20–60. Panel B and C report effects for males and females, respectively. Panel D reports effects for married women only. Panel E reports effects for individuals with more than 200K average annual labor income in the 1994–1996 period.

We do not find statistically significant evidence that the tax holiday affected one of these outcomes for any of these groups. Therefore, the lack of responses along the extensive margin is pervasive and holds along all the dimensions we have explored.

Effects by income groups based on aggregate time series. Table A4 presents estimates of the tax holiday (TH) on labor supply based on regressions of the aggregate time series for the 5 groups of cantons on year dummies, group dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. The estimation sample covers the years 1990–2010 in columns 1–3 and 1987–2010 in column (4). Columns (1) and (2) are estimated using the full sample of adults aged 20–60. Column (3) focuses on wage employees (i.e., individuals with positive wage earnings). Column (4) is based on all individuals that have positive self-employment earnings in at least one period. The outcome in column (1) is the employment rate (in percent). The outcome in column (2) is annual labor earnings per person (including individuals with zero earnings). The outcome in column (3) is the average wage per employee. The outcome in column (4) is average self-employment earnings (self-employment earnings of all individuals with positive self-employment earnings in a given year). Individuals are assigned to Panels A–E based on their average annual labor income in the 1994–1996 period. Individuals with zero earnings in 1994–1996 are dropped. The Frisch elasticity η^F is estimated by dividing $\%\Delta y$ (i.e. the estimated effect relative to the average level of the outcome variable in the year of the tax

holiday) by the estimated percent change in net of tax wage rates ($\%\Delta[1-\tau]$) due to the tax holiday for the respective group. $\%\Delta[1-\tau]$ is based on changes in average tax rates in column (1) and on changes in marginal tax rates in the remaining columns. For each individual, $\%\Delta[1-\tau]$ is computed based on hypothetical marginal or average tax rates on the actual income earned during the tax-free years in the tax system in place prior to the tax holidays.

The results from the time series are very consistent with the event study estimates reported in Table 4. For wage earnings, the elasticities along the extensive margin are always zero, while the elasticities along the intensive margin are sharply increasing with earnings: from 0 at the bottom to about .09 at the top. For self-employment earnings, the elasticities are within .18–0.26 throughout the distribution.

Event study robustness checks. Table A5 shows that the main event study estimates are robust along a number of dimensions. It presents semi-elasticities derived from individual-level IV regressions of labor supply outcomes on person and year fixed effects and $\log(1-\tau_{it})$, where τ is the average tax rate in column (1) and the marginal tax rate in the other columns. $\log(1-\tau_{it})$ is instrumented with an indicator variable which is 1 in the year in which municipal and cantonal taxes are zero due to the tax holiday. The dependent variable in column (1) is an indicator whether a person has positive wage income in a given year. The dependent variable in columns (2) and (3) is average wages of males (column 2) and females (column 3) with positive wage income in a given year. The dependent variable in columns (4) is annual self-employment income per person (including zeros but in the sample of individuals with positive self-employment earnings in at least one year) in a given year. The first panel presents our baseline results (see Tables 3 and 5 for the definition of the estimation samples). Panel B excludes the control variables included in the baseline. Panel C contains two control variables absorbing effects of the tax holiday in the the year before and after the tax holiday, thus accounting for possible effects of the tax holidays on income shifting. In Panel D, we control for the cantonal unemployment rate (based on register data). In Panel E, we discard observations with imputed place of residence. In Panel F, the effect is only identified from the response in the second cantonal blank year, controlling for the effect in the first. Similarly, Panel G identifies the effect only from the response in late-coming cantons with tax holidays in 2001/02. Panel H uses wage and self-employment incomes that are not capped at 2.5 Mio. in 2010 CHF. In all Panels B-H, the estimates are very similar to the baseline estimates in Panel A.

Wage Structure Survey results. Table A6 presents estimates of the tax holiday on labor supply and wages based on regressions of aggregate time series for three groups of cantons (based on their transition timing) on year dummies, group dummies, linear time trends interacted with groups dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. The estimation is based on the wage structure surveys (LSE) 1994–2010 carried out bi-annually so that the total number of observations in each regression in 27. OLS standard errors are reported. The dependent variable in column (1) is monthly earnings in 2010 CHF in October of each year. Earnings include regular salaries and overtime and other variable pay components (e.g. bonuses). The dependent variable in column (2) is hourly wages, computed from October salaries in each year, excluding overtime and variable pay components (e.g. bonuses). The dependent variable in column (3) is employer-reported hours worked per worker in October. Hours worked refer to contractual (i.e. normal) hours worked for workers with monthly salaries and to actual hours worked for workers with hourly wages. The dependent variable in column (4) is the fraction of employees with bonuses above 5,000 in 2010 CHF. Panel A reports results for all employees aged 20–60 with Swiss passport or residency permit C in the dataset, excluding public sector employees. Panel B is restricted to workers with individual wage contract. Panel C is restricted

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to workers falling under a collective (firm-, occupation-, or industry-wide) bargaining agreement. Panel D is restricted to workers in jobs with the main activities examining, advising, and attesting.

The results from the table show that there is a insignificant effect of .6 percent on total earnings for the total sample—an estimate that is roughly in line with our baseline estimate based on the social security data (.71 percent in Table 2, col. (2)). The effect on earnings is much stronger (4.8 percent) and highly significant in the job category examining/advising/attesting. In this more responsive group, this effect on total earnings is driven by an effect on hourly wage rates of 4.3 percent (highly significant) while the effect on hours of work is pretty small (.7 percent) and only marginally significant.

In the full sample, the effect on hours of work is very small (0.1 percent) and insignificant. The effect on hours of work is stronger (0.5 percent) and marginally significant for workers in individual contracts while it is slight negative (-0.3 percent) for workers in collective agreement. It is conceivable that workers in individual contracts have more flexibility to adjust their hours of work than workers in collective agreement.

The estimated effect on bonuses is fairly large (around 9.4 percent) but only marginally significant. The effect on bonuses is larger and significant for workers in collective agreement. It is conceivable that unions managed to negotiate higher bonuses during the tax holidays.

Average Tax on CHF 100,000 Gross Income

Single taxpayer
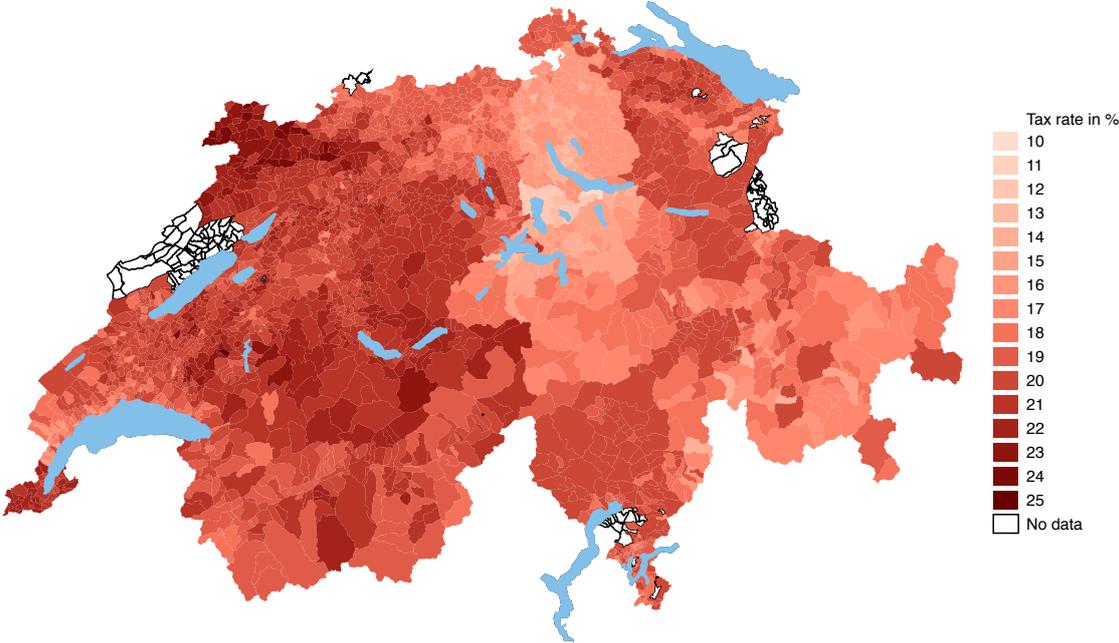
Figure A1: Average Tax Rates Across Swiss Cantons

Notes: This figure depicts the average income tax rate in 1999 across Swiss municipalities. The tax rate combines income taxes at the federal, cantonal, and municipal levels and is computed for a single tax filer with gross income of 100,000 CHF, approximately the 90th percentile of labor earnings across all Swiss workers. The average tax rate is defined as taxes owed divided by gross income. The graph shows substantial variation in tax burdens across areas with tax rates as low at 10 percent and tax rates as high as 25 percent.

