Choices in experience rating the UI tax: simulation results for Finland
Appendices

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Appendix A Historical experience rating of furloughs

In the early 1990's, furloughing employers had to pay a premium for furloughs. The premium corresponded to two weeks of flat-rate UA benefits for each each newly furloughed employee. Similar systems were simulated for the period from 1999 to 2021. The premium payments were then compared to aggregate UI costs of furloughs. As elsewhere in the paper, the costs are scaled to correspond to the share of UI costs that is currently covered by employer UI taxes overall.

Figure 1 describes the fraction of costs covered under different parameters. Firstly, the two "censoring" scenarios correspond to an unlimited, direct assignment of the scaled furlough costs to previous employers, and reflect the effect of censoring very long spells. The scenario restricted to identified employers is a purely technical scenario that captures the fact that in the simulation the furloughing employer could not always be clearly identified from the available data. In a real-world implementation, the furloughing employer would always be known; a jobseeker cannot simply register as a furloughed, but must identify their present employer.

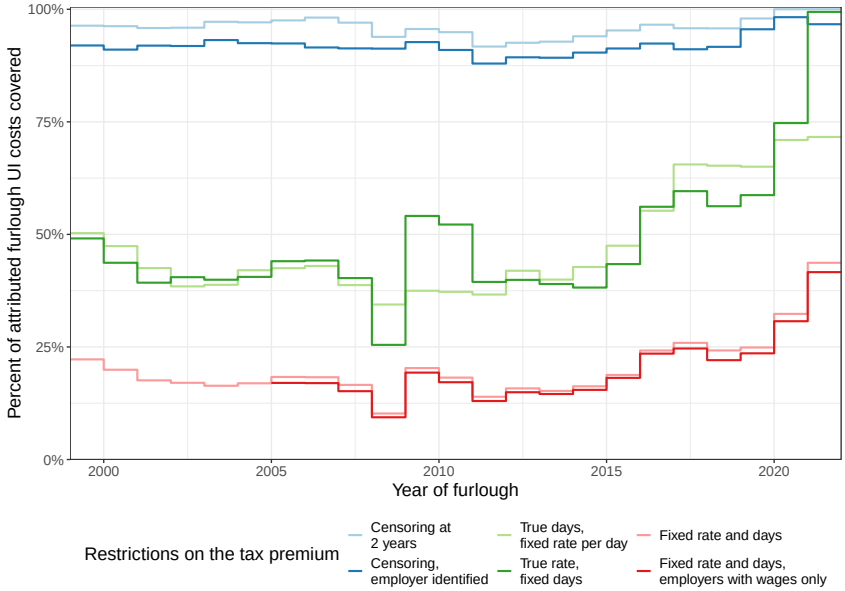
Two scenarios show the effects of restricting the duration or rated amount per day separately. "True days" means the employers were assigned the cost of observed number of benefit days, but this duration was multiplied by the annual flat rate corresponding to the unemployment assistance available for uninsured workers. Since roughly 90% of furloughed workers are insured and receive an earnings-related compensation, on average only 47% of the costs was covered. "True costs per day" correspond to using empirical costs per day, but multiplied by a fixed duration. For this purpose, four weeks instead of the original two was used. This restriction covered roughly 49% of costs on average.

Applying the two restrictions together, similarly to the version in 1990's but doubling the number of fixed days, would only have covered 20% of the costs. It is notable in this case that there would be very few strict losses to exits: restricting the premium to employers who pay wages in the following year has negligible impact on the costs covered. This is very different from what is observed under the more general experience rating simulations.

The clear majority of furloughs end in a recall, and most furloughing employers resume their operations; in some industries it is also common for employers to furlough workers repeatedly from year to year, while in others furloughs were only common during the

financial crisis and the COVID-19 pandemic.

Figure 1: Costs covered under different variations of the furlough rating. For descriptions of the variations, see text.



In the simulation, the existing UI taxes were scaled down, linearly reducing them by the fraction of the UI revenue that would have been covered by the furlough premiums. Figures 2 and 3 show the changes and decompositions of tax rates for a number of industries and personnel size classes.

Figure 2: Net change in cumulative tax rate due to furlough premiums. The mean rates are defined as cumulative payments divided by cumulative wages within an industry–size category combination. The net changes between the simulated taxes and actualized payments are expressed as percentage point differences. Employer size is defined as total observed headcount divided by observed years in operation. Industries with highest average premiums relative to their wages are shown. Some size class–industry combinations with very few observations have been omitted to protect sensitive data.

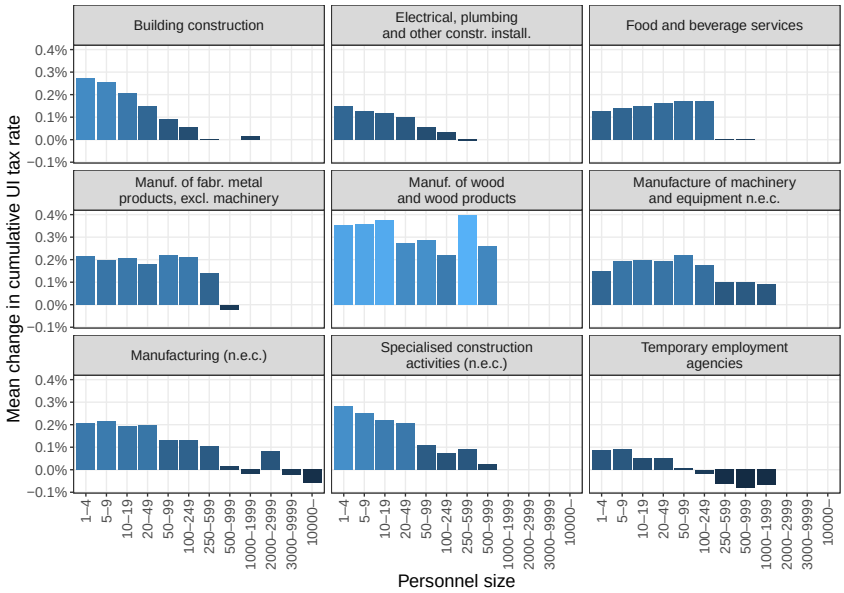
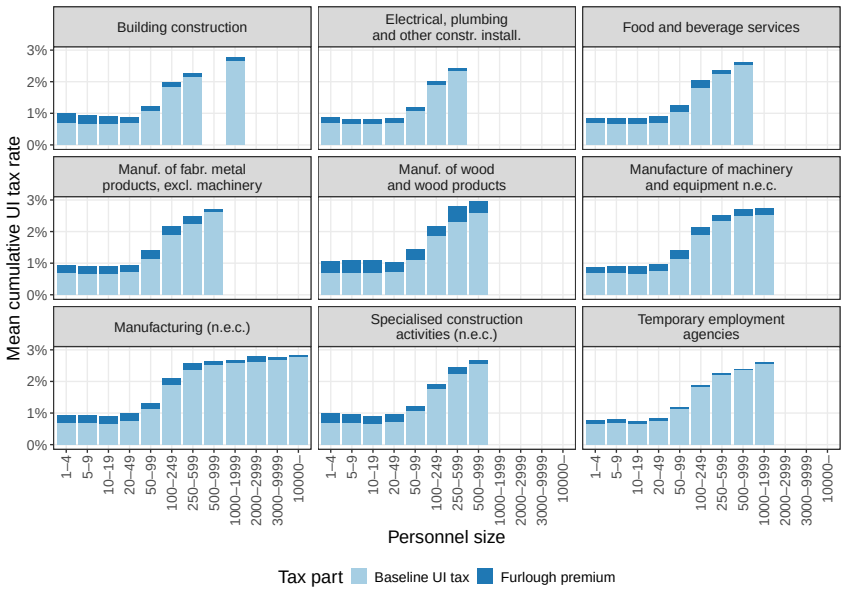


Figure 3: Decomposition of cumulative tax rate by personnel size and industry. The baseline UI tax refers to simulated payments excluding the furlough premiums, divided by wages.



Appendix B Experience rating of the old-age extension

Finland has a long history of age-specific policies for the older unemployed, since at least 1971. These policies were generally speaking expanded until 1997 and have been gradually scaled down since.

One of the main policies has provided an extension to the regular maximum duration of UI until old-age retirement. The age limit for this extension has been gradually increased over time to curb the costs of this system. Kyyrä and Pesola (2020) show that mass layoffs have disproportionately targeted persons eligible to the extension; in particular, when the age limits have been increased, the discontinuity in the age distribution of layoffs has visibly followed these movements.

An experience rating scheme specific to this extension has been applied since 2009. Nominally, the scheme was meant to collect 80% of the gross UI costs of the extension, increased to 90% in 2013. In reality, benefits paid during the extensions between 2009 and 2021 amount to 2,121 million euros in 2019 wage levels[1], or about 7.6% of UI expenditure, while the rated payments sum up to about 470 million.

The discrepancy reflects various constraints based on the payments. The estimated[2] effects of these restrictions are collected in Table 1. The effects were simulated in two ways: by removing the restriction and leaving all the other ones intact (marginal effect of removing a restriction), and by dropping all restrictions and only adding the single restriction (marginal effect of adding a restriction). All effects are expressed relative to the sum of uncovered costs. Total uncovered costs correspond to roughly three quarters of the direct costs of the extension system. Some technical limitations of the simulations are also listed for completeness.

Unlike in the main text, the benefit costs in this appendix are used in full, rather than scaled by the average employer tax share of all UI costs. The accrued pension is not added to the nominal costs. These choices reflect the fact that the existing rating system explicitly targets the total costs of benefits.

Quantitatively, the most important restrictions are that employers for fixed-term jobs and jobs lasting less than 3 years are exempt, and that the payment is lower for small employers. The payment responsibility scales linearly with the employer's total annual wages between about 1.9 million and 33.4 million; employers with wages below the lower threshold pay nothing.

[1] Amounts deflated by the wage index, as elsewhere in the paper.

[2] The existing experience rating system was estimated using the legislation and data on benefits, jobseeking and employment. The estimated revenues closely match the publicly available statistics.

Table 1: Effects of various restrictions on simulated ER coverage of extended benefits

Restriction	Effect if removed last	Effect if added first
Job ended before the age of 56	0.23%	0.96%
Start date of UI entitlement unidentified	0.49%	1.11%
Dismissals for misc. reasons	0.65%	1.71%
Dismissal reason unclear	0.51%	2.06%
Employer wage data not found	0.02%	3.83%
Employer wages below threshold	12.49%	34.57%
Fixed-term contract ended	4.49%	31.00%
Job duration less than 3 years	17.81%	17.81%
Rating below 100%	6.95%	6.95%

Shares are defined as percentage of total uncovered costs. Uncovered costs refer to the sum of relevant extended benefits over 2009–2021 which are not covered by the system.
The second column describes how much payments would be increased if the constraint was removed, but the other restrictions remained. The third column states the amount of payments would be reduced if a single restriction was added, compared to a hypothetical baseline with no other restrictions.

Appendix C Limitations of the employment and wage data

For years 1999–2018, daily wages per employee were estimated from annual data, linking job contracts and data on annual wage in that job. For some early years, job-specific wages were not available for all employers, in which case person-level annual data on wages from tax records was used for estimation. All wages are gross wages. When a person was observed to be full-time unemployed or furloughed, their wage was set to 0 for those days even if employment data suggested they were employed, and the residual annual wage distributed among the residual working days. When a person was observed part-time unemployed, the part-time wage observed in unemployment data was used for those days. Overall, the procedure probably underestimates fluctuations in wages over a year somewhat. There is likely to be some measurement error in job durations, related to jobs that have in reality ended but linger in the register data.

For years 2019–, wages were obtained from the Incomes Register at the level of individual payments, which typically happen once per month. A limitation of this data is that it tracks technical payment periods. These are often, but not always, the same as periods during which wages are earned. In particular, the majority of workers are eligible for a special annual bonus called the holiday bonus (*lomaraha*). The bonus usually amounts to about a half a month's wages. It is earned throughout the year, but paid only once per year, typically in the summer. Allocating this payment to the summer months would have artifically inflated the fluctuation in wages. This bonus was tracked separately and simply distributed across the person's annual working days in the year in which it was paid. Some smaller similar payments, earned through a longer period but paid in a specific payment period, probably remain. Overall, the data available from the Incomes Register probably overestimate the flucuations in wages over a year somewhat.

In some cases, the ID numbers used to identify employers may change in the data even though the employer in reality stays the same. On average, such cases appear likely to be rare after 2005, but may be slightly more common for public sector employers. The measurement error is likely to be stronger at the turn of the year 2018/2019 when the data source changes.

Figures 4 and 5 illustrate the observed monthly and annual variation. While the observed variation in employment changes does not appear to be substantially changed by the switch in the dataset, the variation in wages causes the variation in wages to increase substantially from 2019.

Figure 4: Monthly median changes and annual variation indices. The lighter-colored monthly measures are changes for the median employer in headcount or wages from the previous month, divided by a rolling average of headcount or wages and expressed as percentage points. The darker lines with steps at ends of years represent the median variation indices, the per-employer annual average of the monthly changes. The dashed vertical line represents a change in the datasets used. The median is a wage-weighted median, defined as a value such that 50% of the wages in the period were paid by employers with a smaller value.

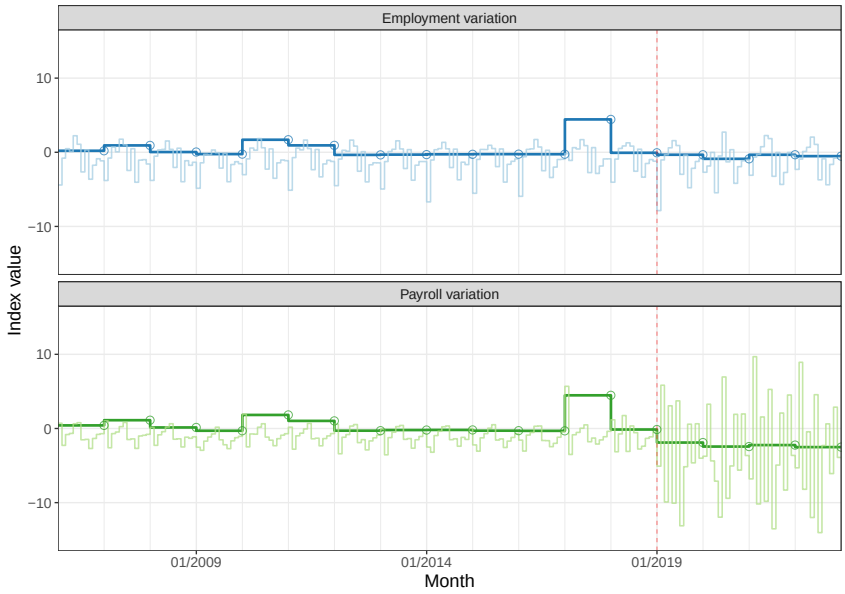
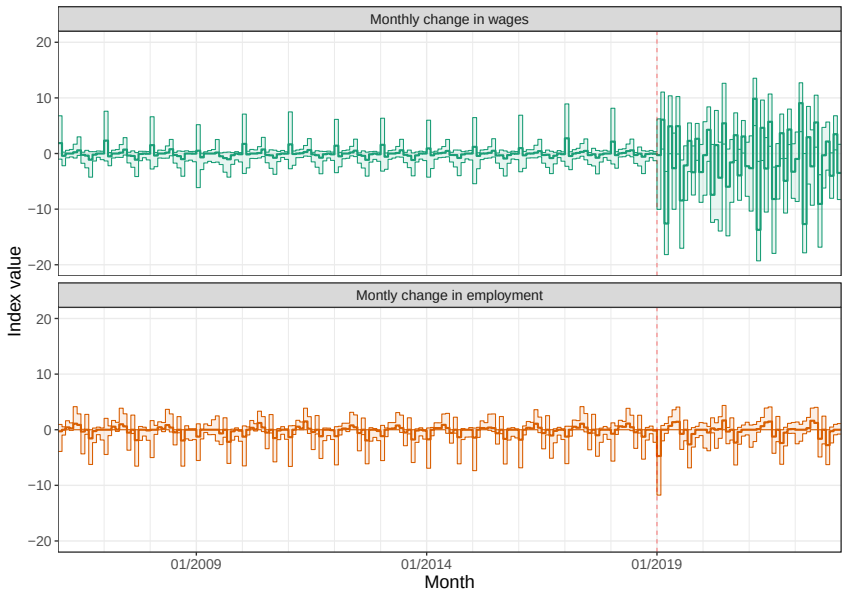


Figure 5: Range of monthly employment and wage changes. The solid line represents the monthly median changes as in figure 4. The shaded areas correspond to 25th and 75th weighted percentiles of monthly changes, defined analogously to the median.



Appendix D Comparison of employer attribution mechanisms

For most employers, the choice in how costs were attributed to different employers had negligible impact on their tax rates; the choice in which costs to attribute turned out to be much more important on average. Figure illustrates the distribution of differences in cumulative tax rates per employer, comparing different attribution mechanisms to the simplest one, where the latest employer (paying the highest wage if there were several simultaneous ones) gets the entire cost. The tax rates are assigned by the direct assignment method with a 10% cap of annual wages (Appendix G).

However, the differences are more significant when one examines annual tax rates in specific classes, such as those paying the highest taxes and small employers. Generally, placing at least come constraints on the job that the unemployed individual held with the employer reduces tax rates in the top tax brackets (Figure 7) and for the smallest employers (Figure 8). Which specific constraints are used matters much less.

Figure 6: Differences in cumulative tax rates by attribution method. The difference plotted is the percentage point difference in tax rate for moving from the simplest attribution to a different attribution method.

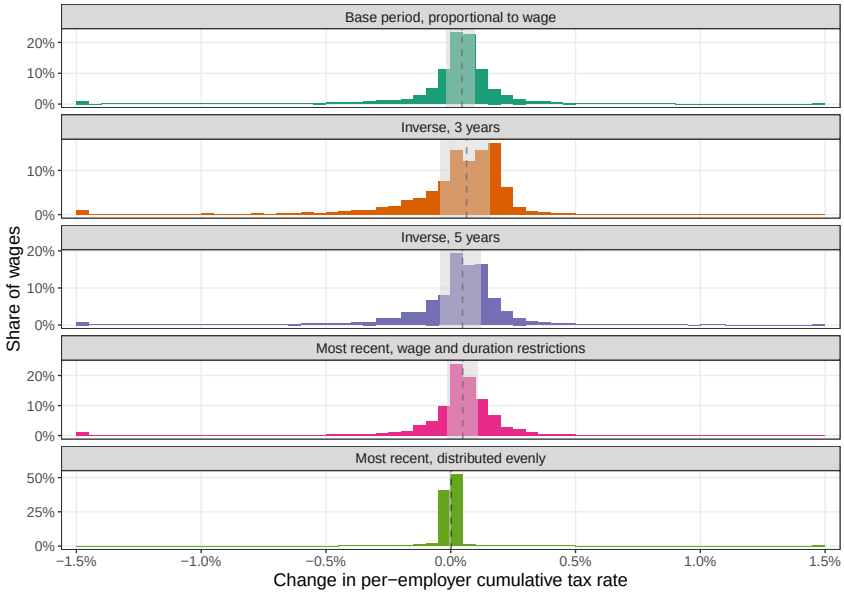


Figure 7: Differences between attribution methods, by personnel size.

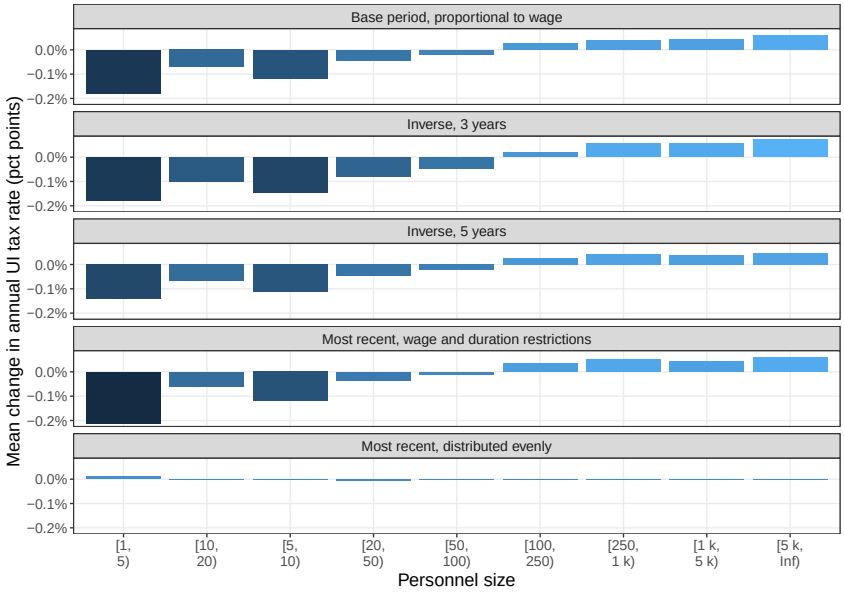
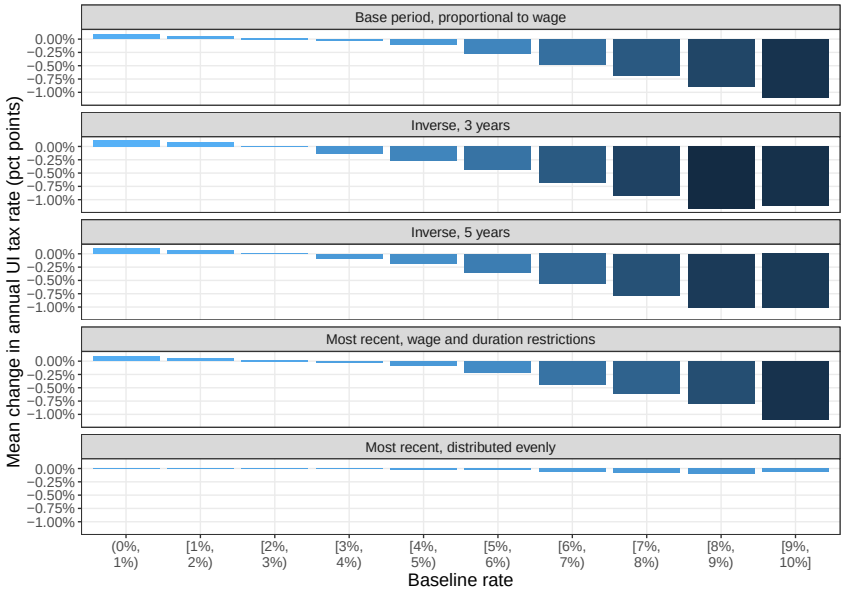


Figure 8: Differences between attribution methods, by tax rate. Baseline rate refers to the simulated rate when using the simplest attribution method.



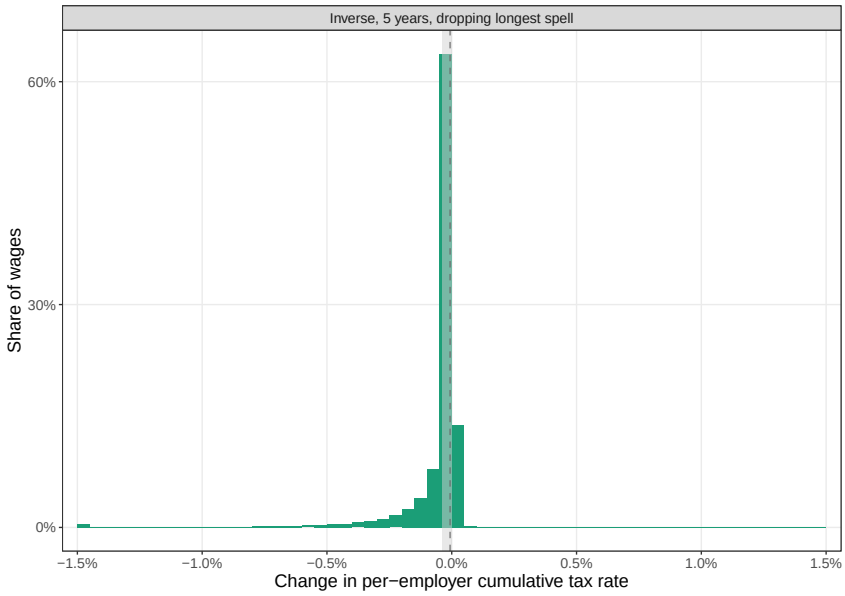
Appendix E The effect of the longest unemployment spell per employer

One of the concerns with experience rating is that a single long spell of unemployment by a former worker can have a disproportionate impact on an employer's taxes. As noted in the main text, 50% of all UI costs were attributed to a group of employers who only pay 8.7% of the current UI tax. Within this group, the longest single spell per employer was typically[3] responsible for a sixth of the attributed costs.

To test the effects of the longest spell per employer directly, a variant of the simulations drops the longest spell for each employer at a time, keeping the assignment otherwise fixed. For most employers, the change in their cumulative tax rate was negligible, as shown in Figure 9.[4]

However, in the top tax brackets and for annual taxes, the mean effect of dropping the longest spell was almost a full percentage point. For the smallest employers, the mean annual effect was more than 0.3 percentage points. These effects are illustrated in Figures 10–11.

Figure 9: Effect on cumulative tax rates of dropping the longest spell. The change plotted is the percentage point difference in tax rate for dropping the longest spell per employer.



[3]Defined as the wage-weighted median share of attributed costs across employers.

[4]Because the tax assignment used a tax rate capped at annual levels, and due to the nature of the inverse assignment, dropping a specific spell could sometimes even increase the cumulative tax paid, as dropping the longest spell might mean the employer became responsible to a different later spell instead.

Figure 10: Effect on annual tax rates of dropping the longest spell, by personnel size.

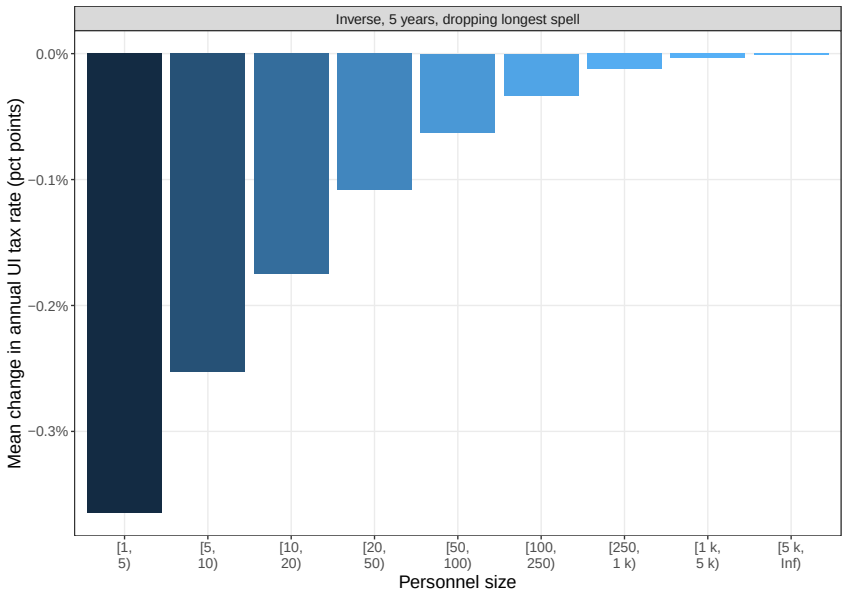
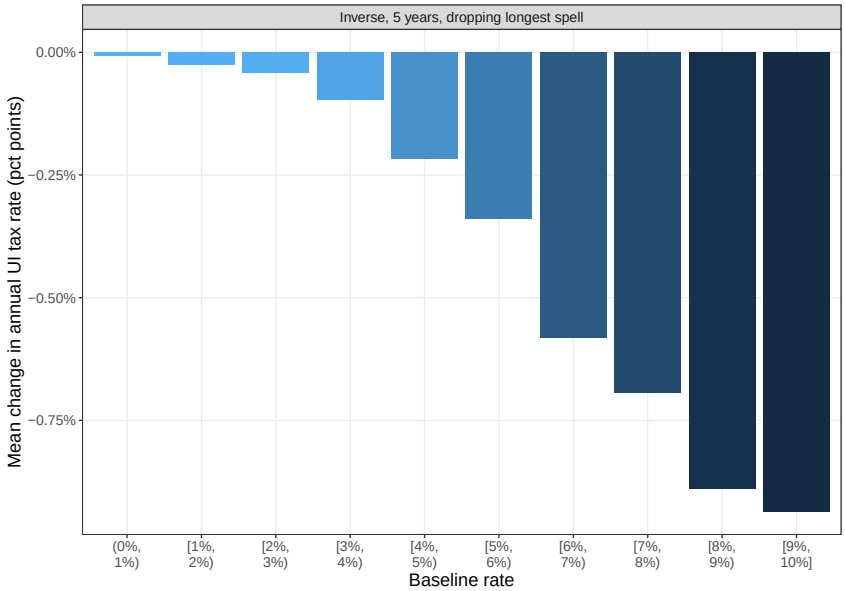


Figure 11: Effect on annual tax rates of dropping the longest spell, by tax bracket. Baseline rate refers to the simulated rate when no spells are dropped.



Appendix F Tracking mergers

All state laws in the US regulate how the accumulated UI tax liability should be transferred when one employer acquires another's business. The scope of the transfer rules varies by state: in some states, only a full transfer is possible, while in others, a partial transfer is possible. At the federal level, the SUTA[5] Dumping Prevention Act of 2004 seeks to curb employer attempts to avoid their UI tax liabilities through transfers of business or employees.

For this paper, a mechanical transfer rule was applied for two purposes. The first aim was to roughly approximate a simplified version of a legal transfer rule. The second goal was to deal with identifier changes in the data for public sector employers. As noted in Appendix C, the identifiers for the public sectors were not entirely consistent over time, reflecting either changes in the underlying datasets used or large scale reorganizations within the government.

The rule specified that if $s \geq 10\%$ or more of employees moved from employer A to employer B in period t_0, then share s of the benefits assigned to A in year t_0 would transfer to B. The rule was only applied to employees who had worked for at least 3 months with employer A above a minimum wage, to employers with a base headcount of at least 10, and to transfers of at least 5 persons. The potential transition periods used a sliding scale of 3 months, so the workers did not all have to move on the same date. Roughly 2% of attributed benefits were transferred between employers in this way.

The transfer rule captures some but not all relevant transitions. Table 2 illustrates some potential cases for firms A and B; in all cases, 90% of workers move from A to B during t_0. It is assumed that any open tax liabilities already assigned to A by t_0 will be covered by existing conventions and laws; the main question here is the correct attribution of benefit costs that have not yet been translated to taxes. In reality, for both the benefit and the reserve ratio, benefits from $t_0 - 1$ would continue to affect taxes in $t_0 + 1$; this distinction was ignored mainly for computational convenience.

Appendix G Direct assignment with and without a tax cap

The simplest translation of the relevant attributed costs c_t to taxes τ_{t+1} would be the direct assignment. Under this method, costs attributed from year t are assigned as a a lump-sum tax at the end of year $t + 1$. Only the costs currently covered by the employer UI tax that could not be financed from these lump-sum payments would be shared across employers. These shared tax rates would be raised in the same way as the existing system

[5] State Unemployment Tax

Table 2: Examples of covered and uncovered transitions

Firing	Unemployment	Effect
Firm A fires worker i at start of t_0	i is unemployed during t_0	B is assigned 90% of the benefits by i
Firm A fires worker i at end of t_0	i is unemployed during $t_0 + 1$	B is not assigned i's benefits, because they accrued during $t_0 + 1$
Firm A fires worker i during $t_0 - 1$	i is unemployed during $t_0 - 1$	B is not assigned i's benefits, because benefits accrued during $t_0 - 1$ and already affected A's taxes in t_0

(smaller employers paying less), but scaled down proportionally across all employers.

In some cases, the direct assignment might result in exorbitant effective tax rates, defined as total UI taxes divided by wages in $t + 1$. To examine how common such cases might be, the direct assignment was simulated with three variants: a maximum rate of 10%, a maximum rate of 100%, and no maximum. Under the capped systems, any tax liability in excess of the maximum rate would stay on the employer's balance and transfer to later years until they were paid out in full. The maximum rate in later years would apply to the transfered back taxes, any potential new liabilities, and the shared rate together.

Much of the taxes would continue to be delayed indefinitely, as most employers would not be able to pay back their backlog. Figure 12 shows how the backlog would develop over time. For the purposes of illustration, losses of taxes to employer exits in year t are defined as tax liabilities of employers who paid no wages in t or any later years.[6]

Most employers would pay a slightly lower tax under a direct assignment system, with or without a cap. The distribution of differences in tax rates from the current system is illustrated in Figure 13. Small employers would also continue to pay lower tax rates, as the shared part of the tax would continue to be smaller for wages below 2 million euros, as shown in Figure 14.

However, some employers would be persistently paying the top rates during several years under the capped system. For example, in certain sub-industries in construction, almost a quarter of wages would be paid by employers who would reach the maximum rate on at least two different years. Figure 15 shows the share of employers reaching the tax threshold per industry for the ten industries with the highest and lowest shares.

The main text discussed the effect the capped direct assignment would have on the

[6]In the majority of cases, the tax authority would not know when such an exit happens. Employers often stay in the business register long after they've ceased all observable operation. On average, employers with no wages would also have negligible turnover, liquid funds or equity relative to the tax assignment.

financial figures of employers who reach the cap in an example year of 2016. On average, these employers would reach a cumulative maximum tax rate of 4% by the end of 2022. Many of these employers saw a steady decline in their wages already since the financial crisis, and had suffered from low profitability since then. Figure 16 plots the long-term development of these firms, comparing them to employers who paid taxes below the cap.

Figure 12: New, accumulated and recovered backlog and losses to exits under the capped system. Cumulative losses of exits are defined as assigned but uncovered costs due to employers ceasing to stop wages in a given year until the end of observations. Delays refer to both new and accumulated backlog that were not paid out in a given year. New residual is any cost assigned in a given year that exceeded the employer's maximum rate.

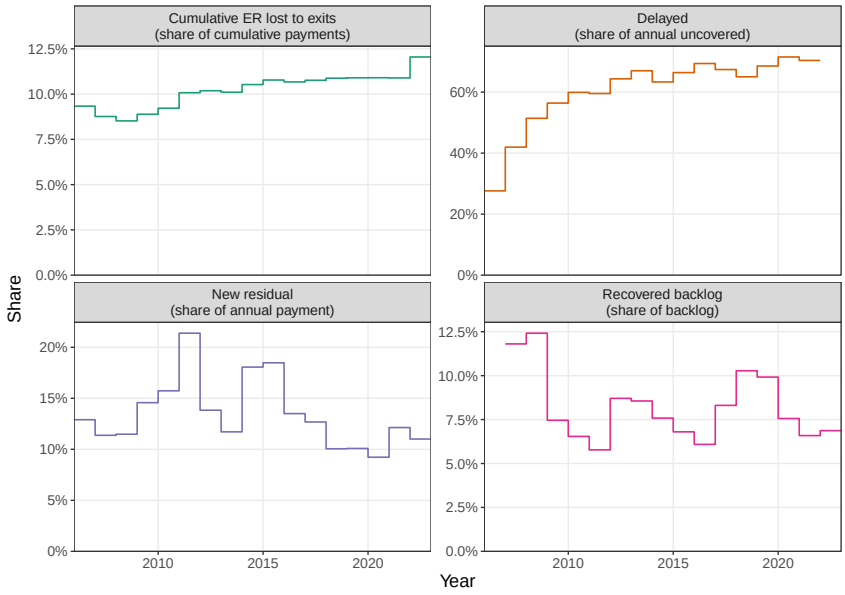


Figure 13: Difference between the direct assignment and the current tax. The change plotted is the percentage point difference in annual total tax rates between the existing system and the direct assignment.

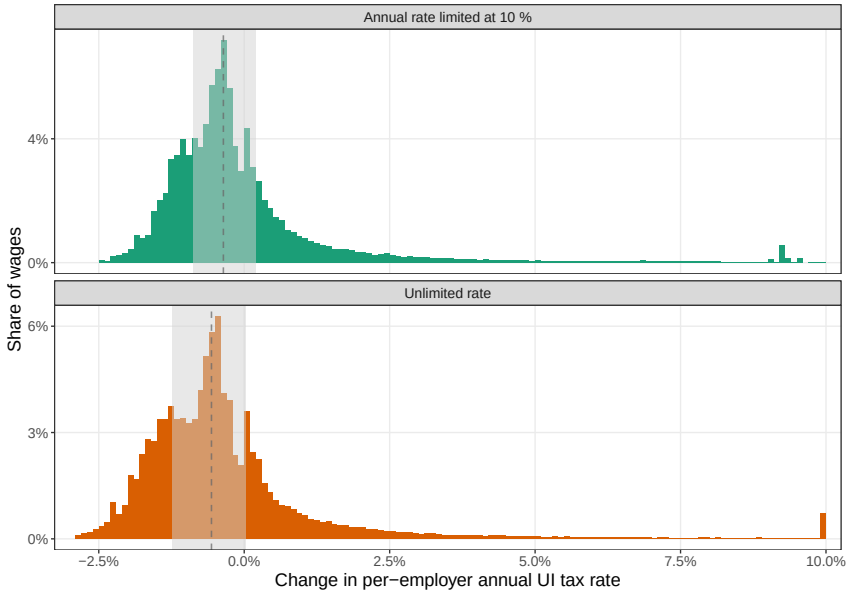


Figure 14: Annual tax rate under direct assignment, by personnel size.

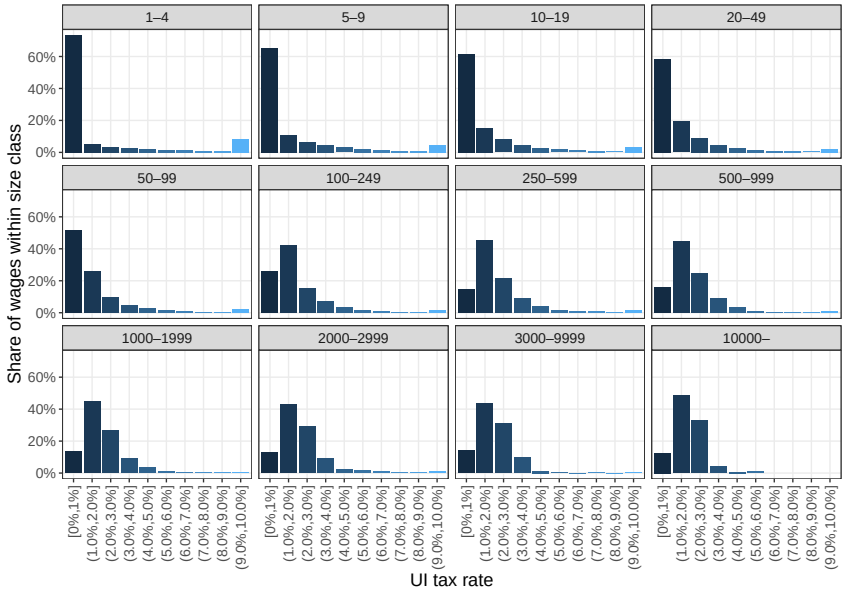


Figure 15: Years at the maximum rate, by industry. For each employer, years between 2006 and 2022 when the employer paid wages and would be at the maximum tax rate under the capped indirect assignment were counted.