Gewusst wie!

2003 wird im Wallis die Gegenwartsbemessung eingeführt.
Was hat dieser Steuersystemwechsel für Auswirkungen in der Bemessunglücke 2001 und 2002

Ablauf des Wechsels des Veranlagungssystems

(A) Press coverage of tax holidays

Teilrevision des Steuergesetzes				Erläuterungen
1998	**1999**	**2000**	**2001**	**2002**
Bezug der Steuer 1998	Bezug der Steuer 1999	Bezug der Steuer 2000	Bezug der Steuer 2001 (Akonto-zahlung)	Bezug der Steuer 2002 (Akonto-zahlung)
Veranlagung 1997/98	Veranlagung 1999/2000	Veranlagung 1999/2000		Veranlagung 2001
Bemessung 1995/96	Bemessung 1997/98	Bemessung 1997/98		Bemessung 2001
		BEMESSUNGSLÜCKE		
			Steuer-erklärung 2001A	Steuer-erklärung 2001B

(B) Voting material explaining tax holidays

Figure A2: Explanations of Tax Holidays in the Press and Official Voting Material

Notes: Panel A shows an illustration of a press article explaining the tax reform and the tax holiday it creates. The article was published on February 16, 2001 for the canton of Valais, which transitioned in 2003 and hence had a tax holiday for years 2001 and 2002. Hence, as early as the beginning the first holiday year, the public was clearly informed that incomes earned in 2001 and 2002 would not be taxed. Panel B depicts the voting pamphlet explaining the incidence of blank years ("Bemessungslücke") sent to voters before the tax reform referendum for the canton of Obwalden in October 1999. Such voting documents were typically produced in cantons organizing a referendum for the tax transition.
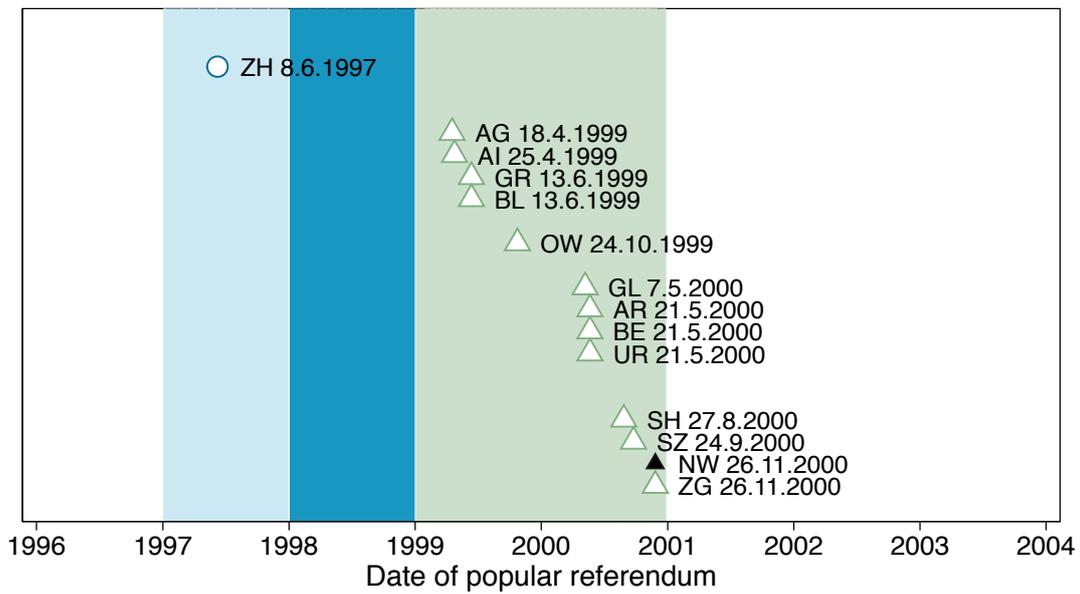
Figure A3: Dates of Cantonal Referenda

Notes: The figure depicts the dates of cantonal referenda held in each canton where the new law was put to a public vote. The colored time frames indicate periods of the federal and cantonal tax holidays applying to the cantons where a vote was held. Note that NW only had a federal holiday. The voting referendum was the very last part of the reform process.
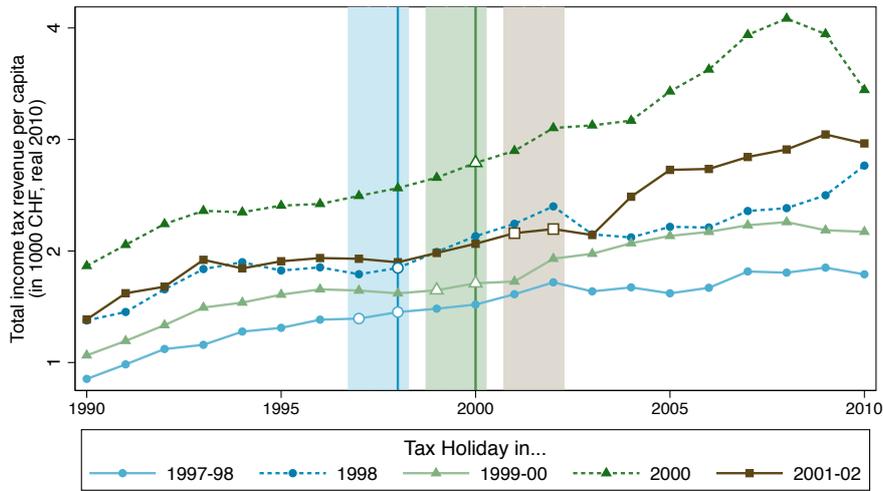
Figure A4: Individual Income Tax Collections per Capita

Notes: This figure depicts total income tax revenue per capita collected by year and groups of cantons. Amounts are expressed in thousands of 2010 CHF. The cantons are divided in five groups based on when the tax holiday took place. (1a) light blue line with circles: tax holiday in 1997–98 (1 canton), (1b) dark blue dashed line with circles: tax holiday in 1998 (1 canton), (2a) light green line with triangles: tax holiday in 1999–2000 (15 cantons), (2b) dark green dashed line with triangles: tax holiday in 2000 (4 cantons), (3) brown line with squares: tax holiday in 2001-02 (3 cantons). In the series, the dots corresponding to tax holidays are bigger and are blanked out (as tax holidays are called blank years in French and German). Tax rates are naturally zero during tax holidays. Before the transitions, income tax collected in a given year typically corresponded to incomes earned in prior years. After the transition, income tax collected in a given year typically corresponds to incomes earned in the current year. The figure shows that there was no visible discontinuity in income tax collections across the tax holidays (there was no double taxation nor gap in tax collection in the transition).

Social security earnings records (SSER)

1981 ──────────────────────────────────→ 2010

100%

Immigration and Birth

Immigration and Birth

No unique match (7.9%)

No unique match (6.9%)

Register-based census 2010 (N = 6,288,279)

Census 2000 (N = 5,217,721)