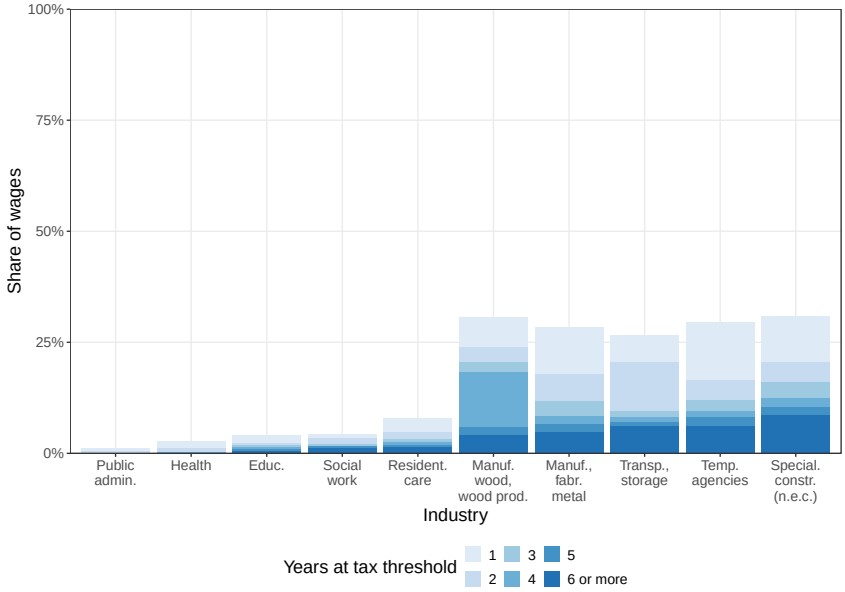
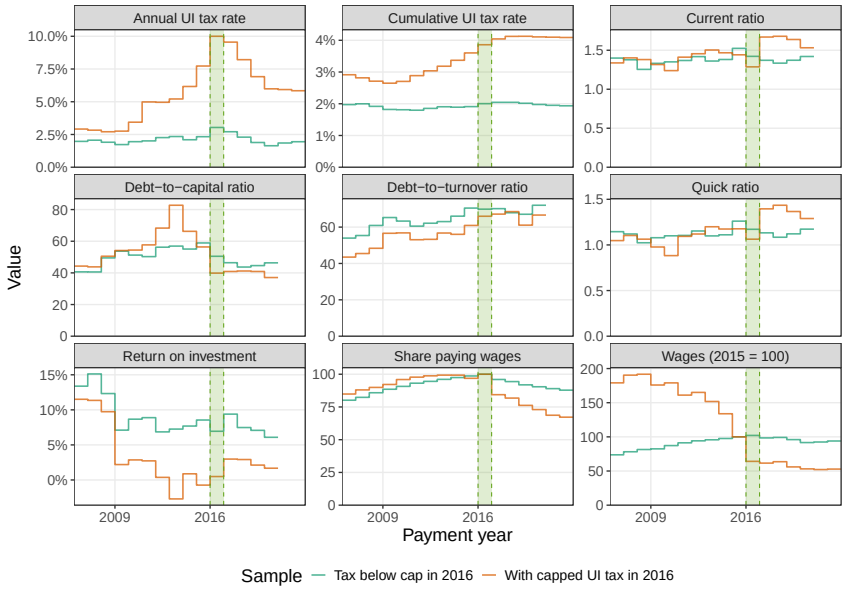


Figure 16: Year 2016 employers, with UI taxes at or below cap. All values are calculated at the group level. The rates and ratios are calculated by dividing the group-level annual numerators and denominators with each other. For financial figures, only private sector employers are included and the finance industries are excluded.



Appendix H Example index value calculations

Example calculations are presented:

- for the baseline simulation all counterfactual scenarios for one index type (benefit ratio, 0.5%–5.4%) and two synthetic employers (tables 3–6)
- for six different synthetic employers for one scenario and one index type (Table 7)
- for all index types for one counterfactual scenario (hiring) and two synthetic employers (Tables 8–12)

The synthetic employers resemble real pathways of real employers, but the numerical values have been randomized (within a range of real values) to protect sensitive data. The six employers were generated to resemble actual firms with small and medium average personnel sizes, and low, medium and high cost-to-payment lifetime ratios.

Table 3: Example of a benefit ratio calculation with no counterfactuals injected

Employer	Time	Sum of costs	Sum of wages	Index	Rated tax	Current payment	Total new payment
A	2012	14.3 k€	1.4 M€	0.011	1.30%	2.1 k€	4.2 k€
A	2013	24.3 k€	1.3 M€	0.019	1.55%	1.7 k€	3.9 k€
A	2014	25.9 k€	1.2 M€	0.021	2.55%	1.5 k€	5.5 k€
A	2015	26.7 k€	1.1 M€	0.024	2.76%	1.4 k€	5.3 k€
A	2016	20.8 k€	1.0 M€	0.020	2.88%	1.8 k€	6.1 k€
A	2017	19.1 k€	961.9 k€	0.020	2.61%	1.5 k€	5.3 k€
A	2018	9.0 k€	944.8 k€	0.010	2.64%	1.3 k€	5.3 k€
A	2019	7.5 k€	927.1 k€	0.008	1.42%	911.1 €	2.6 k€
A	2020	7.4 k€	914.4 k€	0.008	1.24%	742.0 €	2.1 k€
A	2021	1.6 k€	892.9 k€	0.002	1.22%	809.0 €	2.1 k€
A	2022				0.50%	785.8 €	973.3 €
B	2012	164.3 k€	38.0 M€	0.004	0.65%	193.2 k€	115.1 k€
B	2013	228.1 k€	39.0 M€	0.006	0.71%	219.8 k€	136.1 k€
B	2014	304.8 k€	40.6 M€	0.008	0.93%	222.9 k€	140.4 k€
B	2015	340.7 k€	41.9 M€	0.008	1.15%	226.3 k€	172.2 k€
B	2016	370.0 k€	42.4 M€	0.009	1.22%	247.7 k€	215.0 k€
B	2017	404.1 k€	42.8 M€	0.009	1.30%	214.3 k€	175.9 k€
B	2018	413.7 k€	41.8 M€	0.010	1.40%	153.0 k€	121.9 k€
B	2019	362.1 k€	39.6 M€	0.009	1.46%	109.6 k€	102.6 k€
B	2020	300.6 k€	37.6 M€	0.008	1.38%	88.9 k€	94.3 k€
B	2021	249.3 k€	36.4 M€	0.007	1.21%	99.4 k€	97.1 k€
B	2022				1.08%	110.3 k€	102.2 k€

Table 4: Example of a benefit ratio calculation for a furlough in 2017

Employer	Time	Sum of costs	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(14.3 k€)	(1.4 M€)	(0.011)	(1.30%)	(3.4 k€)	
A	2013	(24.3 k€)	(1.3 M€)	(0.019)	(1.55%)	(3.3 k€)	
A	2014	(25.9 k€)	(1.2 M€)	(0.021)	(2.55%)	(5.1 k€)	
A	2015	(26.7 k€)	(1.1 M€)	(0.024)	(2.76%)	(4.9 k€)	
A	2016	(20.8 k€)	(1.0 M€)	(0.020)	(2.88%)	(5.3 k€)	
A	2017	+1.7 k€(19.1 k€)	-4.9 k€(961.9 k€)	+0.00190 (0.020)	- (2.61%)	- (4.9 k€)	
A	2018	+1.7 k€(9.0 k€)	-4.9 k€(944.8 k€)	+0.00188 (0.010)	+0.197% (2.64%)	+390.4 €(5.2 k€)	+390.4 €(5.2 k€)
A	2019	+1.7 k€(7.5 k€)	-4.9 k€(927.1 k€)	+0.00191 (0.008)	+0.246% (1.42%)	+449.2 €(2.6 k€)	+839.6 €(7.8 k€)
A	2020	+1.7 k€(7.4 k€)	-4.9 k€(914.4 k€)	+0.00193 (0.008)	+0.238% (1.24%)	+394.0 €(2.1 k€)	+1.2 k€(9.9 k€)
A	2021	+1.7 k€(1.6 k€)	-4.9 k€(892.9 k€)	+0.00195 (0.002)	+0.241% (1.22%)	+390.4 €(2.0 k€)	+1.6 k€(11.8 k€)
A	2022				+0.176% (0.50%)	+277.9 €(785.8 €)	+1.9 k€(12.6 k€)
B	2012	(164.3 k€)	(38.0 M€)	(0.004)	(0.65%)	(50.0 k€)	
B	2013	(228.1 k€)	(39.0 M€)	(0.006)	(0.71%)	(61.0 k€)	
B	2014	(304.8 k€)	(40.6 M€)	(0.008)	(0.93%)	(85.9 k€)	
B	2015	(340.7 k€)	(41.9 M€)	(0.008)	(1.15%)	(101.7 k€)	
B	2016	(370.0 k€)	(42.4 M€)	(0.009)	(1.22%)	(97.5 k€)	
B	2017	+1.7 k€(404.1 k€)	-4.9 k€(42.8 M€)	+0.00004 (0.009)	- (1.30%)	- (106.7 k€)	
B	2018	+1.7 k€(413.7 k€)	-4.9 k€(41.8 M€)	+0.00004 (0.010)	+0.005% (1.40%)	+411.2 €(105.9 k€)	+411.2 €(105.9 k€)
B	2019	+1.7 k€(362.1 k€)	-4.9 k€(39.6 M€)	+0.00004 (0.009)	+0.005% (1.46%)	+392.6 €(102.6 k€)	+803.8 €(208.5 k€)
B	2020	+1.7 k€(300.6 k€)	-4.9 k€(37.6 M€)	+0.00004 (0.008)	+0.005% (1.38%)	+380.9 €(94.3 k€)	+1.2 k€(302.7 k€)
B	2021	+1.7 k€(249.3 k€)	-4.9 k€(36.4 M€)	+0.00004 (0.007)	+0.005% (1.21%)	+403.6 €(83.0 k€)	+1.6 k€(385.7 k€)
B	2022				+0.006% (1.08%)	+434.4 €(75.5 k€)	+2.0 k€(461.2 k€)

Table 5: Example of a benefit ratio calculation for a long unemployment spell in 2017

Employer	Time	Sum of costs	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(14.3 k€)	(1.4 M€)	(0.011)	(1.30%)	(3.4 k€)	
A	2013	(24.3 k€)	(1.3 M€)	(0.019)	(1.55%)	(3.3 k€)	
A	2014	(25.9 k€)	(1.2 M€)	(0.021)	(2.55%)	(5.1 k€)	
A	2015	(26.7 k€)	(1.1 M€)	(0.024)	(2.76%)	(4.9 k€)	
A	2016	(20.8 k€)	(1.0 M€)	(0.020)	(2.88%)	(5.3 k€)	
A	2017	+11.8 k€(19.1 k€)	-31.2 k€(961.9 k€)	+0.01336 (0.020)	- (2.61%)	- (4.9 k€)	
A	2018	+11.8 k€(9.0 k€)	-31.2 k€(944.8 k€)	+0.01326 (0.010)	+1.220% (2.64%)	+2.4 k€(5.2 k€)	+2.4 k€(5.2 k€)
A	2019	+11.8 k€(7.5 k€)	-31.2 k€(927.1 k€)	+0.01347 (0.008)	+1.562% (1.42%)	+2.8 k€(2.6 k€)	+5.3 k€(7.8 k€)
A	2020	+11.8 k€(7.4 k€)	-31.2 k€(914.4 k€)	+0.01366 (0.008)	+1.544% (1.24%)	+2.5 k€(2.1 k€)	+7.8 k€(9.9 k€)
A	2021	+11.8 k€(1.6 k€)	-31.2 k€(892.9 k€)	+0.01378 (0.002)	+1.589% (1.22%)	+2.6 k€(2.0 k€)	+10.4 k€(11.8 k€)
A	2022				+1.649% (0.50%)	+2.6 k€(785.8 €)	+13.0 k€(12.6 k€)
B	2012	(164.3 k€)	(38.0 M€)	(0.004)	(0.65%)	(50.0 k€)	
B	2013	(228.1 k€)	(39.0 M€)	(0.006)	(0.71%)	(61.0 k€)	
B	2014	(304.8 k€)	(40.6 M€)	(0.008)	(0.93%)	(85.9 k€)	
B	2015	(340.7 k€)	(41.9 M€)	(0.008)	(1.15%)	(101.7 k€)	
B	2016	(370.0 k€)	(42.4 M€)	(0.009)	(1.22%)	(97.5 k€)	
B	2017	+11.8 k€(404.1 k€)	-31.2 k€(42.8 M€)	+0.00028 (0.009)	- (1.30%)	- (106.7 k€)	
B	2018	+11.8 k€(413.7 k€)	-31.2 k€(41.8 M€)	+0.00029 (0.010)	+0.037% (1.40%)	+2.8 k€(105.9 k€)	+2.8 k€(105.9 k€)
B	2019	+11.8 k€(362.1 k€)	-31.2 k€(39.6 M€)	+0.00030 (0.009)	+0.038% (1.46%)	+2.7 k€(102.6 k€)	+5.5 k€(208.5 k€)
B	2020	+11.8 k€(300.6 k€)	-31.2 k€(37.6 M€)	+0.00032 (0.008)	+0.038% (1.38%)	+2.6 k€(94.3 k€)	+8.1 k€(302.7 k€)
B	2021	+11.8 k€(249.3 k€)	-31.2 k€(36.4 M€)	+0.00033 (0.007)	+0.040% (1.21%)	+2.8 k€(83.0 k€)	+10.9 k€(385.7 k€)
B	2022				+0.042% (1.08%)	+3.0 k€(75.5 k€)	+13.8 k€(461.2 k€)

Table 6: Example of a benefit ratio calculation for a median duration unemployment spell in 2017

Employer	Time	Sum of costs	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(14.3 k€)	(1.4 M€)	(0.011)	(1.30%)	(3.4 k€)	
A	2013	(24.3 k€)	(1.3 M€)	(0.019)	(1.55%)	(3.3 k€)	
A	2014	(25.9 k€)	(1.2 M€)	(0.021)	(2.55%)	(5.1 k€)	
A	2015	(26.7 k€)	(1.1 M€)	(0.024)	(2.76%)	(4.9 k€)	
A	2016	(20.8 k€)	(1.0 M€)	(0.020)	(2.88%)	(5.3 k€)	
A	2017	+4.4 k€(19.1 k€)	-31.2 k€(961.9 k€)	+0.00541 (0.020)	- (2.61%)	- (4.9 k€)	
A	2018	+4.4 k€(9.0 k€)	-31.2 k€(944.8 k€)	+0.00516 (0.010)	+0.541% (2.64%)	+1.1 k€(5.2 k€)	+1.1 k€(5.2 k€)
A	2019	+4.4 k€(7.5 k€)	-31.2 k€(927.1 k€)	+0.00521 (0.008)	+0.656% (1.42%)	+1.2 k€(2.6 k€)	+2.3 k€(7.8 k€)
A	2020	+4.4 k€(7.4 k€)	-31.2 k€(914.4 k€)	+0.00529 (0.008)	+0.636% (1.24%)	+1.0 k€(2.1 k€)	+3.3 k€(9.9 k€)
A	2021	+4.4 k€(1.6 k€)	-31.2 k€(892.9 k€)	+0.00519 (0.002)	+0.646% (1.22%)	+1.0 k€(2.0 k€)	+4.4 k€(11.8 k€)
A	2022				+0.601% (0.50%)	+944.7 €(785.8 €)	+5.3 k€(12.6 k€)
B	2012	(164.3 k€)	(38.0 M€)	(0.004)	(0.65%)	(50.0 k€)	
B	2013	(228.1 k€)	(39.0 M€)	(0.006)	(0.71%)	(61.0 k€)	
B	2014	(304.8 k€)	(40.6 M€)	(0.008)	(0.93%)	(85.9 k€)	
B	2015	(340.7 k€)	(41.9 M€)	(0.008)	(1.15%)	(101.7 k€)	
B	2016	(370.0 k€)	(42.4 M€)	(0.009)	(1.22%)	(97.5 k€)	
B	2017	+4.4 k€(404.1 k€)	-31.2 k€(42.8 M€)	+0.00011 (0.009)	- (1.30%)	- (106.7 k€)	
B	2018	+4.4 k€(413.7 k€)	-31.2 k€(41.8 M€)	+0.00011 (0.010)	+0.014% (1.40%)	+1.1 k€(105.9 k€)	+1.1 k€(105.9 k€)
B	2019	+4.4 k€(362.1 k€)	-31.2 k€(39.6 M€)	+0.00011 (0.009)	+0.014% (1.46%)	+1.0 k€(102.6 k€)	+2.1 k€(208.5 k€)
B	2020	+4.4 k€(300.6 k€)	-31.2 k€(37.6 M€)	+0.00012 (0.008)	+0.014% (1.38%)	+1.0 k€(94.3 k€)	+3.2 k€(302.7 k€)
B	2021	+4.4 k€(249.3 k€)	-31.2 k€(36.4 M€)	+0.00012 (0.007)	+0.015% (1.21%)	+1.1 k€(83.0 k€)	+4.2 k€(385.7 k€)
B	2022				+0.016% (1.08%)	+1.1 k€(75.5 k€)	+5.4 k€(461.2 k€)

Table 7: Example of a benefit ratio calculation for a hiring in 2017 by six employers

Employer	Time	Sum of costs	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
C	2017	- (6.3 k€)	+31.2 k€(631.9 k€)	-0.000466191 (0.010)	- (1.45%)	- (1.7 k€)	
C	2018	- (6.3 k€)	+62.4 k€(651.3 k€)	-0.000840598 (0.010)	-0.0610938% (1.46%)	-91.0 €(2.2 k€)	-91.0 €(2.2 k€)
C	2019	- (7.8 k€)	+93.6 k€(663.6 k€)	-0.001457052 (0.012)	-0.1126505% (1.43%)	-154.5 €(2.0 k€)	-245.5 €(4.1 k€)
C	2020	- (5.7 k€)	+124.8 k€(682.5 k€)	-0.001288443 (0.008)	-0.1766836% (1.70%)	-272.5 €(2.6 k€)	-518.0 €(6.8 k€)
C	2021	- (2.7 k€)	+156.0 k€(688.3 k€)	-0.000721925 (0.004)	-0.1628570% (1.26%)	-207.4 €(1.6 k€)	-725.3 €(8.4 k€)
C	2022						-725.3 €(8.4 k€)
A	2017	- (19.1 k€)	+31.2 k€(961.9 k€)	-0.000623853 (0.020)	- (2.61%)	- (4.9 k€)	
A	2018	- (9.0 k€)	+62.4 k€(944.8 k€)	-0.000592591 (0.010)	-0.0666279% (2.64%)	-131.6 €(5.2 k€)	-131.6 €(5.2 k€)
A	2019	- (7.5 k€)	+93.6 k€(927.1 k€)	-0.000740624 (0.008)	-0.0793077% (1.42%)	-144.5 €(2.6 k€)	-276.1 €(7.8 k€)
A	2020	- (7.4 k€)	+124.8 k€(914.4 k€)	-0.000966444 (0.008)	-0.0943877% (1.24%)	-155.6 €(2.1 k€)	-431.8 €(9.9 k€)
A	2021	- (1.6 k€)	+156.0 k€(892.9 k€)	-0.000272647 (0.002)	-0.1223320% (1.22%)	-197.9 €(2.0 k€)	-629.7 €(11.8 k€)
A	2022				- (0.50%)	- (785.8 €)	-629.7 €(12.6 k€)
D	2017	- (19.4 k€)	+31.2 k€(676.4 k€)	-0.001265114 (0.029)	- (4.43%)	- (5.2 k€)	
D	2018	- (10.8 k€)	+62.4 k€(726.8 k€)	-0.001176753 (0.015)	-0.1111718% (3.49%)	-198.4 €(6.2 k€)	-198.4 €(6.2 k€)
D	2019	- (9.6 k€)	+93.6 k€(720.3 k€)	-0.001531034 (0.013)	-0.1435738% (2.10%)	-196.3 €(2.9 k€)	-394.7 €(9.1 k€)
D	2020	- (6.9 k€)	+124.8 k€(699.6 k€)	-0.001484233 (0.010)	-0.1815267% (1.88%)	-240.4 €(2.5 k€)	-635.2 €(11.6 k€)
D	2021	- (1.1 k€)	+156.0 k€(659.4 k€)	-0.000319790 (0.002)	-0.1846794% (1.44%)	-174.2 €(1.4 k€)	-809.4 €(12.9 k€)
D	2022						-809.4 €(12.9 k€)
E	2017	- (478.5 k€)	+31.2 k€(54.1 M€)	-0.000005107 (0.009)	- (1.31%)	- (138.8 k€)	
E	2018	- (412.9 k€)	+62.4 k€(53.3 M€)	-0.000009052 (0.008)	-0.0006802% (1.32%)	-72.4 €(140.8 k€)	-72.4 €(140.8 k€)
E	2019	- (366.5 k€)	+93.6 k€(56.6 M€)	-0.000010694 (0.006)	-0.0012450% (1.18%)	-180.4 €(170.3 k€)	-252.8 €(311.1 k€)
E	2020	- (245.5 k€)	+124.8 k€(60.4 M€)	-0.000008386 (0.004)	-0.0013877% (1.04%)	-198.0 €(148.2 k€)	-450.7 €(459.3 k€)
E	2021	- (112.9 k€)	+156.0 k€(63.9 M€)	-0.000004301 (0.002)	-0.0011043% (0.71%)	-153.2 €(98.3 k€)	-604.0 €(557.6 k€)
E	2022				- (0.50%)	- (69.2 k€)	-604.0 €(626.8 k€)
B	2017	- (404.1 k€)	+31.2 k€(42.8 M€)	-0.000006866 (0.009)	- (1.30%)	- (106.7 k€)	
B	2018	- (413.7 k€)	+62.4 k€(41.8 M€)	-0.000014726 (0.010)	-0.0009041% (1.40%)	-68.4 €(105.9 k€)	-68.4 €(105.9 k€)
B	2019	- (362.1 k€)	+93.6 k€(39.6 M€)	-0.000021529 (0.009)	-0.0019491% (1.46%)	-136.6 €(102.6 k€)	-204.9 €(208.5 k€)
B	2020	- (300.6 k€)	+124.8 k€(37.6 M€)	-0.000026415 (0.008)	-0.0026869% (1.38%)	-183.9 €(94.3 k€)	-388.8 €(302.7 k€)
B	2021	- (249.3 k€)	+156.0 k€(36.4 M€)	-0.000029149 (0.007)	-0.0033279% (1.21%)	-227.6 €(83.0 k€)	-616.4 €(385.7 k€)
B	2022				-0.0037474% (1.08%)	-262.8 €(75.5 k€)	-879.1 €(461.2 k€)
F	2017	- (865.1 k€)	+31.2 k€(62.3 M€)	-0.000006952 (0.014)	- (2.31%)	- (277.2 k€)	
F	2018	- (752.2 k€)	+62.4 k€(61.0 M€)	-0.000012620 (0.012)	-0.0008371% (1.96%)	-94.0 €(220.2 k€)	-94.0 €(220.2 k€)
F	2019	- (688.6 k€)	+93.6 k€(59.0 M€)	-0.000018501 (0.012)	-0.0015972% (1.78%)	-173.4 €(193.4 k€)	-267.4 €(413.7 k€)
F	2020	- (684.6 k€)	+124.8 k€(55.4 M€)	-0.000027814 (0.012)	-0.0022230% (1.69%)	-195.2 €(148.3 k€)	-462.6 €(561.9 k€)
F	2021	- (1.4 M€)	+156.0 k€(43.1 M€)	-0.000116733 (0.032)	-0.0033311% (1.75%)	-8.5 €(4.4 k€)	-471.1 €(566.4 k€)
F	2022						-471.1 €(566.4 k€)

Table 8: Example of a reserve ratio calculation (0.5%–5.4%) for a hiring in 2017

Employer	Time	Sum of costs	Sum of payments	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(14.3 k€)	(12.4 k€)	(1.4 M€)	(-0.001)	(2.32%)	(6.2 k€)	
A	2013	(24.3 k€)	(14.9 k€)	(1.3 M€)	(-0.007)	(2.17%)	(4.7 k€)	
A	2014	(25.9 k€)	(21.2 k€)	(1.2 M€)	(-0.004)	(3.85%)	(7.7 k€)	
A	2015	(26.7 k€)	(24.0 k€)	(1.1 M€)	(-0.002)	(2.34%)	(4.2 k€)	
A	2016	(20.8 k€)	(26.3 k€)	(1.0 M€)	(0.005)	(2.00%)	(3.7 k€)	
A	2017	- (19.1 k€)	+156.0 €(21.1 k€)	+31.2 k€(961.9 k€)	+0.00009 (0.002)	- (0.50%)	- (932.1 €)	
A	2018	- (9.0 k€)	+495.7 €(19.0 k€)	+62.4 k€(944.8 k€)	-0.000161456 (0.011)	-0.0269132% (1.29%)	-53.2 €(2.5 k€)	-53.2 €(2.5 k€)
A	2019	- (7.5 k€)	+651.7 €(12.2 k€)	+93.6 k€(927.1 k€)	+0.00017 (0.005)	- (0.50%)	- (911.1 €)	-53.2 €(3.5 k€)
A	2020	- (7.4 k€)	+971.4 €(10.2 k€)	+124.8 k€(914.4 k€)	+0.00055 (0.003)	-0.0468387% (1.32%)	-77.2 €(2.2 k€)	-130.4 €(5.6 k€)
A	2021	- (1.6 k€)	+1.3 k€(9.0 k€)	+156.0 k€(892.9 k€)	-0.000018540 (0.008)	-0.0910798% (1.53%)	-147.4 €(2.5 k€)	-277.8 €(8.1 k€)
A	2022					+0.002% (0.63%)	+4.3 €(992.3 €)	-273.4 €(9.1 k€)
B	2012	(164.3 k€)	(382.5 k€)	(38.0 M€)	(0.006)	(0.50%)	(38.6 k€)	
B	2013	(228.1 k€)	(319.4 k€)	(39.0 M€)	(0.002)	(0.50%)	(42.8 k€)	
B	2014	(304.8 k€)	(307.4 k€)	(40.6 M€)	(0.000)	(0.97%)	(89.2 k€)	
B	2015	(340.7 k€)	(339.4 k€)	(41.9 M€)	(0.000)	(1.48%)	(131.1 k€)	
B	2016	(370.0 k€)	(423.4 k€)	(42.4 M€)	(0.001)	(1.52%)	(121.7 k€)	
B	2017	- (404.1 k€)	+415.2 €(493.8 k€)	+31.2 k€(42.8 M€)	+0.00000 (0.002)	- (1.33%)	- (109.1 k€)	
B	2018	- (413.7 k€)	+633.6 €(548.3 k€)	+62.4 k€(41.8 M€)	+0.00001 (0.003)	-0.0024079% (1.29%)	-182.1 €(97.3 k€)	-182.1 €(97.3 k€)
B	2019	- (362.1 k€)	+898.4 €(556.5 k€)	+93.6 k€(39.6 M€)	+0.00001 (0.005)	-0.0024037% (1.39%)	-168.4 €(97.4 k€)	-350.5 €(194.7 k€)
B	2020	- (300.6 k€)	+1.1 k€(519.3 k€)	+124.8 k€(37.6 M€)	+0.00001 (0.006)	-0.0030449% (1.37%)	-208.4 €(93.9 k€)	-558.8 €(288.6 k€)
B	2021	- (249.3 k€)	+1.3 k€(472.7 k€)	+156.0 k€(36.4 M€)	+0.00001 (0.006)	-0.0016753% (1.10%)	-114.6 €(75.0 k€)	-673.4 €(363.6 k€)
B	2022					-0.0015985% (0.95%)	-112.1 €(66.9 k€)	-785.5 €(430.5 k€)

Table 9: Example of a reserve ratio calculation (0%–8.5%) for a hiring in 2017

Employer	Time	Sum of costs	Sum of payments	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(14.3 k€)	(12.2 k€)	(1.4 M€)	(-0.002)	(3.39%)	(9.0 k€)	
A	2013	(24.3 k€)	(16.0 k€)	(1.3 M€)	(-0.006)	(2.64%)	(5.7 k€)	
A	2014	(25.9 k€)	(25.0 k€)	(1.2 M€)	(-0.001)	(4.54%)	(9.1 k€)	
A	2015	(26.7 k€)	(27.8 k€)	(1.1 M€)	(0.001)	(1.69%)	(3.0 k€)	
A	2016	(20.8 k€)	(29.1 k€)	(1.0 M€)	(0.008)	(1.28%)	(2.3 k€)	
A	2017	- (19.1 k€)	- (20.1 k€)	+31.2 k€(961.9 k€)	0 (0.001)			
A	2018	- (9.0 k€)	+576.6 €(17.8 k€)	+62.4 k€(944.8 k€)	0 (0.009)	+0.016% (1.73%)	+32.6 €(3.4 k€)	+32.6 €(3.4 k€)
A	2019	- (7.5 k€)	+576.6 €(8.7 k€)	+93.6 k€(927.1 k€)	+0 (0.001)			+32.6 €(3.4 k€)
A	2020	- (7.4 k€)	+1.1 k€(11.5 k€)	+124.8 k€(914.4 k€)	+0 (0.005)	-0.2619203% (3.48%)	-431.9 €(5.7 k€)	-399.3 €(9.2 k€)
A	2021	- (1.6 k€)	+608.0 €(11.9 k€)	+156.0 k€(892.9 k€)	0 (0.011)	-0.5528662% (1.68%)	-894.5 €(2.7 k€)	-1.3 k€(11.9 k€)
A	2022							-1.3 k€(11.9 k€)
B	2012	(164.3 k€)	(317.9 k€)	(38.0 M€)	(0.004)	(0.00%)	(0.0 €)	
B	2013	(228.1 k€)	(206.5 k€)	(39.0 M€)	(-0.001)	(0.00%)	(0.0 €)	
B	2014	(304.8 k€)	(259.6 k€)	(40.6 M€)	(-0.001)	(1.71%)	(157.7 k€)	
B	2015	(340.7 k€)	(318.0 k€)	(41.9 M€)	(-0.001)	(1.81%)	(160.3 k€)	
B	2016	(370.0 k€)	(463.4 k€)	(42.4 M€)	(0.002)	(1.82%)	(145.5 k€)	
B	2017	- (404.1 k€)	+292.0 €(540.1 k€)	+31.2 k€(42.8 M€)	+0 (0.003)	- (0.94%)	- (76.7 k€)	
B	2018	- (413.7 k€)	+302.5 €(585.2 k€)	+62.4 k€(41.8 M€)	+0 (0.004)	-0.0023085% (0.60%)	-174.6 €(45.0 k€)	-174.6 €(45.0 k€)
B	2019	- (362.1 k€)	+611.6 €(505.1 k€)	+93.6 k€(39.6 M€)	+0 (0.004)	-0.0005192% (1.11%)	-36.4 €(77.6 k€)	-210.9 €(122.7 k€)
B	2020	- (300.6 k€)	+1.0 k€(492.5 k€)	+124.8 k€(37.6 M€)	+0 (0.005)	-0.0040046% (2.16%)	-274.0 €(147.6 k€)	-485.0 €(270.3 k€)
B	2021	- (249.3 k€)	+693.8 €(423.4 k€)	+156.0 k€(36.4 M€)	0 (0.005)	-0.0096653% (1.12%)	-661.0 €(76.4 k€)	-1.1 k€(346.7 k€)
B	2022					+0.000% (0.99%)	+43.0 €(69.7 k€)	-1.1 k€(416.3 k€)

Table 10: Example of a payroll variation calculation for a hiring in 2017

Employer	Time	Weighted change	Average wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(-14.46%)	(7.2)	(-1.303)	(1.78%)	(4.7 k€)	
A	2013	(-17.04%)	(5.9)	(-2.810)	(1.77%)	(3.8 k€)	
A	2014	(-16.61%)	(5.5)	(-2.983)	(2.81%)	(5.6 k€)	
A	2015	(0.00%)	(4.9)	(-0.737)	(2.94%)	(5.2 k€)	
A	2016	(0.00%)	(5.0)	(0.272)	(1.40%)	(2.6 k€)	
A	2017		+0.9 (5.1)	+1 (-0.051)	- (0.74%)	- (1.4 k€)	
A	2018		+0.9 (5.4)	0 (0.494)	-0.547807% (1.05%)	-1.1 k€(2.1 k€)	-1.1 k€(2.1 k€)
A	2019	+3.32% (-21.99%)	+0.9 (5.0)	+1 (-6.448)	+0.038% (0.62%)	+70.4 €(1.1 k€)	-1.0 k€(3.2 k€)
A	2020	+3.62% (-21.96%)	+0.9 (4.5)	+0 (-2.772)	-0.243381% (2.34%)	-401.3 €(3.9 k€)	-1.4 k€(7.1 k€)
A	2021	+1.09% (-6.52%)	+0.9 (4.4)	+0 (-1.635)	-0.155089% (1.14%)	-250.9 €(1.8 k€)	-1.7 k€(8.9 k€)
A	2022	+0.28% (-1.66%)	+0.9 (4.3)	+0 (-2.856)	-0.103668% (0.71%)	-162.9 €(1.1 k€)	-1.8 k€(10.0 k€)
B	2012	(-2.18%)	(210.9)	(-0.758)	(1.06%)	(81.6 k€)	
B	2013	(1.59%)	(234.5)	(0.568)	(1.35%)	(115.8 k€)	
B	2014	(0.94%)	(252.4)	(0.040)	(0.50%)	(46.1 k€)	
B	2015	(0.34%)	(242.5)	(-1.532)	(0.82%)	(72.2 k€)	
B	2016	(2.34%)	(218.9)	(-1.632)	(1.87%)	(149.8 k€)	
B	2017	-0.01% (1.37%)	+0.9 (224.5)	+0 (-0.715)	- (2.10%)	- (172.1 k€)	
B	2018	+0.01% (-1.23%)	+0.9 (207.2)	+0 (-1.755)	-0.030165% (1.58%)	-2.3 k€(119.3 k€)	-2.3 k€(119.3 k€)
B	2019	-0.08% (18.17%)	+0.9 (192.2)	+0 (-3.189)	-0.004860% (2.30%)	-340.5 €(161.1 k€)	-2.6 k€(280.5 k€)
B	2020	+0.01% (-2.20%)	+0.9 (186.8)	+0 (-3.501)	-0.004919% (1.38%)	-336.6 €(94.6 k€)	-3.0 k€(375.0 k€)
B	2021	+0.14% (-29.05%)	+0.9 (187.8)	+0 (-4.416)	-0.005501% (1.39%)	-376.3 €(94.8 k€)	-3.3 k€(469.8 k€)
B	2022	-0.09% (20.56%)	+0.9 (192.8)	+0 (-1.614)	-0.006668% (1.69%)	-468.6 €(119.0 k€)	-3.8 k€(588.8 k€)

Table 11: Example of an employment variation calculation for a hiring in 2017

Employer	Time	Weighted change	Average employment	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(-19.15%)	(7.8)	(-2.686)	(2.30%)	(6.1 k€)	
A	2013	(0.00%)	(6.1)	(-1.836)	(2.68%)	(5.7 k€)	
A	2014	(-28.57%)	(5.2)	(-5.225)	(2.27%)	(4.5 k€)	
A	2015	(0.00%)	(4.2)	(-1.012)	(3.97%)	(7.0 k€)	
A	2016	(0.00%)	(4.8)	(0.964)	(1.54%)	(2.8 k€)	
A	2017		+1.0 (5.0)	+1.667 (0.000)	- (0.50%)	- (932.1 €)	
A	2018		+1.0 (5.0)		-0.407064% (0.91%)	-804.1 €(1.8 k€)	-804.1 €(1.8 k€)
A	2019		+1.0 (4.9)	+0.631 (-3.955)	- (0.84%)	- (1.5 k€)	-804.1 €(3.3 k€)
A	2020		+1.0 (4.2)	+0.223 (-1.089)	-0.272498% (2.45%)	-449.3 €(4.0 k€)	-1.3 k€(7.4 k€)
A	2021		+1.0 (4.2)	+0.162 (-0.907)	-0.121014% (1.06%)	-195.8 €(1.7 k€)	-1.4 k€(9.1 k€)
A	2022		+1.0 (4.4)	-0.180 (0.961)	-0.105241% (1.12%)	-165.4 €(1.8 k€)	-1.6 k€(10.8 k€)
B	2012	(-1.85%)	(243.8)	(-0.363)	(1.30%)	(100.5 k€)	
B	2013	(2.31%)	(259.3)	(0.384)	(0.95%)	(81.6 k€)	
B	2014	(0.00%)	(281.5)	(-0.322)	(0.50%)	(46.1 k€)	
B	2015	(0.00%)	(263.2)	(-1.556)	(1.00%)	(88.8 k€)	
B	2016	(-3.14%)	(238.8)	(-1.693)	(1.90%)	(152.3 k€)	
B	2017	-0.01% (1.30%)	+1.0 (231.6)	+0.040 (-1.340)	- (2.20%)	- (180.4 k€)	
B	2018	-0.01% (1.37%)	+1.0 (218.7)	+0.008 (-1.767)	-0.030780% (2.00%)	-2.3 k€(150.9 k€)	-2.3 k€(150.9 k€)
B	2019	-0.01% (2.62%)	+1.0 (190.8)	+0.006 (-1.096)	-0.005670% (2.25%)	-397.2 €(157.8 k€)	-2.7 k€(308.8 k€)
B	2020	-0.01% (1.57%)	+1.0 (190.8)	+0.006 (-1.069)	-0.003111% (1.03%)	-212.9 €(70.7 k€)	-2.9 k€(379.5 k€)
B	2021	+0.00% (-0.77%)	+1.0 (194.8)	+0.002 (-0.390)	-0.003035% (1.05%)	-207.6 €(72.1 k€)	-3.1 k€(451.6 k€)
B	2022	-0.01% (2.91%)	+1.0 (206.0)	+0.001 (-0.246)	-0.001190% (0.80%)	-83.6 €(55.9 k€)	-3.2 k€(507.5 k€)