Census 1990 (N = 4,342,786)
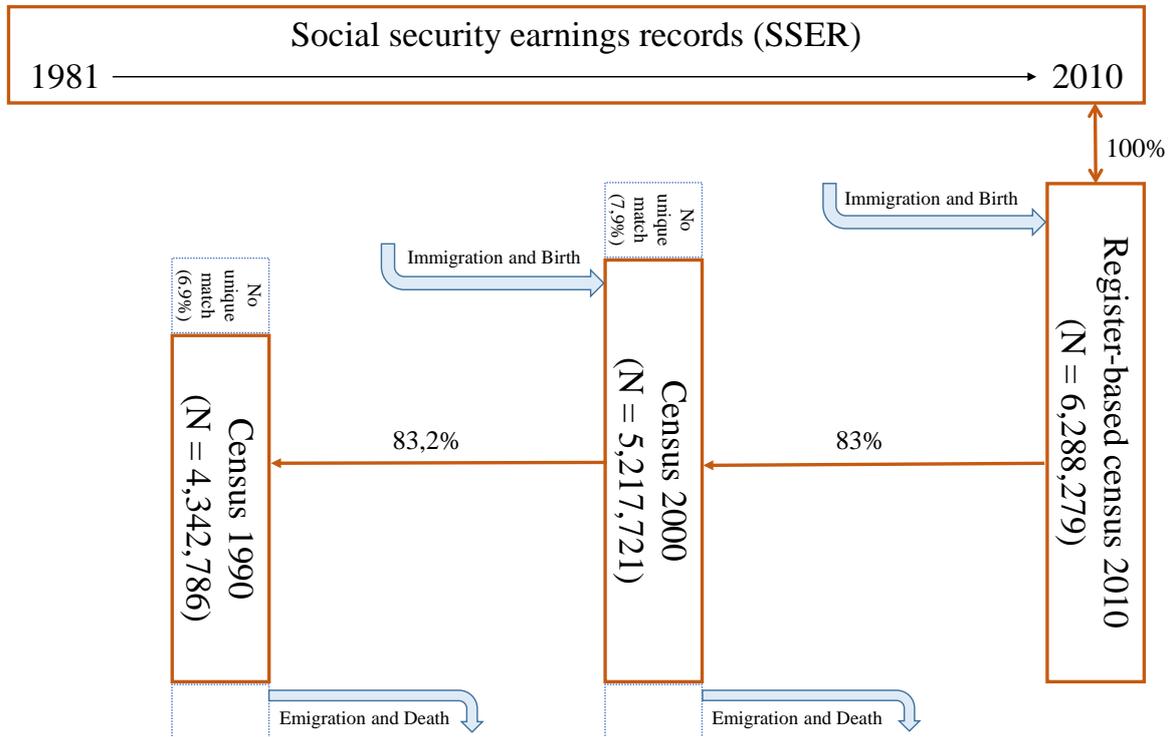
83%

83,2%

Emigration and Death

Emigration and Death

Figure A5: Illustration of matched SSER-Census data

Notes: This figure illustrates the matched SSER-census dataset. The data cover everyone that ever generated a social security record between 1981 and 2010 and that is still alive and living in Switzerland in 2010. Because contributing to the old age insurance is mandatory from age 18 onward, the 6.29 million observations in 2010 represent 98 percent of the actual population aged 18 and older in 2010 in Switzerland. 83 percent of these individuals (5.18 million individuals) could be matched to a consistent census 2000 record. 69.1 percent (83.2 percent of 83 percent or 4.34 million individuals) could be matched to a consistent census 1990 record.
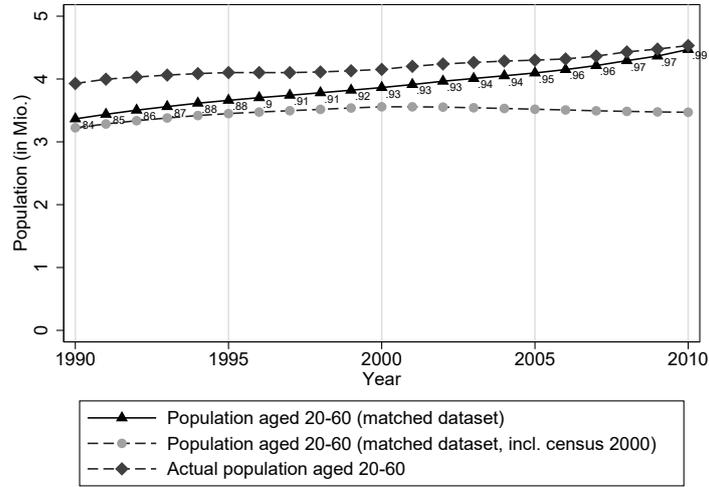
Figure A6: Sample Coverage

Notes: This figure displays the total resident population of Switzerland aged 20–60, the total population captured by our sample aged 20–60 (which are all individuals with a social security record in any year 1990–2010 and resident in Switzerland in 2010 so that they can be matched to the Census 2010), and the population in our sample that can also be matched to the 2000 Census. The numbers show the fraction of individuals in our sample vs. the full population. Coverage is closer to one in recent years (due to deaths and migration).
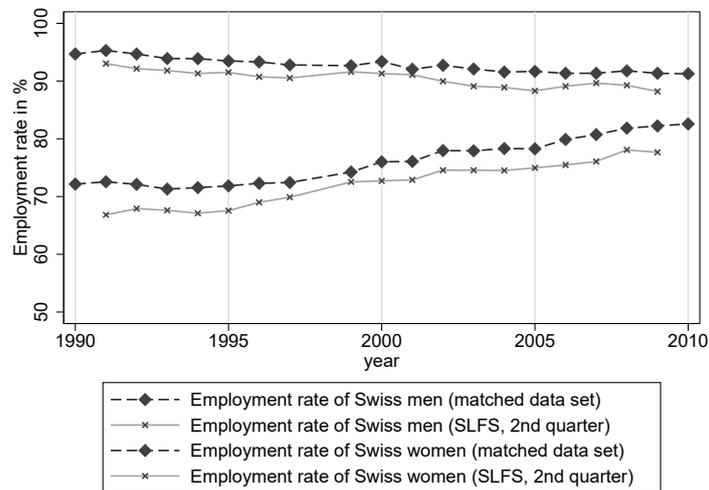

Figure A7: Accuracy of Employment Rate

Notes: This figure displays the employment rates of men and women aged 20–64 separately in our sample and in official statistics derived from the Swiss Labor Force Survey (SLFS). In our data, we count individuals as employed if they have non-zero labor earnings in a given year. The official statistics count a person as employed if she works at least one hour in the second quarter of a specific year. These differences in the measurement of employment explain the level differences between the two statistics. We omit 1998 due to the missing social security records in this year.
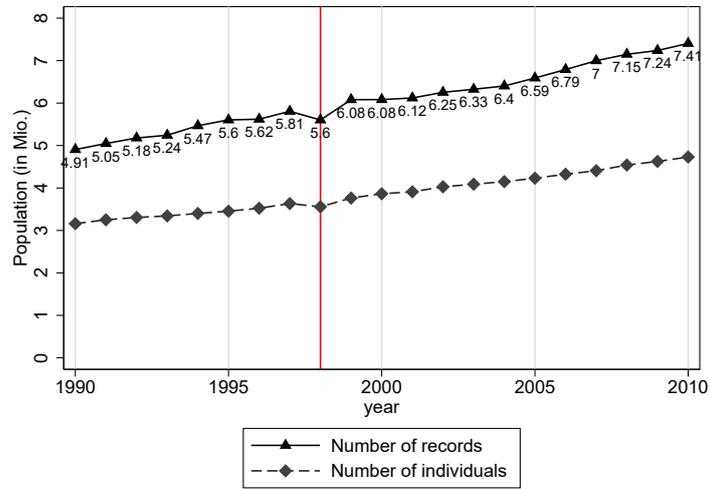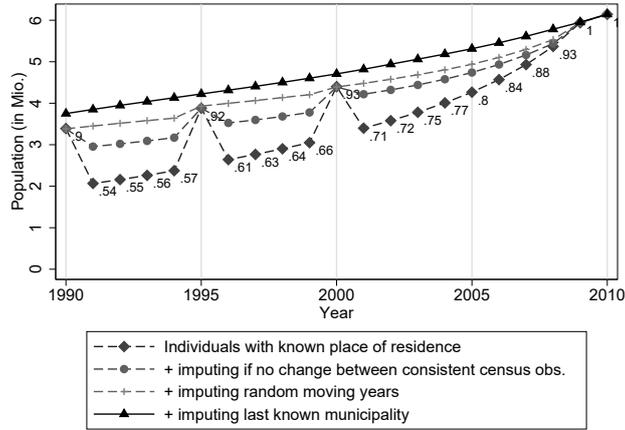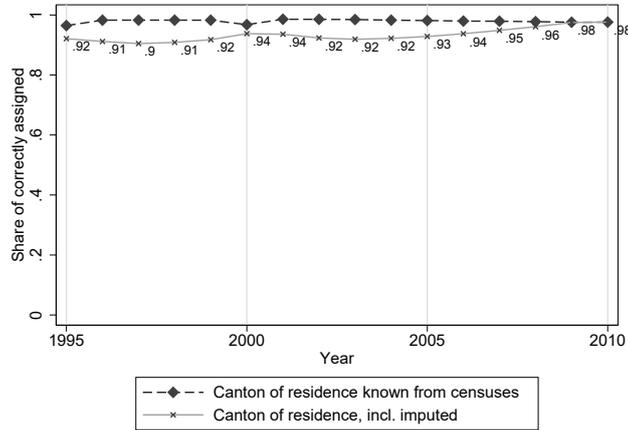
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Figure A8: Missing Records in 1998

Notes: This figure displays the number of records and individuals in our data by year. It illustrates the issue of missing records in 1998 due to missing social security data for that year.