Table 12: Example of a benefit ratio (0%–8.5%) calculation for a hiring in 2017

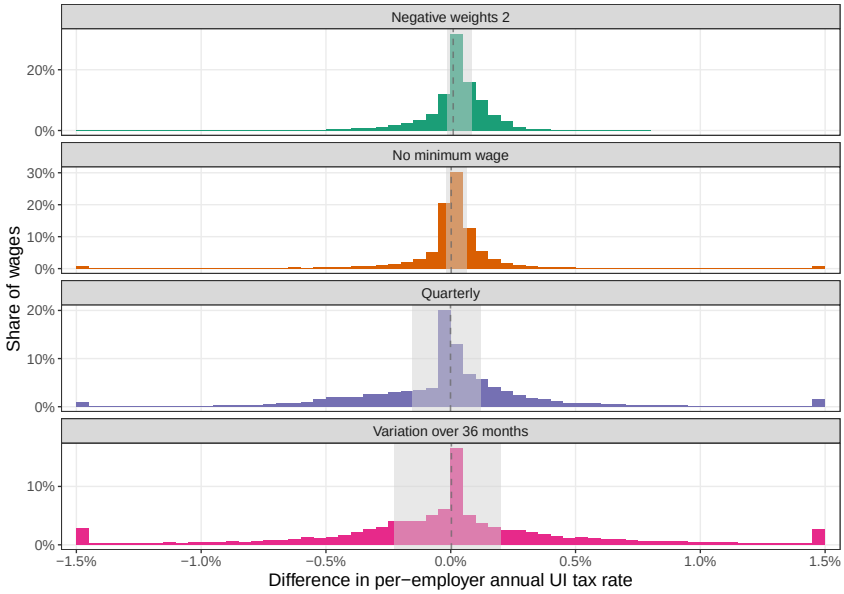
Employer	Time	Sum of costs	Sum of wages	Index	Rated tax	Rated payment (fixed wages)	Cumulative payment (fixed wages)
A	2012	(14.3 k€)	(1.4 M€)	(0.011)	(1.17%)	(3.1 k€)	
A	2013	(24.3 k€)	(1.3 M€)	(0.019)	(1.49%)	(3.2 k€)	
A	2014	(25.9 k€)	(1.2 M€)	(0.021)	(2.70%)	(5.4 k€)	
A	2015	(26.7 k€)	(1.1 M€)	(0.024)	(3.03%)	(5.4 k€)	
A	2016	(20.8 k€)	(1.0 M€)	(0.020)	(3.34%)	(6.1 k€)	
A	2017	- (19.1 k€)	+31.2 k€(961.9 k€)	-0.001 (0.020)	- (2.87%)	- (5.3 k€)	
A	2018	- (9.0 k€)	+62.4 k€(944.8 k€)	-0.001 (0.010)	-0.0855816% (2.81%)	-169.1 €(5.6 k€)	-169.1 €(5.6 k€)
A	2019	- (7.5 k€)	+93.6 k€(927.1 k€)	-0.001 (0.008)	-0.0917662% (1.32%)	-167.2 €(2.4 k€)	-336.3 €(8.0 k€)
A	2020	- (7.4 k€)	+124.8 k€(914.4 k€)	-0.001 (0.008)	-0.1127948% (1.11%)	-186.0 €(1.8 k€)	-522.3 €(9.8 k€)
A	2021	- (1.6 k€)	+156.0 k€(892.9 k€)	0.000 (0.002)	-0.1437393% (1.09%)	-232.6 €(1.8 k€)	-754.8 €(11.5 k€)
A	2022				-0.0409965% (0.17%)	-64.4 €(266.2 €)	-819.3 €(11.8 k€)
B	2012	(164.3 k€)	(38.0 M€)	(0.004)	(0.42%)	(32.2 k€)	
B	2013	(228.1 k€)	(39.0 M€)	(0.006)	(0.51%)	(43.4 k€)	
B	2014	(304.8 k€)	(40.6 M€)	(0.008)	(0.75%)	(69.3 k€)	
B	2015	(340.7 k€)	(41.9 M€)	(0.008)	(1.01%)	(89.1 k€)	
B	2016	(370.0 k€)	(42.4 M€)	(0.009)	(1.10%)	(87.9 k€)	
B	2017	- (404.1 k€)	+31.2 k€(42.8 M€)	0.000 (0.009)	- (1.19%)	- (97.4 k€)	
B	2018	- (413.7 k€)	+62.4 k€(41.8 M€)	0.000 (0.010)	-0.0010628% (1.29%)	-80.4 €(97.8 k€)	-80.4 €(97.8 k€)
B	2019	- (362.1 k€)	+93.6 k€(39.6 M€)	0.000 (0.009)	-0.0022657% (1.37%)	-158.7 €(96.1 k€)	-239.1 €(193.8 k€)
B	2020	- (300.6 k€)	+124.8 k€(37.6 M€)	0.000 (0.008)	-0.0032479% (1.27%)	-222.2 €(86.9 k€)	-461.3 €(280.7 k€)
B	2021	- (249.3 k€)	+156.0 k€(36.4 M€)	0.000 (0.007)	-0.0039260% (1.08%)	-268.5 €(73.8 k€)	-729.8 €(354.5 k€)
B	2022				-0.0043553% (0.92%)	-305.4 €(64.5 k€)	-1.0 k€(419.0 k€)

Appendix I Variation indices with different parameters

As a baseline, the variation indices were simulated using 12 periods of 1 month, and only counting employment and wages for jobs with at least a low minimum daily wage corresponding to about 500 euros per month. Periodical decreases were weighed by 1.5. For comparisons, the indices were also ran using quarters instead of months, using 36 months of changes for the index, having no wage threshold, and weighing decreases by 2.0.

For most of the employers, the differences in the resulting tax rates were relatively small in this simulation: for employers paying half the wages, the annual rates differed by less than 0.2 percentage points. This is probably in part because of how the index values are translated into tax rates: because the translation is a bracketed approach, the translation is sensitive to changes in relative rank, rather than to changes in the absolute value of the index. The largest impact on the resulting tax rates came from using 36 months of history instead of 12. This alternative also reduced typical year-to-year fluctuations considerably, as noted in the main text.

Figure 17: Distribution of annual tax rate differences by alternative parameters. The plotted difference is the percentage point difference in the tax rate from a simulation with the baseline parameters.



Appendix J Polynomial transformations

Figures 18–23 demonstrate the polynomial fits to the bracketed schedule by the index values by method and year. For the reserve ratio, a quadratic fit was used, while for the other methods, a cubic polynomial was set. All the index values were first transformed by the inverse hyperbolic sine, and the index values in the figures is also plotted on a transformed axis. The index values used in fitting were the lower bracket thresholds, except for the first and last bracket, which used median values instead to avoid distortions by outliers. The existing schedule is plotted (without any additional fitting) in figure 24, where the index value is taken to be the employer's annual wages.

While in some cases the polynomial fit might appear to change the resulting rates substantially, in reality for most employers the actual tax rate differences are small. Figure 25 demonstrates the mean simulated rate in year $t+1$ per index value bracket, taking into account both the polynomial transformation and prediction error in wages, against the rate that arises from the initial bracketing approach. Each bracket holds 1% of baseline wages.

In the simulation, the translations were performed for each year separately. This simulates a process where the tax setter might not initially know how the distribution of index values would develop over time. At the end, a further sensitivity check was performed, rerunning the polynomial transformations for all years simultaneously and then using the resulting schedules for the rates in each year. For 50% of wages, annual tax rates would have been within ± 0.2 percentage points of the original simulation for the reserve ratio and payroll variation, and within ± 0.08 percentage pionts for the other methods. The corresponding differences for cumulative tax rates would have been -0.08 to 0.17 for the reserve ratio and ± 0.02 for the other methods.