(A) Share with known place of residence

(B) Accuracy of imputed canton of residence

Figure A9: Imputation of Municipality of Residence

Notes: The figure displays statistics of the imputation of municipality of residence. The dashed line in Panel A shows the number of individuals in the SSES data set for which the place of residence is known with certainty. The second line shows the number of individuals for which the place of residence is known if we assume no change in residence between two consistent census reported residence. The third line further imputes a random year of residence change for those with difference residences across two decadal censuses. The fourth line further imputes residence using the last known residence. Panel B evaluates the accuracy of our imputation for the years 1995–2010 regarding the *canton* of residence. The figure exploits that registered unemployed are assigned to cantonal agencies based on their canton of residence. The figure compares the imputed canton of residence of registered unemployed with the canton of the unemployment agency. The figure shows the share of correctly assigned cantons of residence for individuals for which we actually know the canton of residence due to the information in the census (dashed line) and for all individuals, including the imputed places of residence (straight line). The figure shows that the share of correctly assigned cantons of residences among all individuals is above 90 percent in all years.
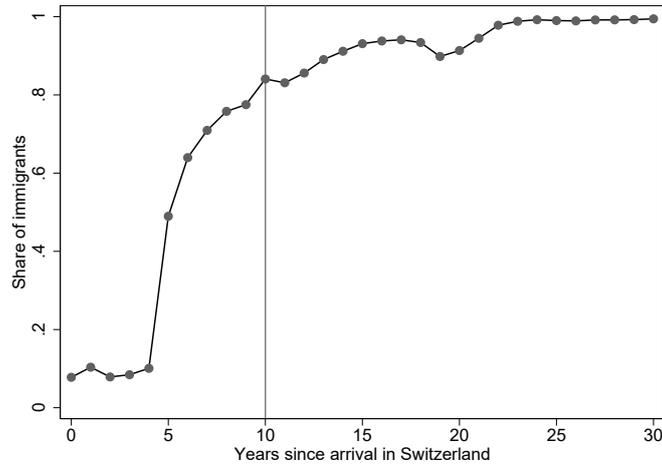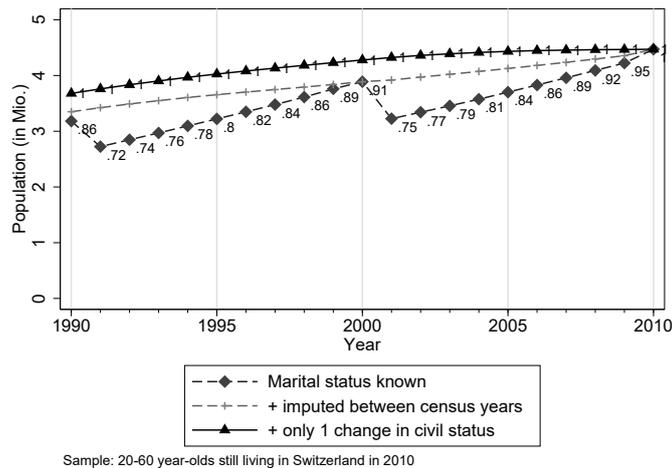
25

Figure A10: Share of Immigrants with C Permit or a Swiss Passport, by Duration of Stay

Notes: The figure displays the share of immigrants with C permit or a Swiss passport, by duration of stay.

Figure A11: Marital Status Imputation

Notes: The figure displays the number of individuals in our sample for which the marital status is known based on our stepwise imputation method. We focus on the population aged 20–60 in a given year. Line (1) shows the number of individuals for which the marital status is known. The figure shows that the share of individuals with respect to the total sample aged 20–60 with known civil status lies at 91 percent in 2000 and almost 100 percent in 2010 as this information is reported in the decadal censuses. The share becomes smaller, the further away from the next census year. Line (2) builds on the census information and imputes missing data between these years. In particular, we always assume no change in the marital status for the years in-between if the status is unchanged across two consecutive censuses. The third line further imputes the marital status for the remaining individuals—those with no data from the censuses 1990/2000—by basically assuming that the change in marital status recorded in the 2010 census data is the only one that ever took place. This assumption allows us imputing the marital status for almost the entire sample.

26
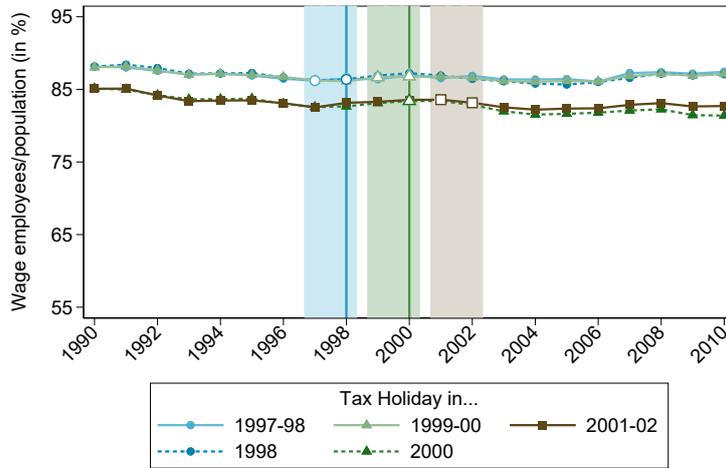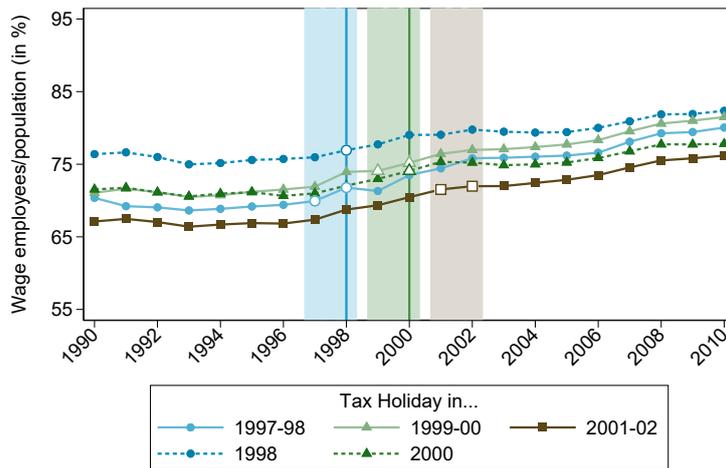
(A) Males

(B) Females

Figure A12: Effects of Tax Holidays on Wage Employment Rates by Gender

Notes: This figure displays the employment rate of wage earners for males (Panel A) and females (Panel B) by year and groups of cantons from 1990 to 2010. The sample in a given year t is all individuals aged 20–60 in year t who are still alive and Swiss residents by 2010 (i.e., present in the 2010 Census). The wage employment rate is computed as the fraction of individuals in the sample with positive wage earnings during the year. The cantons are divided in five groups based on when the *cantonal* tax holiday took place. (1a) light blue circles: 1 canton with tax holiday for cantonal taxes in 1997–98 (1 canton), (1b) dashed dark blue circles: 1 canton with tax holiday for cantonal taxes in 1998 (1 canton), (2a) light green triangles: 15 cantons with cantonal tax holiday in 1999–2000, (2b) dashed dark green triangles: 4 cantons with cantonal tax holiday in 2000, (3) brown squares: 3 cantons with cantonal tax holiday in 2001-02. For each of the groups, we represent the corresponding tax holiday periods using the vertical shading and the same color code. In the series, the dots corresponding to tax holidays are bigger and are blanked out (as tax holidays are called blank years in French and German). Both panels show no evidence of employment effects due to the tax holiday.

27
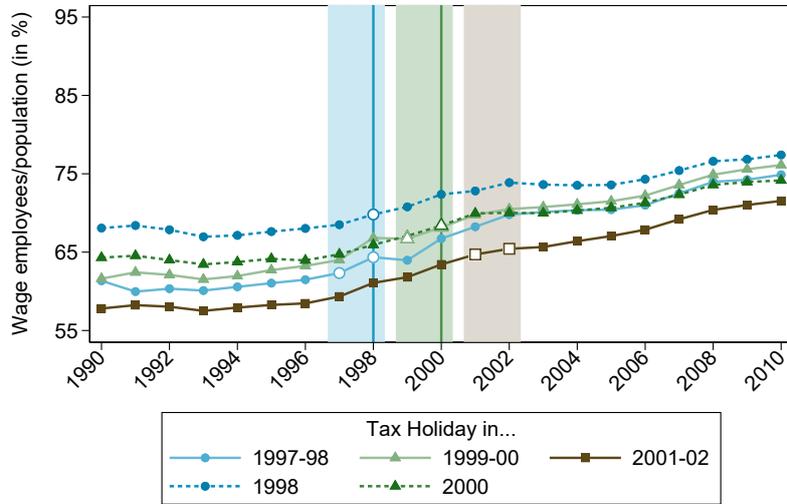
(A) Effects on employment
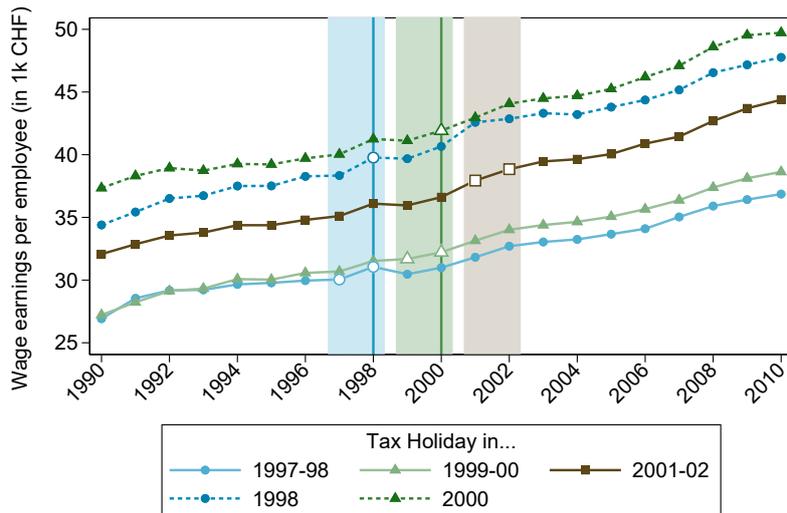
(B) Effects on wage earnings