Figure 18: Polynomial transformation, benefit ratio, 0.5%–5.4%

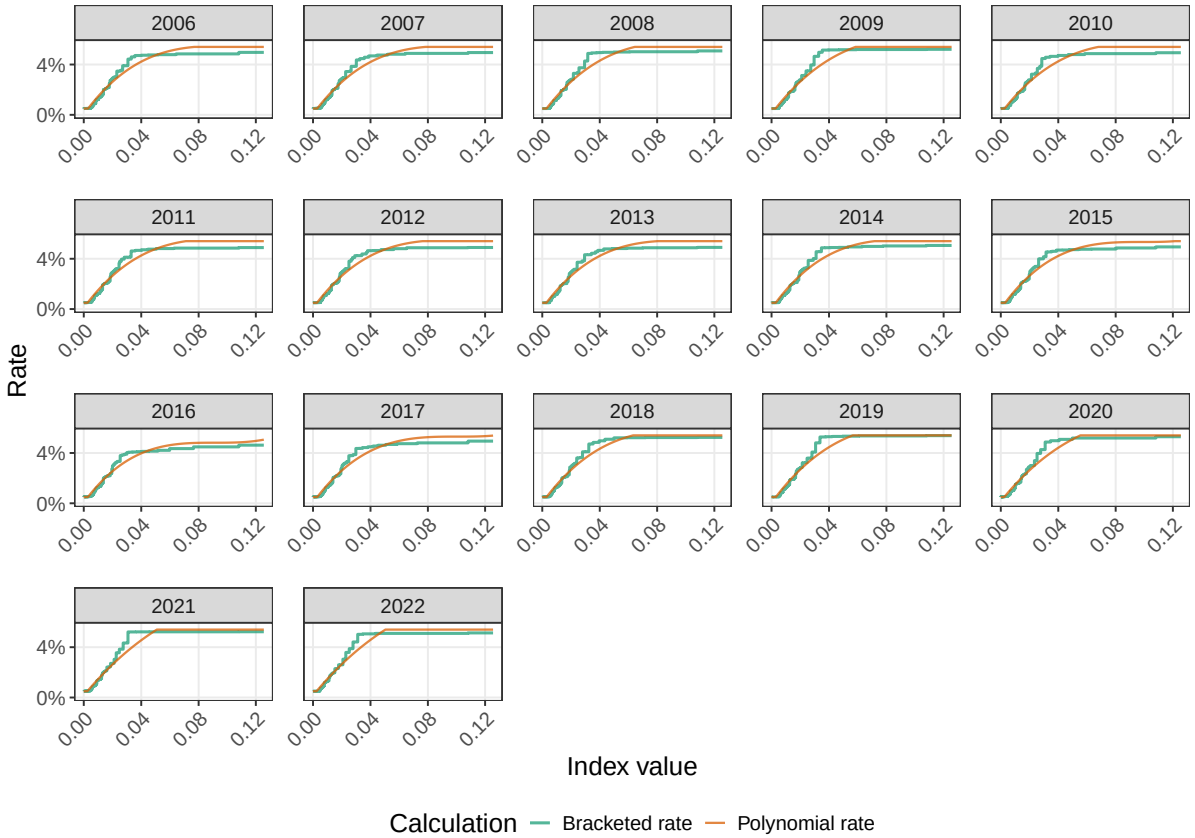


Figure 19: Polynomial transformation, benefit ratio, 0%–8.5%

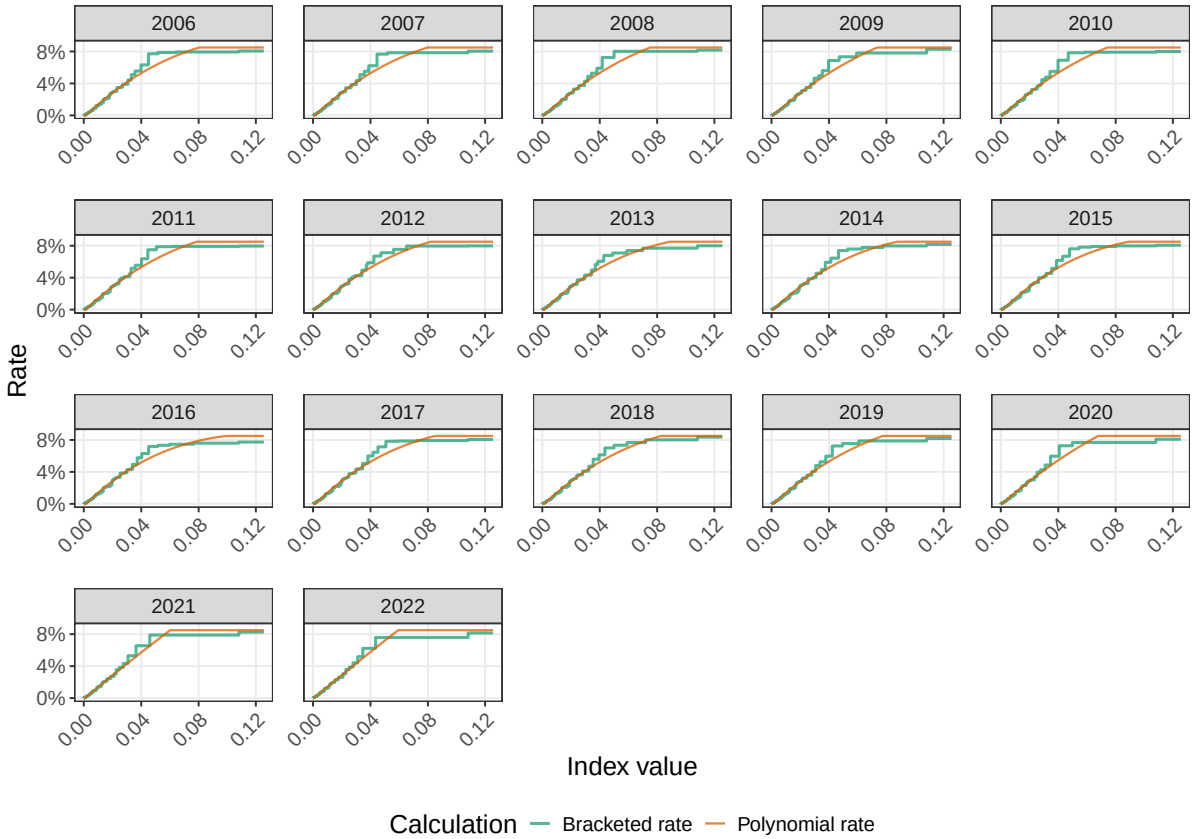


Figure 20: Polynomial transformation, employment variation

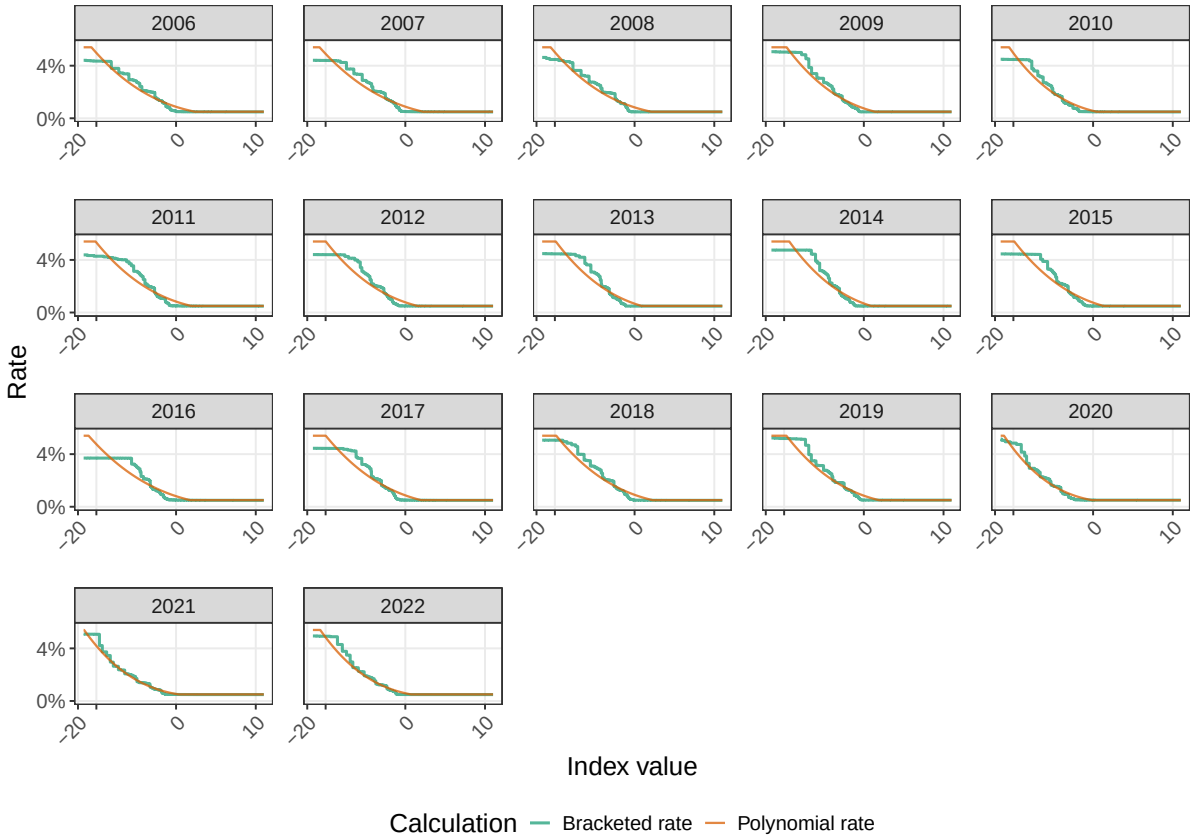


Figure 21: Polynomial transformation, payroll variation

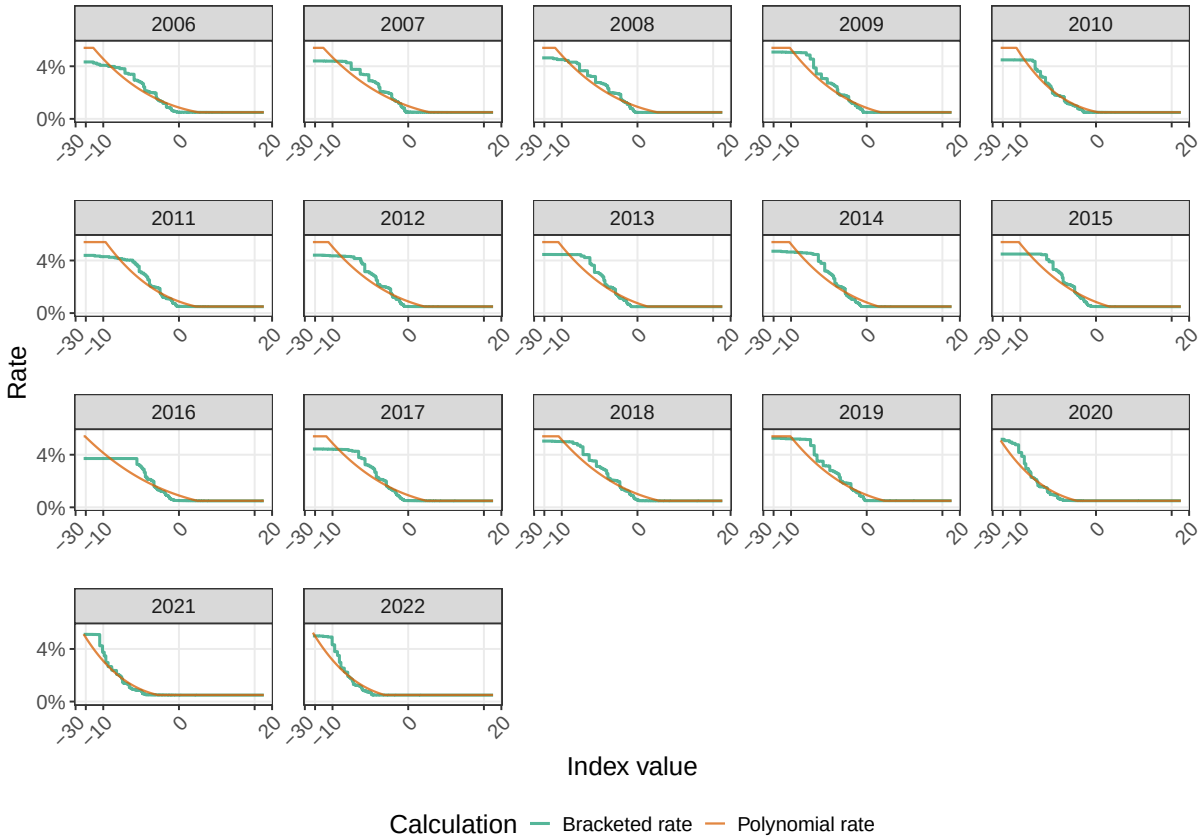


Figure 22: Polynomial transformation, reserve ratio, 0.5%–5.4%

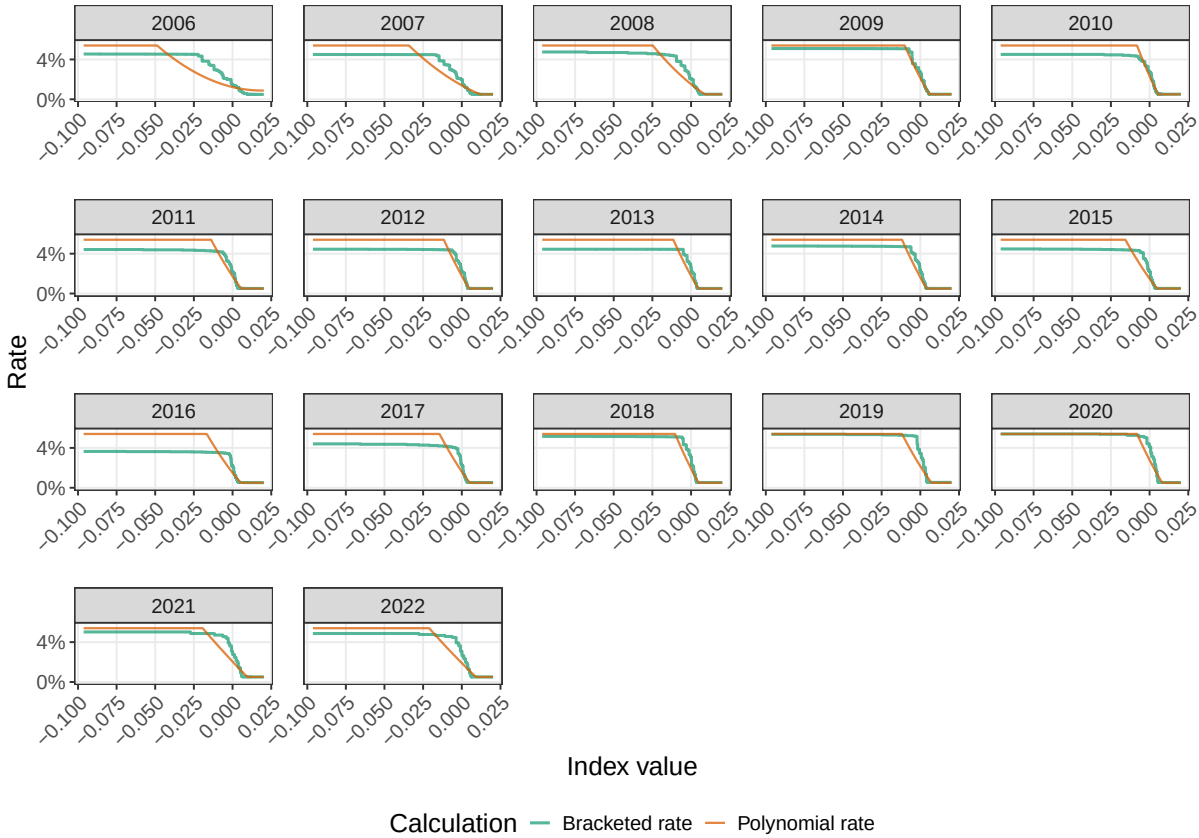


Figure 23: Polynomial transformation, reserve ratio, 0%–8.5%

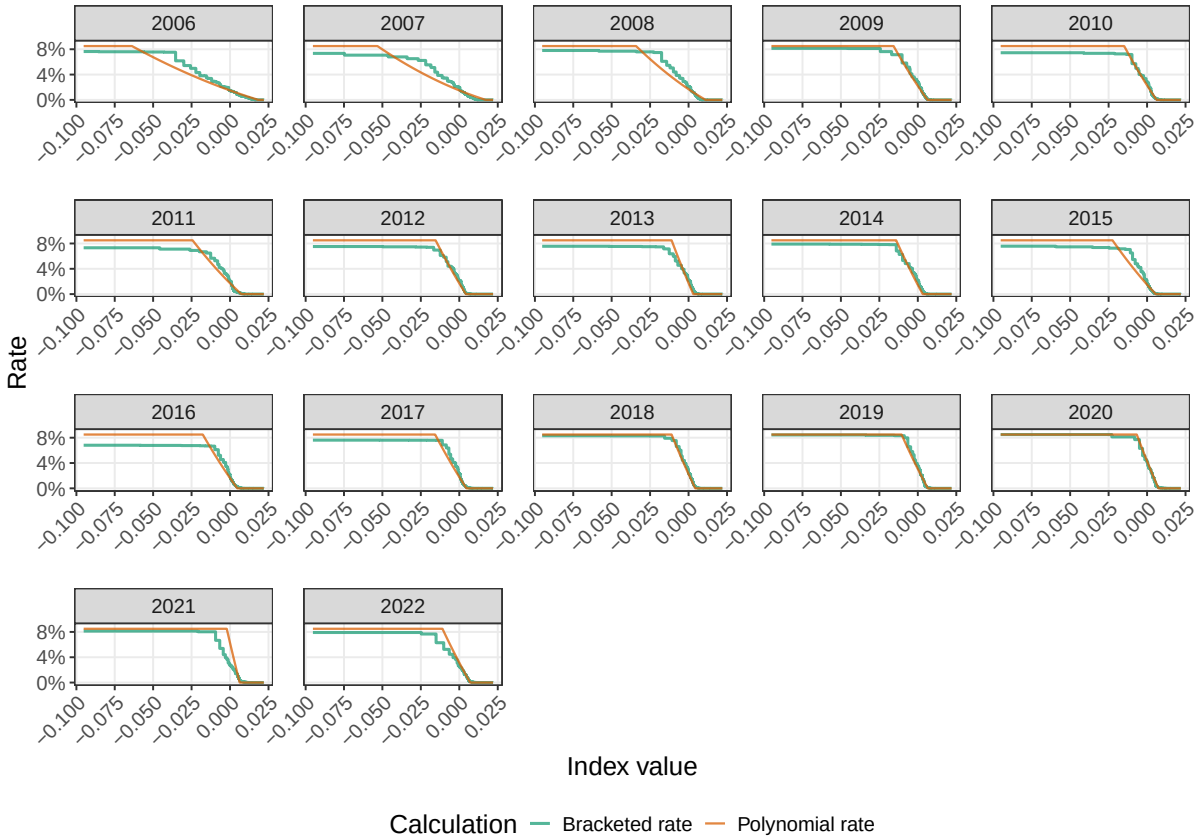


Figure 24: Existing tax schedule as a function of wages

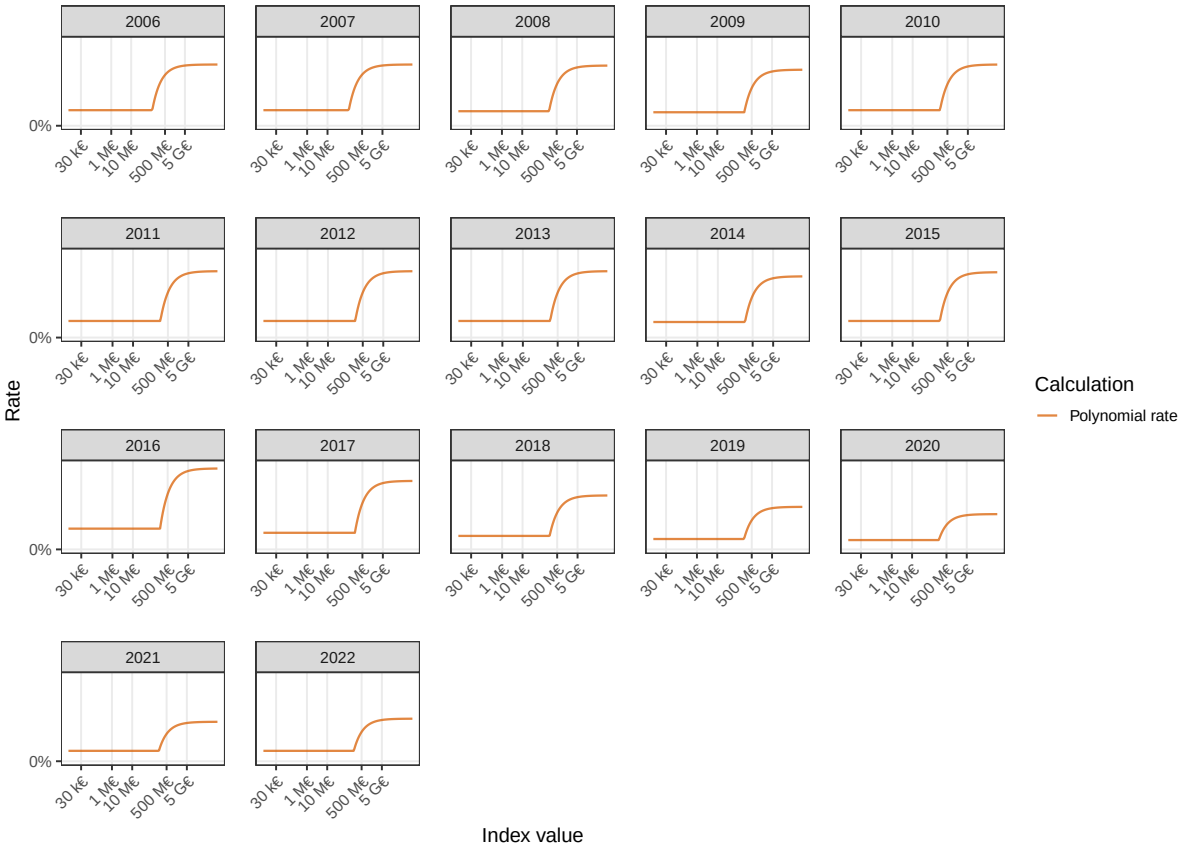
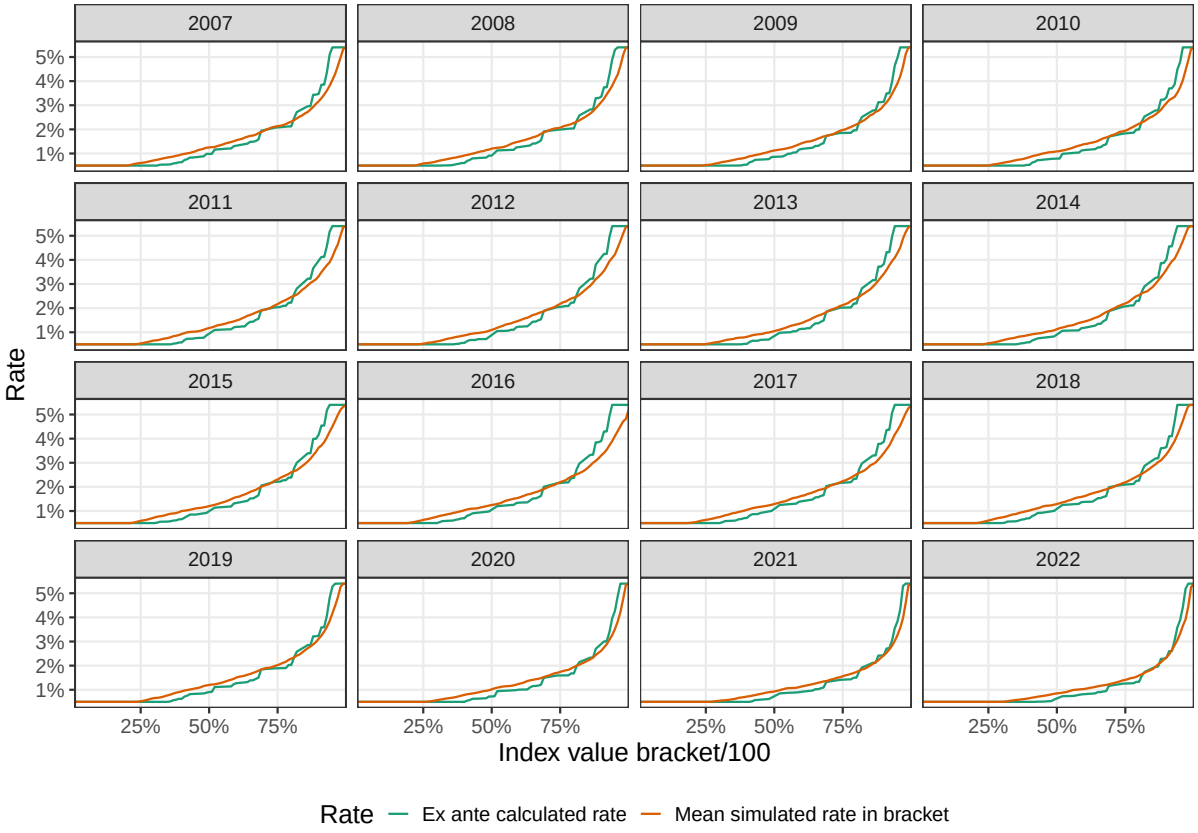


Figure 25: Ex ante calculated bracketed rate and mean simulated rate



Appendix K Alternatives for translating the reserve ratio to a tax rate

With some strong assumptions, the reserve ratio can be used as a basis for tax rate directly. A simple approach would be as follows. The reserve ratio was defined as $ratio_{past} = \frac{payments_{past} - costs_{past}}{wages_{past}}$, where *past* refers to the last five years when setting the future tax rates. Suppose that future costs and wages are going to be the same as past costs and wages, and consider the balance at end of the next five years. Assume that it is possible to determine a target ratio (target balance) $ratio_{target}$. Define $payments_{future} = rate_{future} \times wages_{future}$, and denote the past rate by $rate_{past}$. It is straightforward and quite intuitive that the future tax rate should be $rate_{future} = rate_{past} + (ratio_{past} - ratio_{past})$: when the ratio is lower than the target, tax rates should be increased by that amount, and vice versa. If costs are assumed to regress towards 0 by some factor of z, then the term $(ratio_{past} - ratio_{past})$ can be multiplied by z instead.

While this approach could also be used in the simulation, it yielded results that were difficult to compare to the benefit ratio, as the relative shares of costs covered by the rated tax would swing significantly from year to year. The cost shares would also be strongly affected by the choice of the target reserve and the parameter z.

It is also unclear what the target reserve should be, and whether it should be independent of the business cycle. One option is that the target should be large enough to absorb UI costs for a sudden difficult recession year on average, or around 0.015. However, the Finnish tax system already has a business cycle buffer, which in the simulation is maintained from the shared part of the tax. In practice, high reserve targets and high factors z led to large fluctuations in tax rates, while targets very close to zero would leave much more of the tax shared.

For 50% of wages paid, using a target ratio of 0.01 and a z parameter of 0.66 yielded cumulative tax rates that differed by between -0.20 and 0.26 percentage points for the reserve ratio with the 0%–8.5% tax rate range. However, for annual rates the corresponding rate of differences grew to $(-0.3, +0.6)$. Additionally, on several years, the simulated rated tax revenue would exceed the baseline revenue. For these reasons, the array approach was deemed to produce better comparability across the simulated methods. This way, the main differences stem from the order in which the different indices place employers, rather than from how the indices are technically translated to taxes.

Appendix L Additional figures for simulated tax rates

Figures 26–**??** show the distributions of cumulative tax rates and per-employer differences in cumulative rates across the simulated systems. The main text presented the same figures for annual rates. A firm's cumulative tax rate is defined by the UI taxes it pays,

divided by its observed wages over 2006–2022.

The majority of employers would pay slightly lower taxes than they currently do, and the median cumulative tax rate is close to what it would be if costs were simply assigned to employers directly as taxes. This also applies to the variation indices, even though the costs of unemployment are not used to calculate these indices.

Figure 28 plots the mean differences between methods for the industries with the largest differences between methods. Across most methods and industries, the differences between various rating methods are smaller than their collective difference from the current pyament system. A notable exception is the industry of temporary agencies, reflecting high turnover in this industry: many workers enter unemployment from these firms, but their average headcount changes much less from month to month. In other words, they may also be pulling many persons out of unemployment each month, which is only reflected in the variation indices. Figures 30–31 demonstrate the within-industry variation in rates and selected industries for two methods, showing that for most industries most of the employers would not pay very high taxes on a typical year.

The correlation of differences in simulated tax rates and profitability, liquidity, or indebtedness is surprisingly weak. In particular, it is much smaller than it is for employer headcount or turnover. Figure 29 demonstrates this for return on investment; comparisons are similar for other available financial statistics.

Figure 26: Distribution of cumulative rates. Shaded grey areas correspond to the interquartile range of wages, while the vertical dashed line is the weighted median rate, using wages as weights. The direct assignment's tax rates are winsorized at 8.0%.

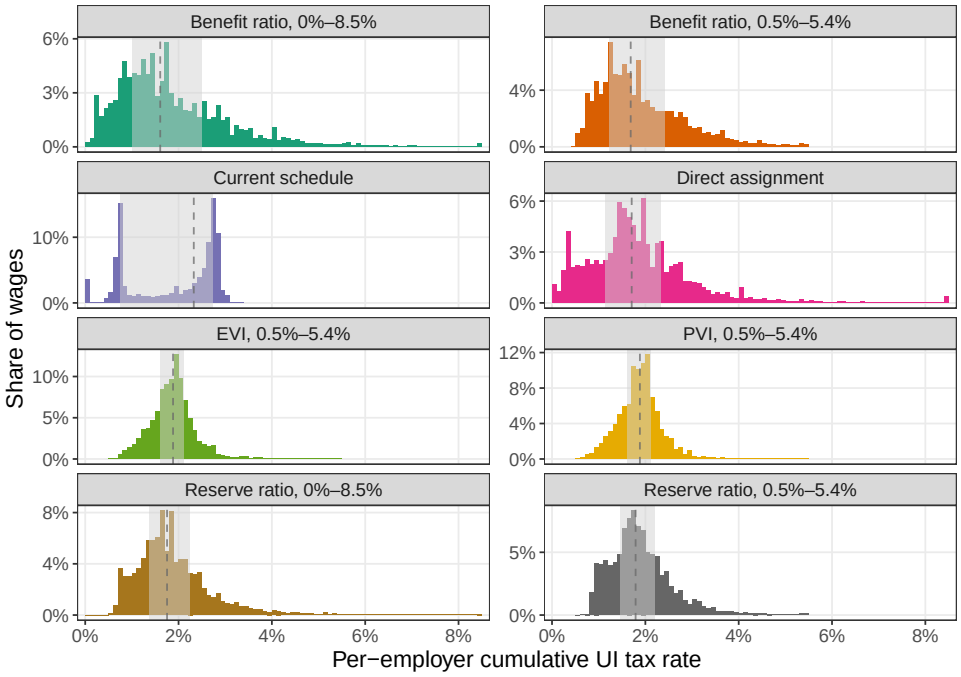


Figure 27: Distribution of changes in cumulative rates. Each method is compared to the same baseline, which is the employment variation index (EVI). The difference, in percentage points, is calculated as $\text{rate}_{\text{EVI}} - \text{rate}_{\text{alternative}}$, i.e., the result of moving *to* the EVI *from* one of the methods listed. The plotted differences are winsorized at ±5.0 percentage points.