Figure A13: Employment and Earnings Effects Among Married Women

Notes: This figure displays the share of wage earners (Panel A) and average wage earnings excluding non-workers (Panel B) for married women by year and groups of cantons from 1990 to 2010. The sample in a given year t is all female individuals aged 20–60 in year t and married in year t who are still alive and Swiss residents by 2010 (i.e., present in the 2010 Census). Wage earnings are expressed in 1000s of 2010 CHF (adjusted for inflation). The cantons are divided in five groups based on when the cantonal tax holiday took place. (1a) light blue circles: tax holiday in 1997-98 (1 canton), (1b) dark blue dashed circles: tax holiday in 1998 (1 canton), (2a) light green triangles: tax holiday in 1999–2000 (15 cantons), (2b) dark green triangles: tax holiday in 2000 (4 cantons), (3) brown squares: tax holiday in 2001-02 (3 cantons). For each of the groups, we represent the corresponding tax holiday periods using the vertical shading and the same color code. Married women are expected to be particularly responsive to taxes; yet, the figure does not show effects on employment or average wage earnings.

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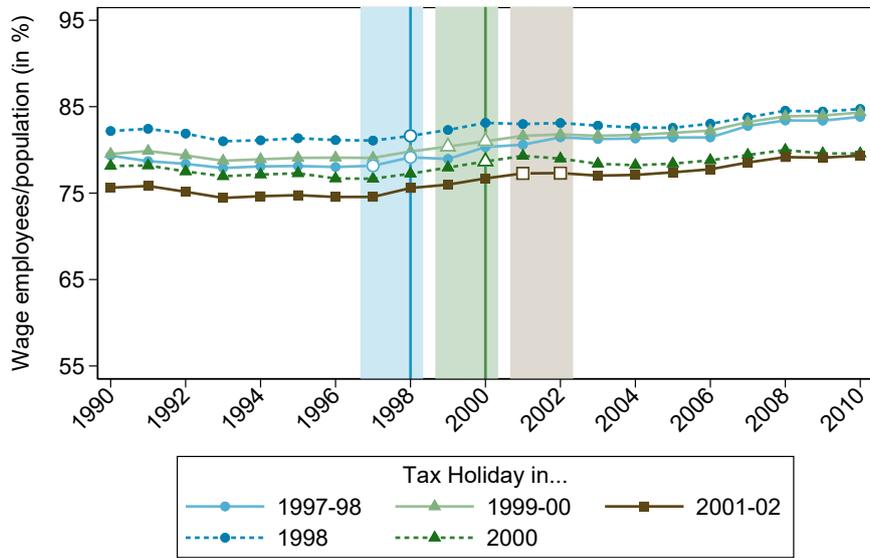
(A) Wage employment effects among all wage earners with positive earnings
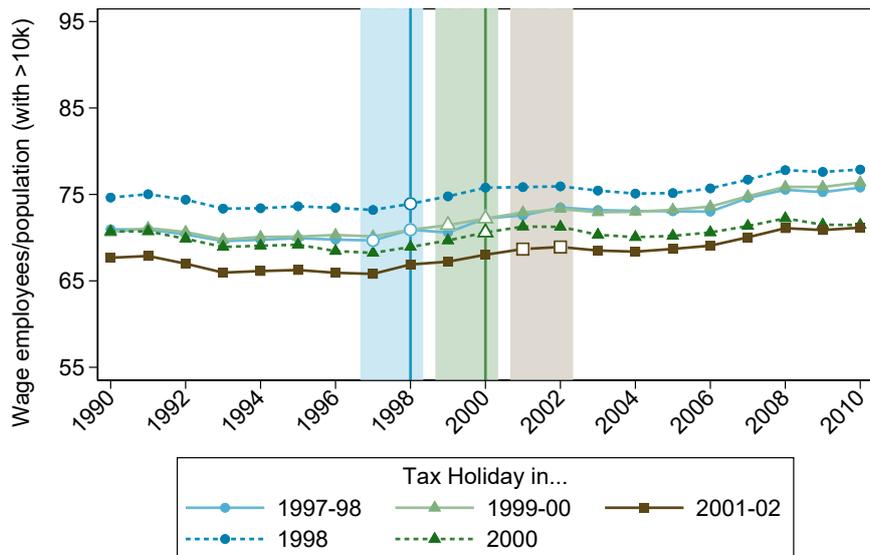
(B) Wage employment effects among those with annual earnings >10,000 CHF

Figure A14: Robustness of Wage Employment Effects

Notes: This figure depicts a robustness check on the wage employment effects from Figure 5. Panel A shows the share of wage earners (pooling together both male and females aged 20–60) where employment is defined as having any positive wage earnings during the year as in Figure 5. Panel B repeats the same figure but defines employment as having annual wage earnings above 10,000 CHF (instead of zero) in 2010 CHF. Both panels show the same absence of employment effects of the tax holiday. Therefore, the lack of employment effects is robust to changing the minimum threshold of earnings used to define employment.

(A) Employment rate

(B) Earnings

(C) Hours of work among employees

(D) Hourly earnings among employees
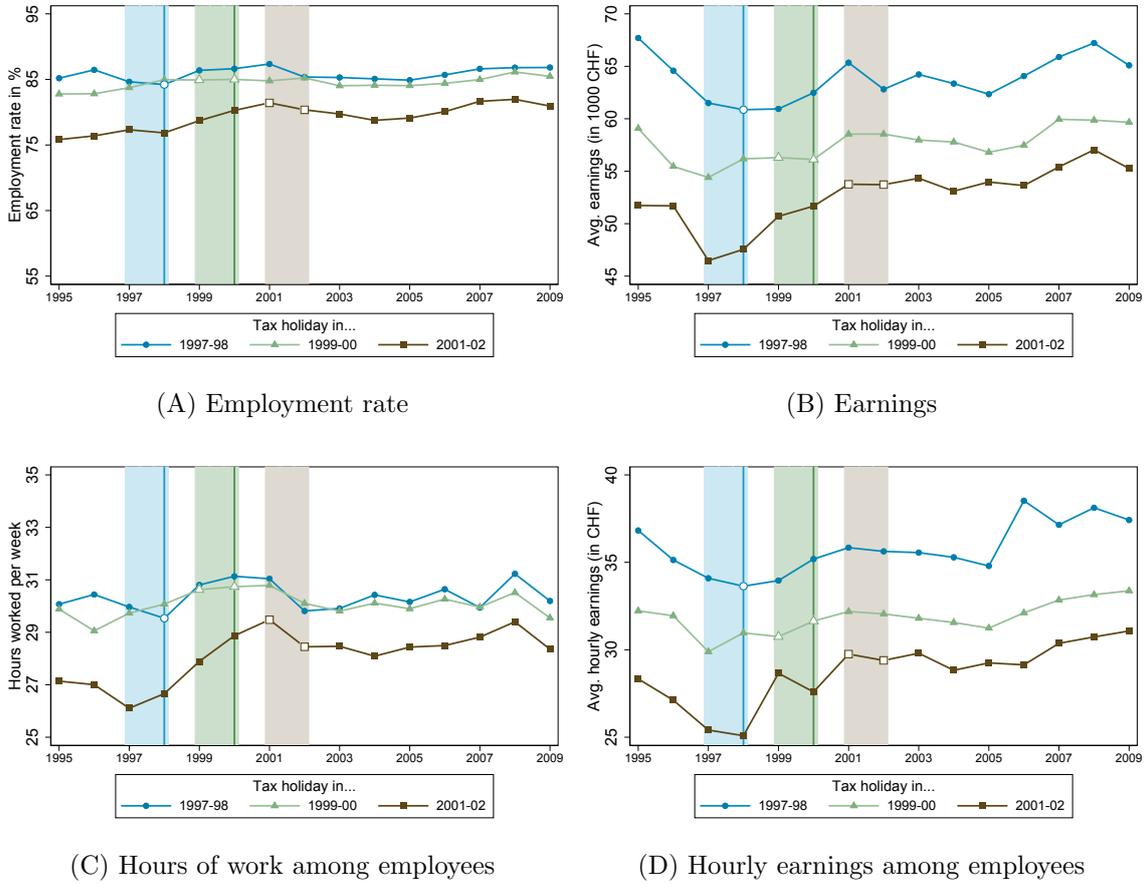
Figure A15: Evidence on Hours and Hourly Earnings from the Labor Force Survey