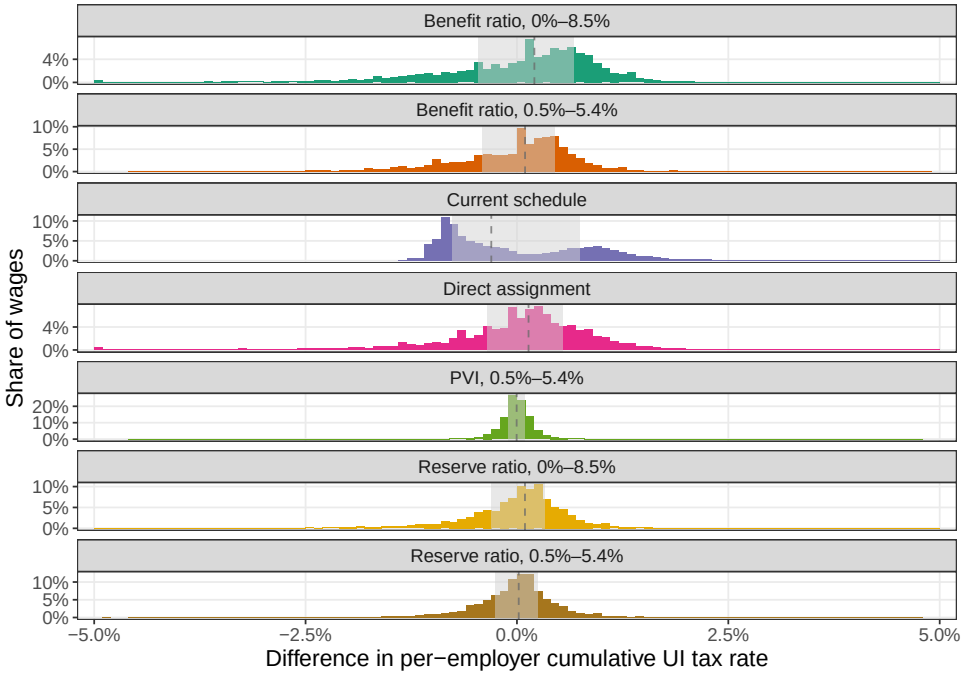


Figure 28: Mean difference in annual payment rates by industry and method.

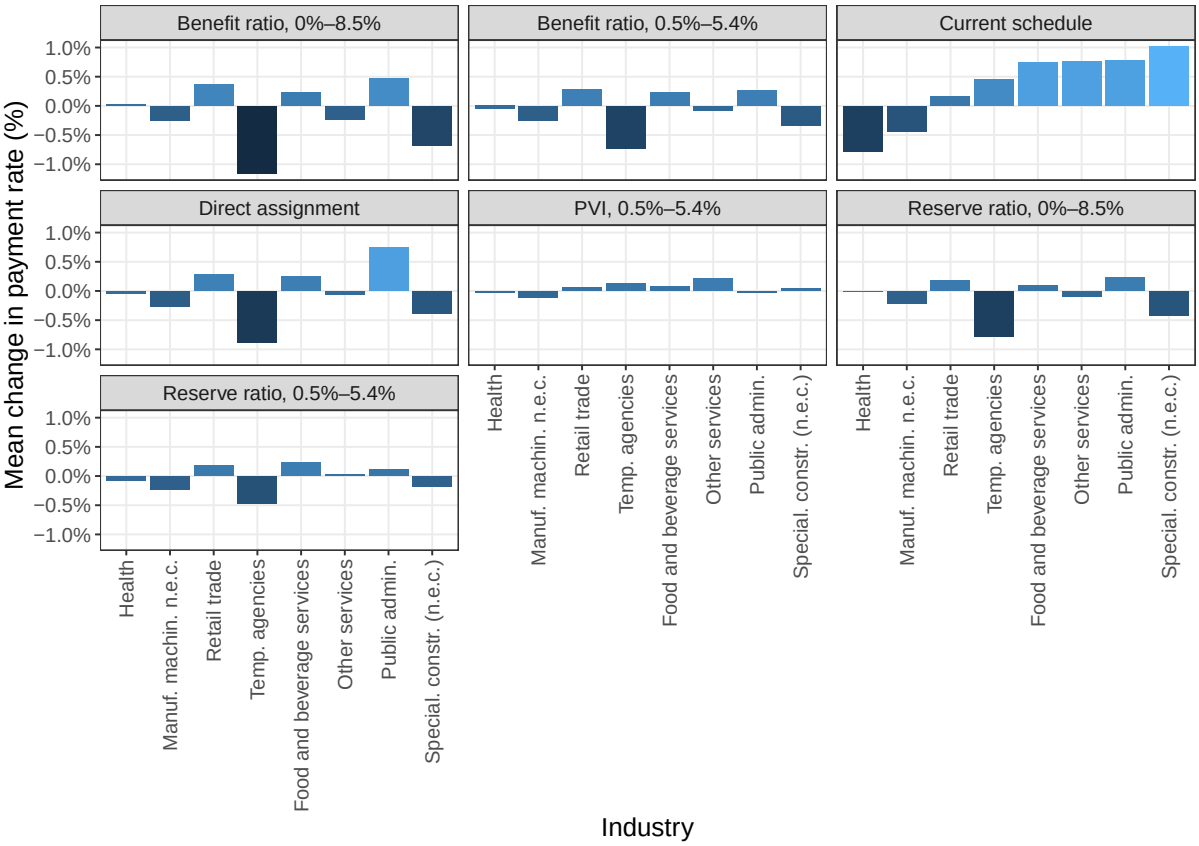


Figure 29: Mean difference in annual payment rates by profitability. The per-employer difference, in percentage points, is calculated as $\text{rate}_{\text{EVI}} - \text{rate}_{\text{alternative}}$, i.e., the result of moving *to* the EVI *from* one of the methods listed. The per-industry difference is the mean of this difference, weighted by wages paid by the employer.

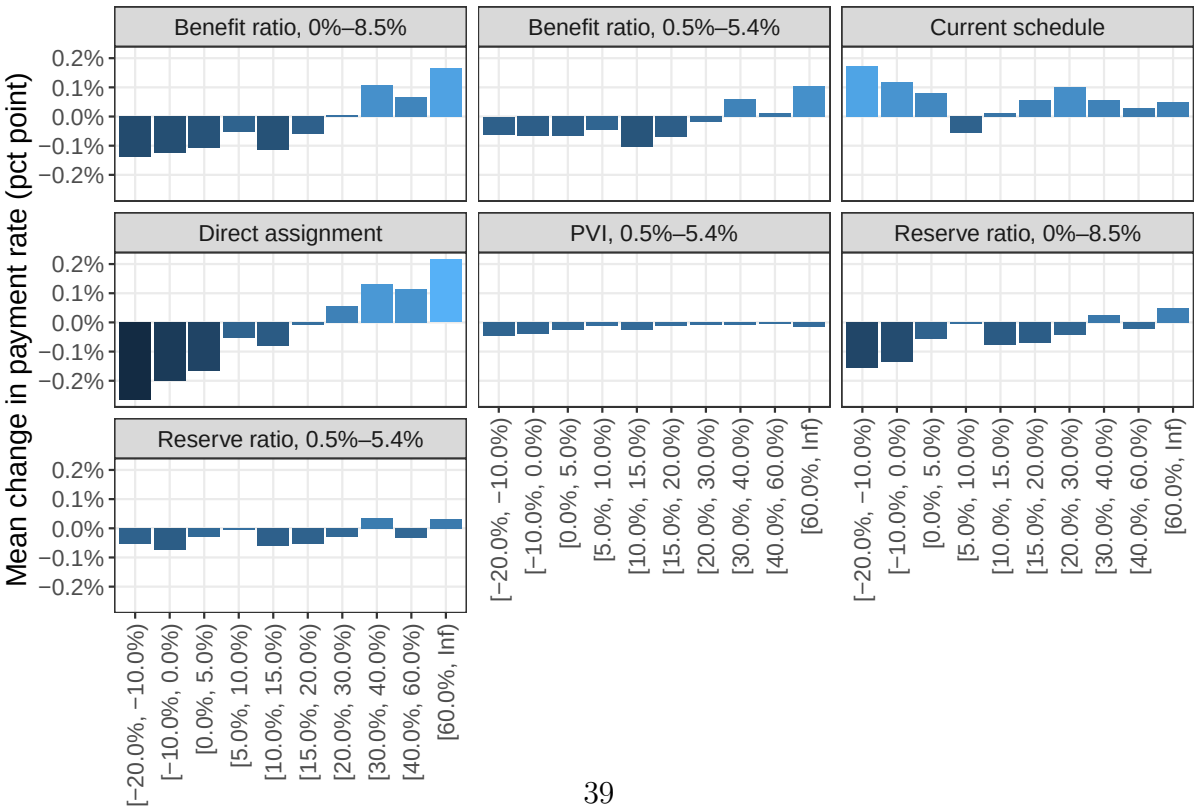


Figure 30: Distribution of simulated tax rates within industry, employment variation index.

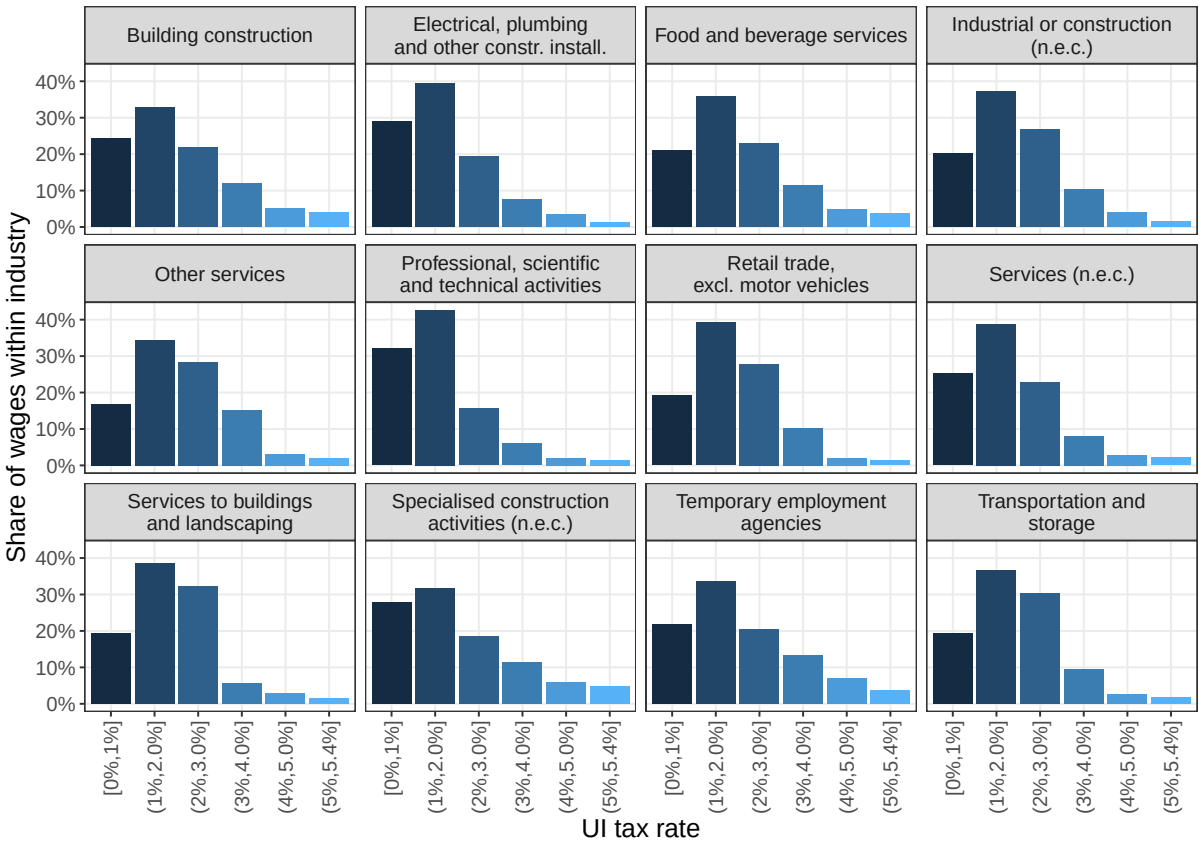
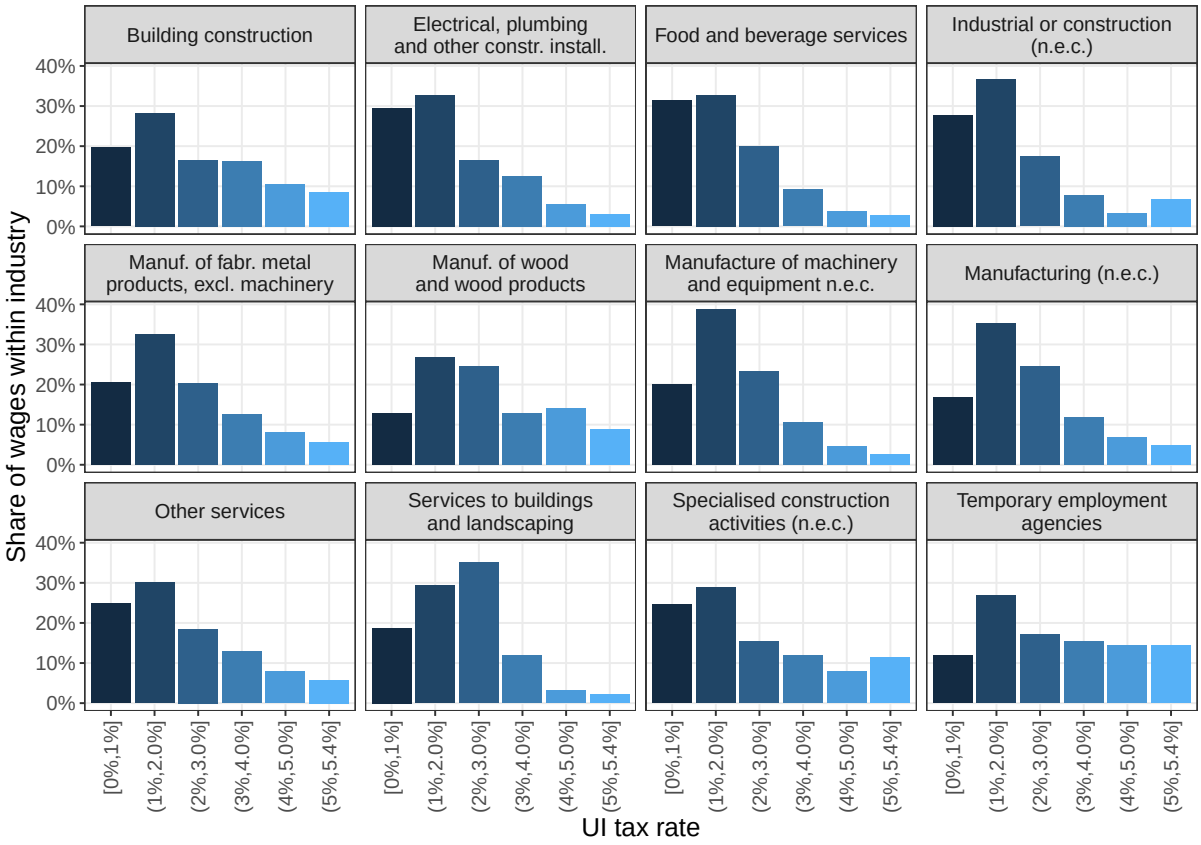


Figure 31: Distribution of simulated tax rates within industry, benefit ratio (0.5%–5.4%).



Appendix M Lifecycle of employers with high cost-to-payment ratios

A plausible explanation for high existing cost-to-payment lifetime ratios for some employers is that many businesses die young and before they've had time to pay substantial taxes. In these cases, high ratios will occur even if most unemployment was caused by random shocks, rather than many employers using temporary unemployment liberally as a flexible work reserve. Additionally, a small share of employers are currently exempt from UI taxes, so even minimal costs will yield an infite cost-to-payment ratio.

For examining the magnitude of these phenomena, the cumulative cost-to-payment ratios were paid for all employers, and employers were then split into four classes. Tax-exempt employers form their own category[7]. The rest were ordered by their ratios and divided by their share of aggregate wages into high, low and in-between ratio classes. The top and bottom classes both paid 20% of wages.

Figures 32–33 demonstrate the development of wages, payments, costs, entries, exit and average employer age in these four categories. While it shows that employers with high cost-to-payment ratios are more likely to cease employment completely than the other groups, the differences are only moderate.

[7]The tax exempt status was defined as the employer paying the majority of its lifetime wages while being exempt. In some cases, an employer appeared to change their exemption status over their lifetime.

Figure 32: Wages, payments and costs by cost-to-payment employer category. See text for definitions of employer categories.