Notes: This figure displays various employment outcomes using the Swiss Labor Force Survey (SLFS): (A) employment rate, (B) earnings, (C) hours of work per week among employees, (D) average hourly earnings among employees. The sample in a given year t includes all Swiss and foreign workers with a resident permit C aged 20–60. For hours of work and hourly earnings, we restrict the sample to employees. We consider 3 groups of cantons: (1) 2 cantons which transitioned in 1999 with a tax holiday for 1998 or 1997–1998 (in blue circles). (2) 19 cantons which transitioned in 2001 with a tax holiday for 2000 or 1999–2000 (in green triangles). (3) 3 cantons which transitioned in 2003 with tax holiday in 2001–02 (in brown squares). (Former groups (1a) and (1b) and groups (2a) and (2b) have been pooled together given sample size in the survey data.) The dots corresponding to tax holidays are blanked out (as tax holidays are called blank years in French and German). The figure does not display any tax holiday effects on these outcomes. Given the noise in the series due to small sample size, this is consistent with our previous analysis using the much larger social security data and the wage structure survey.

(A) Without controls
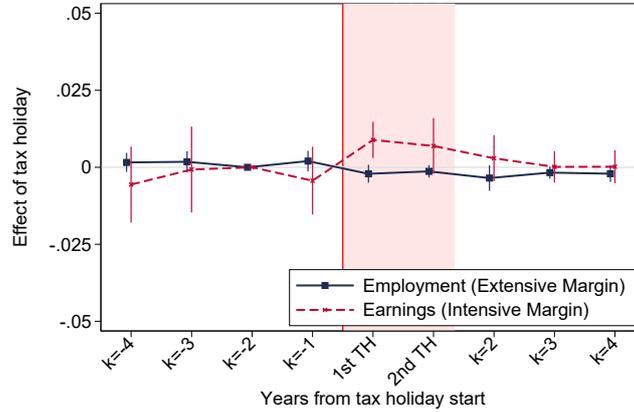
(B) With controls

Figure A16: Wage Earners Event Study Estimates: Effect of Controls

Notes: The figure depicts the impact of including controls in the event study estimates on wage employment and wage earnings per employee. Panel A presents estimates without the control variables while panel B repeats the figure with controls (reported in main text Figure 7.B). Estimates are based on the event study model (equation 2) of outcomes on event dummies (distance in years from the first tax holiday). Panel A includes only year and individual fixed effects. Additional control variables in Panel B include age×gender and age squared×gender, linear time trends by canton of residence in 1996 (the linear time trends omit the treatment years). The estimation sample covers the years 1994–2006 (±4 years around the tax holiday years), excludes 1998, and comprises 19 cantons which transitioned in 2001 and 3 cantons which transitioned in 2003. We focus on workers aged 22–55 in 1996 and drop workers older than 62 in later years. Tax holiday years are shaded and denoted by 1st TH and 2nd TH on the x-axis. The dependent variable in the model "extensive margin" is an indicator equal to 1 if a person has positive wage income in a given year. The dependent variable in the model "intensive margin" is real wage earnings (excluding non-workers). The effect is scaled post-estimation by mean outcome in the estimation sample so that effects can be interpreted as percent change. Individuals are assigned to cantons based on where they lived in 1996. The vertical bars represent cluster-robust 95 percent confidence intervals.

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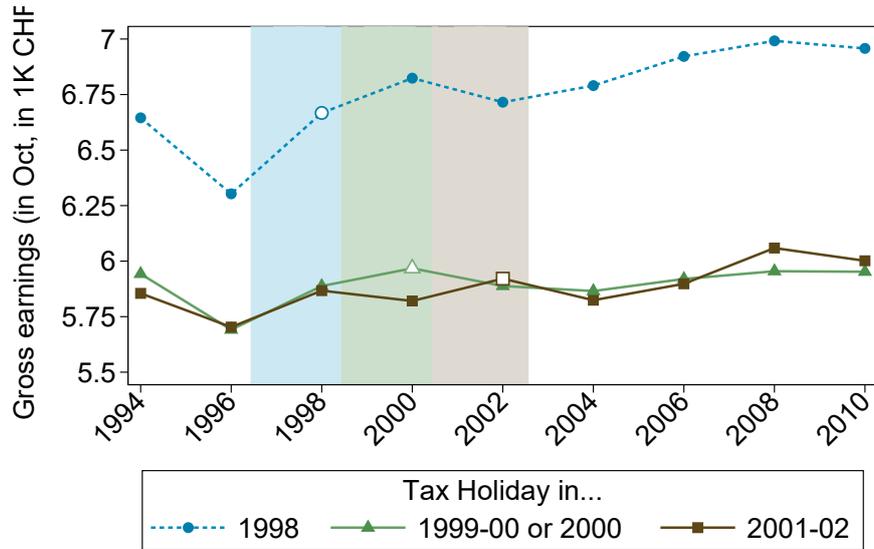
Figure A17: Effects on Monthly Earnings in Employer Survey

Notes: This figure displays monthly earnings in 2010 CHF in October for all workers by year and groups of cantons from 1994 to 2010 using the wage structure surveys (LSE) carried out bi-annually. Earnings include regular salaries and overtime and other variable pay components (e.g. bonuses). The sample in a given year t contains all workers aged 20–60 with Swiss passport or residency permit C in the dataset (excluding public sector employees) weighted to represent population averages. We consider 3 groups of cantons: (1) 2 cantons which transitioned in 1999 with a tax holiday for 1998 or 1997–1998 (in blue circles). (2) 19 cantons which transitioned in 2001 with a tax holiday for 2000 or 1999–2000 (in green triangles). (3) 3 cantons which transitioned in 2003 with tax holiday in 2001–02 (in brown squares). (Former groups (1a) and (1b) and groups (2a) and (2b) have been pooled together given sample size in the survey data.) The dots corresponding to tax holidays are blanked out (as tax holidays are called blank years in French and German). Geographical information in the data is based on place of work while tax treatment is based on residence. To reduce the number of cases where a person works in one group of cantons but resides in another one, we exclude zip codes in which more than 25 percent workers commute from one of the other groups of cantons according to the census in 2000.
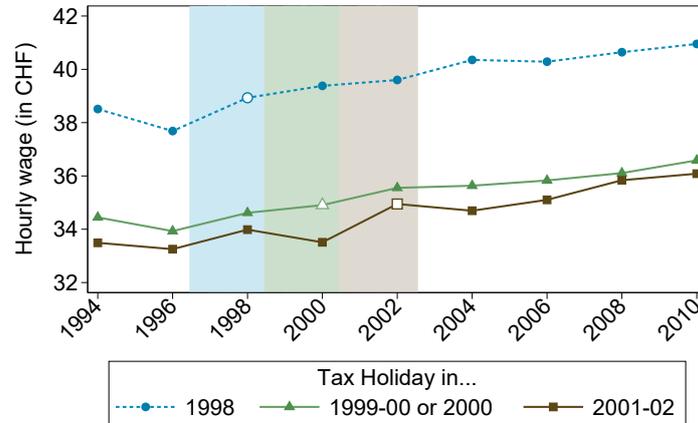
(A) All workers
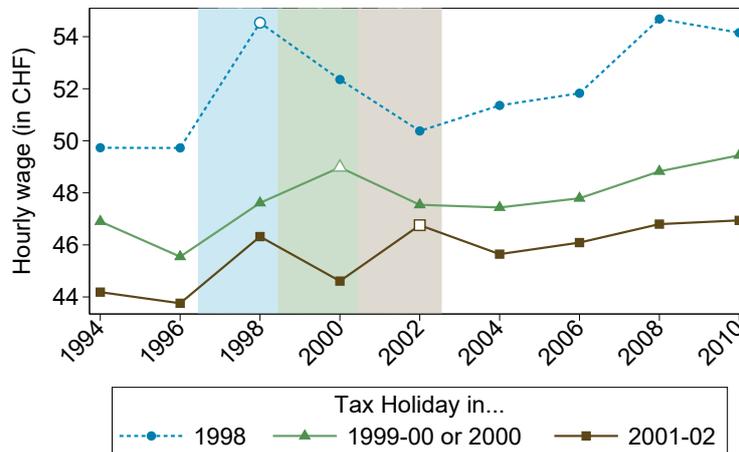
(B) Workers in job category "Examining, Advising, and Attesting"

Figure A18: Effects on Hourly Wages for Selected Job Categories in Employer Survey

Notes: This figure displays average hourly wages in 2010 CHF by year and groups of cantons from 1994 to 2010 using the wage structure surveys (LSE) carried out bi-annually. Hourly wages are computed from October salaries in each year and incorporate regular pay but exclude overtime and variable pay components (e.g. bonuses). In Panel A, the sample in a given year t includes all workers aged 20–60 with Swiss passport or residency permit C in the dataset (excluding public sector employees) weighted to represent population averages. In Panel B, the sample is restricted to workers in jobs with the main activities "examining, advising, attesting". We consider 3 groups of cantons: (1) 2 cantons which transitioned in 1999 with a tax holiday for 1998 or 1997–1998 (in blue circles). (2) 19 cantons which transitioned in 2001 with a tax holiday for 2000 or 1999–2000 (in green triangles). (3) 3 cantons which transitioned in 2003 with tax holiday in 2001–02 (in brown squares). The dots corresponding to tax holidays are blanked out (as tax holidays are called blank years in French and German). Geographical information in the data is based on place of work while tax treatment is based on residence. To reduce the number of cases where a person works in one group of cantons but resides in another one, we exclude zip codes in which more than 25 percent workers stem from one of the other groups of cantons according to the census in 2000.

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Table A1: Date of Cantonal Referenda and Legislative Decisions on the Reform

Holidays	Canton	Date	Share Yes	Turnout	Notes
1997-98					
	TG	6/30/97			no vote
1998					
	ZH	6/8/97	58.85	38.4	
1999-00					
	AG	4/18/99	63.17	33.3	
	AI	4/25/99			*
	BL	6/13/99	65.19	47.57	
	GR	6/13/99	77.54	36.04	
	OW	10/24/99	61.91	26.93	
	GL	5/7/00			*
	BE	5/21/00	60.86	41.72	
	AR	5/21/00			*
	UR	5/21/00	67.11	45.42	
	SH	8/27/00	70.11	59.99	
	SZ	9/24/00	81.43	45.48	
	ZG	11/26/00	69.27	45.88	
	NW**	11/26/00	77.5	41.33	
	SG	4/9/98			no vote
	LU	11/22/99			no vote
	FR	6/6/00			no vote
2000					
	SO	6/30/99			no vote
2001-02					
	VD	7/4/00			no vote
	TI	7/6/01			no vote
	VS	9/13/01			no vote

Notes: Holidays refer to the cantonal (and municipal) income tax holidays. At the federal level all cantons had a two-year holiday. See text for details. In cantons where no popular vote was held, the date refers to the date when the cantonal parliament enacted the tax transition law. Popular votes or parliament votes were the very end of processes that had typically started many months earlier.

* In these cantons, votes are held at a cantonal assembly (*Landsgemeinde*), which is why statistics are not available.

** In NW there was no cantonal holiday.

Table A2: Macro Estimates of Tax Holiday Labor Supply Effects on Wage Earners

	(1) Wage employment (in %) Men	(2) Wage earnings per employee Men	(3) Wage employment (in %) Women	(4) Wage earnings per employee Women
Panel A: Total sample				
$\%\Delta[1-\tau]$	13.2	27.6	12.5	26.3
$\%\Delta y$	-0.01	1.01	-0.21	0.48
	(0.19)	(0.53)	(0.45)	(0.52)
Frisch elasticity η^F	-0.001	0.037	-0.017	0.018
	(0.014)	(0.019)	(0.036)	(0.020)
Panel B: Married with children				
$\%\Delta[1-\tau]$	12.1	28.4	12.7	29.2
$\%\Delta y$	-0.06	1.49	-0.90	0.80
	(0.24)	(0.90)	(0.76)	(0.93)
Frisch elasticity η^F	-0.005	0.052	-0.071	0.027
	(0.019)	(0.032)	(0.060)	(0.032)
Panel C: Married no children				
$\%\Delta[1-\tau]$	15.7	32.8	15.9	32.9
$\%\Delta y$	-0.07	1.06	0.36	0.53
	(0.22)	(0.42)	(0.65)	(0.78)
Frisch elasticity η^F	-0.004	0.032	0.023	0.016
	(0.014)	(0.013)	(0.041)	(0.024)
Observations	105	105	105	105
Canton group FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes

Notes: The table presents estimates of the labor supply effects of the tax holiday based on regressions of the aggregate time series for all 5 groups of cantons on year dummies, canton group dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. OLS standard errors are reported. The estimation sample covers the years 1990–2010 (*including* 1998). The outcome in columns (1) and (3) is the share of wage earners in the population (in percent). The outcome in columns (2) and (4) is the average annual wage per employee with positive wage earnings. Columns (1) and (2) focus on men, columns (3) and (4) on women. Panel A is estimated using the full sample of adults aged 20–60. Panels B and C report effects for married individuals aged 20–60 with and without children, respectively. $\Delta\%y$ indicates the implied percent change in the outcome by dividing the estimated effect—the coefficient of the indicator of the tax holiday—by the average level of the outcome variable in the year of the tax holiday. The Frisch elasticity η^F is estimated by dividing $\%\Delta y$ by the estimated percent change in net of tax wage rates ($\%\Delta[1-\tau]$) due to the tax holiday for the respective group. $\%\Delta[1-\tau]$ is based on changes in average tax rates in column (1) and on changes in marginal tax rates in the remaining columns. For each individual, $\Delta\%[1-\tau]$ is computed based on hypothetical marginal or average tax rates on the actual income earned during the tax-free years in the tax system in place prior to the tax holidays.

Table A3: Effect of Tax Holiday on Months Employed, Number of Jobs, Unemployment, and Between Canton-Group Migration

VARIABLES	(1) Jobs per employee	(2) Months employed (employees)	(3) Unemployed / population (in %)	(4) Immigrant / population (in %)
Panel A: Total sample				
Effect in blank year	-0.0031	0.0178	-0.306	-0.020
	(0.0052)	(0.0108)	(0.239)	(0.052)
$\Delta\%y$	0.14	0.15	-6.25	-4.80
Panel B: Men				
Effect in blank year	-0.0030	0.0173	-0.307	-0.027
	(0.0055)	(0.0112)	(0.266)	(0.048)
$\Delta\%y$	0.24	0.18	-5.97	-5.92
Panel C: Women				
Effect in blank year	-0.0031	0.0175	-0.318	-0.010
	(0.0054)	(0.0132)	(0.223)	(0.056)
$\Delta\%y$	0.02	0.10	-6.49	-3.88
Panel D: Married women				
Effect in blank year	-0.0033	0.0152	-0.303	0.012
	(0.0066)	(0.0194)	(0.180)	(0.024)
$\Delta\%y$	0.13	0.08	-8.98	-1.60
Panel E: Very high earners				
Effect in blank year	-0.0028	-0.0405	0.013	-0.108
	(0.0155)	(0.0244)	(0.108)	(0.098)
$\Delta\%y$	0.25	-0.10	-20.01	-36.68
Observations	105	105	105	105
Canton group FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes

Notes: The table presents estimates of the tax holiday on labor supply based on regressions of the aggregate time series for the 5 groups of cantons on year dummies, group dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. The estimation sample covers the years 1990–2010. The dependent variable in column (1) is the number of jobs per employee. Distinct jobs are identified based on the number of distinct register entries with positive wage earnings in a given year. The dependent variable in column (2) is the number of months in employment per employee during the year. The dependent variable in column (3) is the number of individuals registered as unemployed at the Swiss public employment service as a fraction of the total population (in %). The dependent variable in column (4) is the number of persons moving into a canton of the respective canton group as a fraction of the total population (in %). Panel A reports effects for the total sample aged 20–60. Panel B and C report effects for males and females aged 20–60, respectively. Panel D reports effects for married women aged 20–60 only. Panel E reports effects for individuals with more than 200k average annual labor income in the 1994–1996 period.

Table A4: Macro Estimates of Labor Supply Effects by Pre-Holiday Labor Income Groups

	(1) Wage empl. (in %)	(2) Wage earnings per person	(3) Wage earnings per employee	(4) Self-emp. earnings per self employed
Panel A: 1–25k CHF				
%Δy	-0.24	0.72	1.48	5.09
	(0.37)	(3.37)	(2.99)	(3.76)
Frisch elasticity η^F	-0.025	0.034	0.070	0.236
	(0.038)	(0.159)	(0.141)	(0.174)
Panel B: 25k–50k CHF				
%Δy	-0.12	0.34	0.52	6.14
	(0.24)	(1.46)	(1.41)	(2.37)
Frisch elasticity η^F	-0.010	0.013	0.020	0.238
	(0.020)	(0.057)	(0.054)	(0.092)
Panel C: 50k–100k CHF				
%Δy	-0.13	0.42	0.57	7.97
	(0.18)	(0.44)	(0.60)	(3.25)
Frisch elasticity η^F	-0.009	0.013	0.018	0.261
	(0.012)	(0.014)	(0.019)	(0.107)
Panel D: 100k–200k CHF				
%Δy	-0.03	1.65	1.70	10.86
	(0.36)	(0.72)	(0.85)	(3.85)
Frisch elasticity η^F	-0.001	0.037	0.038	0.248
	(0.016)	(0.016)	(0.019)	(0.088)
Panel E: More than 200k CHF				
%Δy	-0.05	4.91	5.08	10.13
	(0.68)	(1.69)	(2.18)	(2.81)
Frisch elasticity η^F	-0.001	0.086	0.089	0.182
	(0.019)	(0.030)	(0.038)	(0.050)
Observations	105	105	105	80
Canton group FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes

Notes: The table presents estimates of the tax holiday (TH) on labor supply based on regressions of the aggregate time series for the 5 groups of cantons on year dummies, group dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. The estimation sample covers the years 1990–2010 in columns 1–3 and 1987–2010 in column (4). Columns (1) and (2) are estimated using the full sample of adults aged 20–60. Column (3) focuses on wage employees (individuals with positive wage earnings). Column (4) is based on all individuals that have positive self-employment earnings. The outcome in column (1) is the employment rate (in percent). The outcome in column (2) is annual labor earnings per person (including individuals with zero earnings). The outcome in column (3) is the average wage per employee. The outcome in column (4) is average self-employment earnings (self-employment earnings of all individuals with positive self-employment earnings in a given year). Individuals are assigned to Panels A–E based on their average annual labor income in the 1994–1996 period. Individuals with zero earnings in 1994–1996 are dropped. The Frisch elasticity η^F is estimated by dividing %Δy (i.e. the estimated effect relative to the average level of the outcome variable in the year of the tax holiday) by the estimated percent change in net of tax wage rates (%Δ[1 − τ]) due to the tax holiday for the respective group. %Δ[1 − τ] is based on changes in average tax rates in column (1) and on changes in marginal tax rates in the remaining columns. For each individual, %Δ[1 − τ] is computed based on hypothetical marginal or average tax rates on the actual income earned during the tax-free years in the tax system in place prior to the tax holidays.

Table A5: Robustness Checks: Specification and Data Construction

VARIABLES	(1) Employee 0/1 All	(2) Average wage earnings Men	(3) Average wage earnings Women	(4) Earnings per self-employed All
Panel A: Baseline				
$\log(1 - \tau_{it})$	-0.012	3,792	323	7,762
	(0.005)	(606)	(251)	(1,827)
Frisch elasticity η^F	-0.02 (0.006)	0.04 (0.006)	0.01 (0.005)	0.23 (0.054)
Panel B: No controls				
$\log(1 - \tau_{it})$	-0.011	3,946	364	7,135
	(0.005)	(596)	(239)	(1,800)
Frisch elasticity η^F	-0.01 (0.006)	0.04 (0.006)	0.01 (0.005)	0.21 (0.053)
Panel C: Controlling for income shifting				
$\log(1 - \tau_{it})$	-0.014	4,315	365	7,568
	(0.008)	(1,213)	(395)	(1,895)
Frisch elasticity η^F	-0.02 (0.009)	0.04 (0.012)	0.01 (0.008)	0.22 (0.055)
Panel D: Controlling for unemployment				
$\log(1 - \tau_{it})$	-0.013	3,765	455	7,121
	(0.005)	(468)	(254)	(1,742)
Frisch elasticity η^F	-0.02 (0.006)	0.04 (0.004)	0.01 (0.005)	0.21 (0.051)
Panel E: No imputed				
$\log(1 - \tau_{it})$	-0.016	3,856	381	11,107
	(0.005)	(484)	(185)	(2,144)
Frisch elasticity η^F	-0.02 (0.007)	0.04 (0.004)	0.01 (0.004)	0.29 (0.058)
Panel F: Only second year				
$\log(1 - \tau_{it})$	-0.013	4,209	314	12,249
	(0.006)	(558)	(140)	(2,366)
Frisch elasticity η^F	-0.02 (0.007)	0.04 (0.005)	0.01 (0.003)	0.36 (0.070)
Panel G: Only 2001/02				
$\log(1 - \tau_{it})$	0.008	3,687	216	6,713
	(0.010)	(2,490)	(775)	(1,809)
Frisch elasticity η^F	0.01 (0.012)	0.04 (0.026)	0.01 (0.016)	0.19 (0.053)
Panel H: Uncapped earnings				
$\log(1 - \tau_{it})$	-0.012	3,784	329	7,334
	(0.005)	(670)	(230)	(2,377)
Frisch elasticity η^F	-0.02 (0.006)	0.04 (0.007)	0.01 (0.004)	0.21 (0.068)

Notes: The table illustrates the robustness of our main results. It presents semi-elasticities derived from individual-level IV regressions of labor supply outcomes on person and year fixed effects and $\log(1 - \tau_{it})$, where τ is the average tax rate in column (1) and the marginal tax rate in the other columns. $\log(1 - \tau_{it})$ is instrumented with an indicator variable which is 1 in the year in which municipal and cantonal taxes are zero due to the tax holiday (equation 1). The dependent variable in column (1) is an indicator whether a person has positive wage income in a given year. The dependent variable in columns (2) and (3) is average wages of males (column 2) and females (column 3) with positive wage income in a given year. The dependent variable in columns (4) is annual self-employment income per person (including 0) in a given year. The first panel presents our baseline results (see Tables 3 and 5 for the definition of the estimation samples). Panel B excludes the control variables included in the baseline. Panel C contains two control variables absorbing effects of the tax holiday in the the year before and after the tax holiday, thus accounting for possible effects of the tax holidays on income shifting. In Panel D, we control for the cantonal unemployment rate (based on register data). In Panel E, we discard observations with imputed place of residence. In Panel F, the effect is only identified from the response in the second cantonal blank year, controlling for the effect in the first. Similarly, Panel G identifies the effect only from the response in late-coming cantons with tax holidays in 2001 and 2002. Panel H uses wage and self-employment incomes that are not capped at 2.5 Mio. in 2010 CHF. Standard errors are clustered on the level of commuting zones.

Table A6: Effect of Tax Holiday on Wage Earnings, Wage Rates, Hours Worked, and Bonus Payments (Wage Structure Survey)

VARIABLES	(1) Hours worked	(2) Hourly wage	(3) Wage earnings	(4) Bonus 5K+
Panel A: All workers				
Effect in blank year	0.218	0.164	0.036	0.007
	(0.324)	(0.185)	(0.040)	(0.004)
$\%\Delta y$	0.1%	0.5%	0.6%	9.4%
Panel B: Individual contract				
Effect in blank year	0.754	0.327	0.077	0.007
	(0.430)	(0.204)	(0.047)	(0.006)
$\%\Delta y$	0.5%	0.9%	1.3%	7.2%
Panel C: Collective agreement				
Effect in blank year	-0.535	0.080	0.018	0.013**
	(0.541)	(0.282)	(0.043)	(0.005)
$\%\Delta y$	-0.3%	0.2%	0.3%	32.7%
Panel D: Examining/Advising/Attesting				
Effect in blank year	1.138	2.035***	0.419***	0.021
	(0.659)	(0.441)	(0.110)	(0.017)
$\%\Delta y$	0.7%	4.3%	4.8%	8.1%
Observations	27	27	27	27
Canton group FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes
Canton group trends	Yes	Yes	Yes	Yes

Notes: The table presents estimates of the tax holiday on labor supply and wages based on regressions of aggregate time series for three groups of cantons (cantons which transitioned in 1999, in 2001 and in 2003) on year dummies, group dummies, linear time trends interacted with group dummies, and an indicator which is 1 in the year in which municipal and cantonal taxes are zero. The estimation is based on the wage structure surveys (LSE) 1994–2010 carried out bi-annually. The dependent variable in column (1) is earnings in 2010 CHF in October of each year. Earnings include regular salaries and overtime and other variable pay components (e.g. bonuses). The dependent variable in column (2) is hourly wages, computed from October salaries in each year excluding overtime and variable pay components (e.g. bonuses). The dependent variable in column (3) is employer-reported hours worked per worker in October. Hours worked refer to contractual (i.e. normal) hours worked for workers with monthly wages and to actual hours worked for workers paid by the hour. The dependent variable in column (4) is the fraction of employees with bonuses above 5,000 in 2010 CHF. Panel A reports results for all employees aged 20–60 with Swiss passport or residency permit C in the dataset, excluding public sector employees. Panel B is restricted to workers with individual wage contract. Panel C is restricted to workers falling under a collective (firm-, occupation-, or industry-wide) bargaining agreement. Panel D is restricted to workers in jobs with the main activities examining, advising, and attesting.