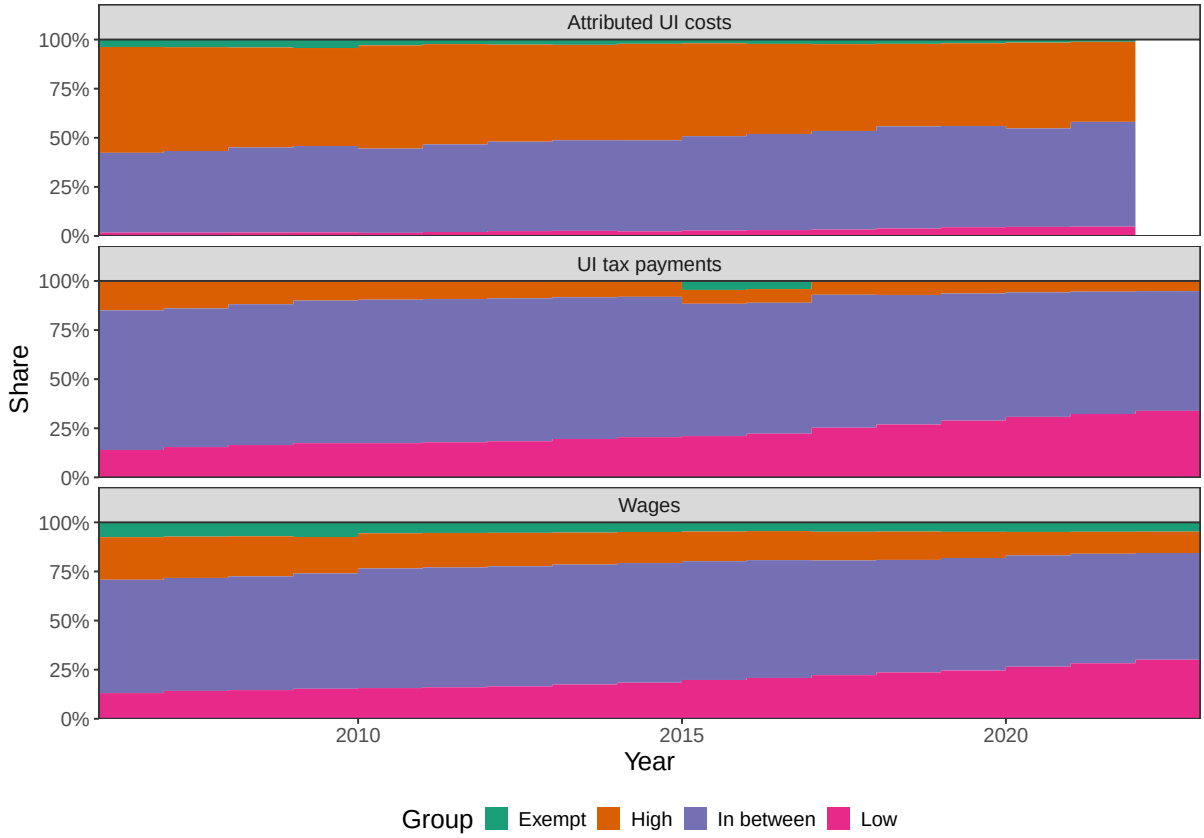
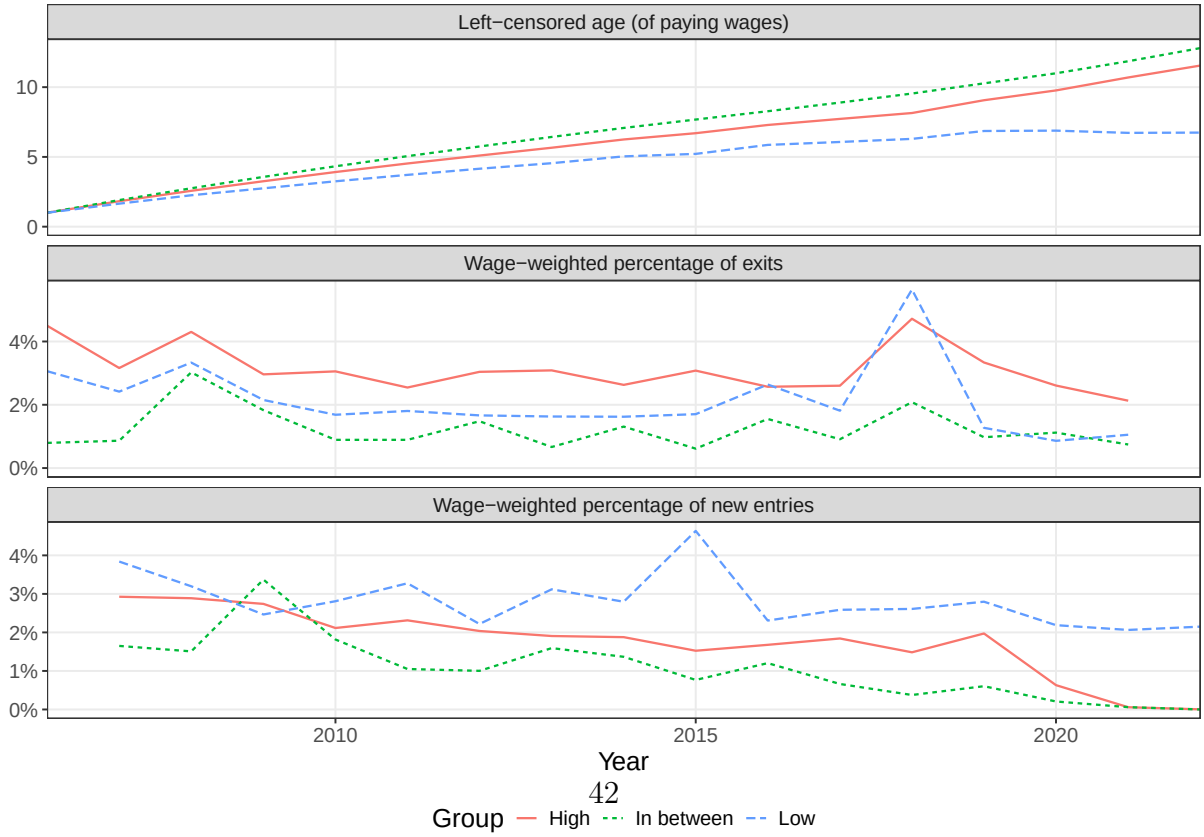


Figure 33: Entries, exits and age by cost-to-payment employer category. Left-censored employer age is defined as the cumulative number of years it has paid wages since 2006. An exit means an employer ceases to pay wages.



Appendix N Patterns of monthly employment changes

The employment variation index (EVI) uses changes in periodical employment to assign tax rates. The implicit assumption is that employers that increase their headcount will contribute to decreased unemployment, and firms where the number of staff decreases will on average cause unemployment to rise. To what extent this is true is a difficult empirical question, and a thorough analysis is beyond the scope of this paper. One potential way to address it would, in fact, be an experiment using taxes rated by the EVI in randomly selected regions.

Some observations are possible from existing data. For this purpose, employment changes were decomposed as follows. Each individual has a status in a given month: they are either employed with one employer, or not employed. If there were multiple employers, the one paying the highest wages wins.[8] An individual can make two types of moves between consecutive months: they may move from one employer to another, or between employment and non-employment. A move to a new job reflects a gross positive change to the employer, and a move from a job a gross negative change. The net change in a given month is the difference.

From March 2022 to March 2023, these changes were tracked from the high-frequency Incomes Register. For each month, between 55% and 70% of all gross moves were between non-employment and employment, rather than between jobs. An unambiguous similar measure cannot be given for net changes, since those often reflect gross moves to opposite directions, but in aggregate the net changes have a strong correlation with changes in unemployment, as one would expect. Overall, the employment variation tracked by the EVI is probably a reasonable net measure of employer choices that will affect unemployment.

Could UI costs avoided by a hiring be attributed to employers in a similar way that UI costs caused by dismissals are attributed in the US systems? In principle, it would be technically possible to attach some monetary value to hiring unemployed persons specifically; for example, the median UI cost for each unemployed person hired, regardless of how long they had been unemployed. This kind of an reward could easily create some very distorted incentives.[9]

Empirically, only between 6%–8% of all new hirings are preceded by insured unemployment in the last month in the data; a much higher share comes from non-employment. Generally speaking, small employers and certain industries like temporary agencies hire unemployed and non-employed persons at roughly double the rates, relative to their wages,

[8] This differs from the actual employment measure used for the variation indices, where a person can contribute towards headcount or wages of two different employers in a period, as long as they earn a meaningful wage with both.

[9] In a historical Finnish system called job alternation compensation, employees could receive an earnings-related compensation for a leave of absence if the employer hired an unemployed jobseeker as a substitute during this leave. Fourty percent of the substitutes hired under this system had been consecutively unemployed for less than two weeks.

of larger employers and industries with smaller unemployment risks. Put differently, many of the employers that are prone to push persons into unemployment are also prone to pull persons out of unemployment. Not all of this phenomenon is down to simple recall employment either: the persons being pushed and the persons being pulled may be different at the employer level. Unemployment cost attribution mechanisms only tend to acknowledge the push and ignore the pull, while the employment variation tries to recognize the net balance.

Appendix O Part-time unemployment

In all unemployment cost attributions, part-time unemployment is treated similarly to full-time unemployment. The UI costs for a person in an ongoing unemployment spell continue to be accrued to the previous employer even if the person takes a part-time job. The costs will shift to the new part-time employer only if the person stops claiming unemployment benefits for at least 30 days. After that, the costs may be attributed to the part-time employer instead, depending on their wages and the general attribution rules being used.

Finland has relatively generous incentives for part-time employment: each euro of labour earnings reduces the UI benefits by 0.5 euros. Kalin, Kyyrä, and Matikka (2023) find that increasing the generosity of these benefits increased the supply of labour into part-time jobs, but had no net effect on transitions to full-time unemployment. While a significant fraction of unemployed persons receive some part-time benefits at some point, most of the periods of partial unemployment are relatively short and low-paid.

It is not clear how the costs during part-time unemployment should be attributed. If it is assumed that without part-time benefits, the jobseeker would be likely to be full-time unemployed instead, then the part-time employer is helping reduce rather than increase UI costs. A different view is that the part-time benefits slow transitions to full-time employment, and that if they increase labour supply, they may also subsidize part-time employers who can attract more workers at lower wages than they otherwise could.

Appendix P Additional figures for marginal tax responses

Figures 34–36 show the marginal tax responses to simulated counterfactual events by rating mechanism and employer size. They complement a similar figure in the main text, which was limited to the tax change due to a long unemployment spell. Generally speaking, tax assignment by EVI shows the strongest sensitivity in responses to the base headcount.

The marginal response trajectories over time are plotted for each event in figures 37–40. The benefit ratio exhibits the most gradual responses over time, while the reserve ratio shows the quickest feedback. Because the baseline employment variation simulation only uses data for one past year, and the dismissal and furlough events were defined to only change employment in the base year, those events cause no additional responses in later years under the variation indices. The new hiring event was, in contrast, defined to be permanent (until the end of observations), so it affects later years as well by attenuating any relative employment variations that exist in the baseline. Arguably, the counterfactuals show the worst possible scenarios for the variation indices because of these choices.

Figure 34: Marginal response to a median-length unemployment spell in the next year, by employer size

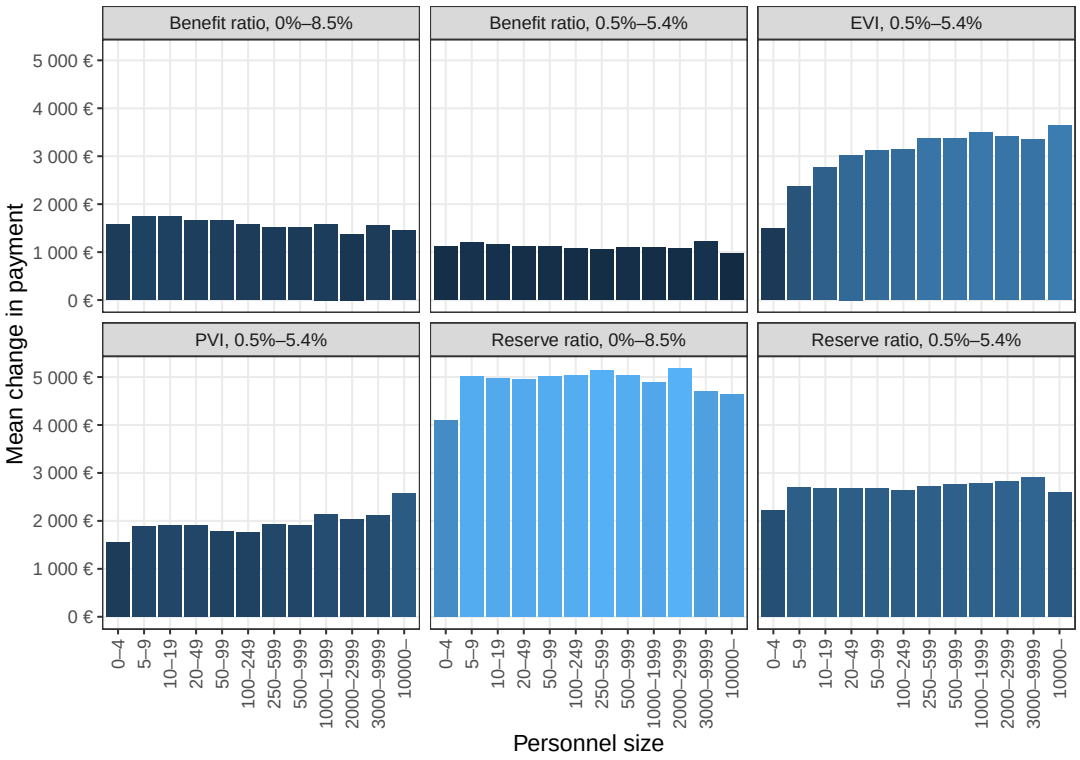


Figure 35: Marginal response to a median-duration furlough in the next year, by employer size

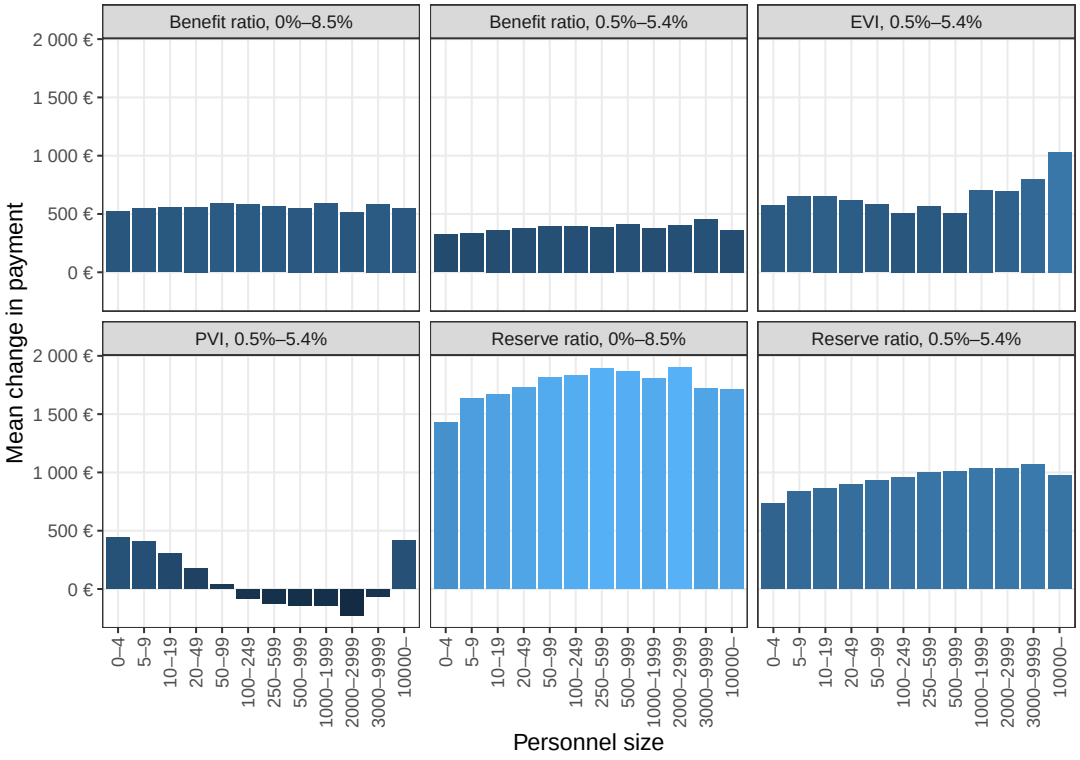


Figure 36: Marginal response to a median-duration hiring in the next year, by employer size

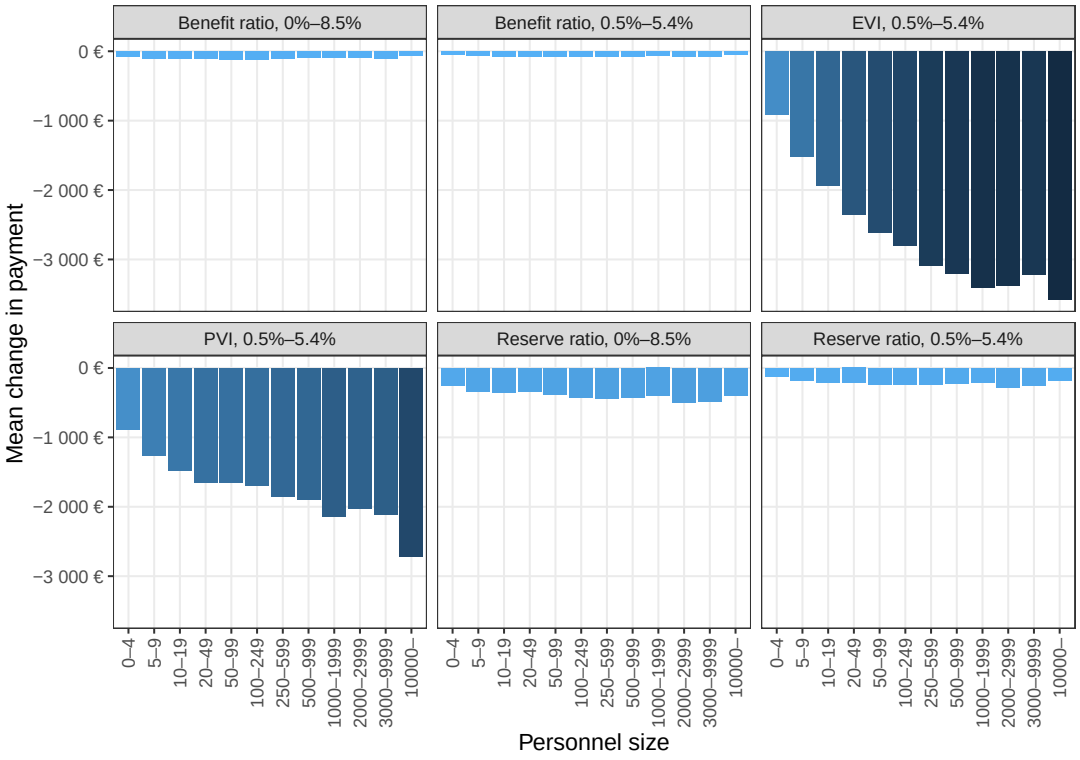


Figure 37: Marginal responses to a median-length unemployment spell over the next five years

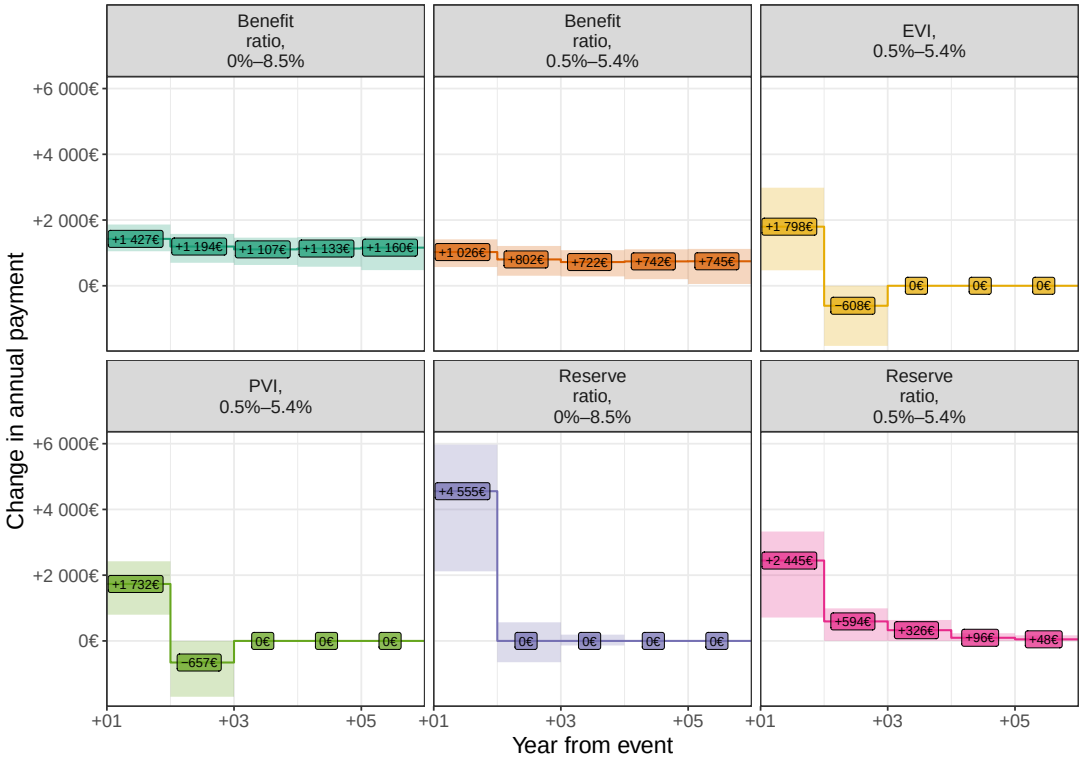


Figure 38: Marginal responses to a median-length furlough over the next five years

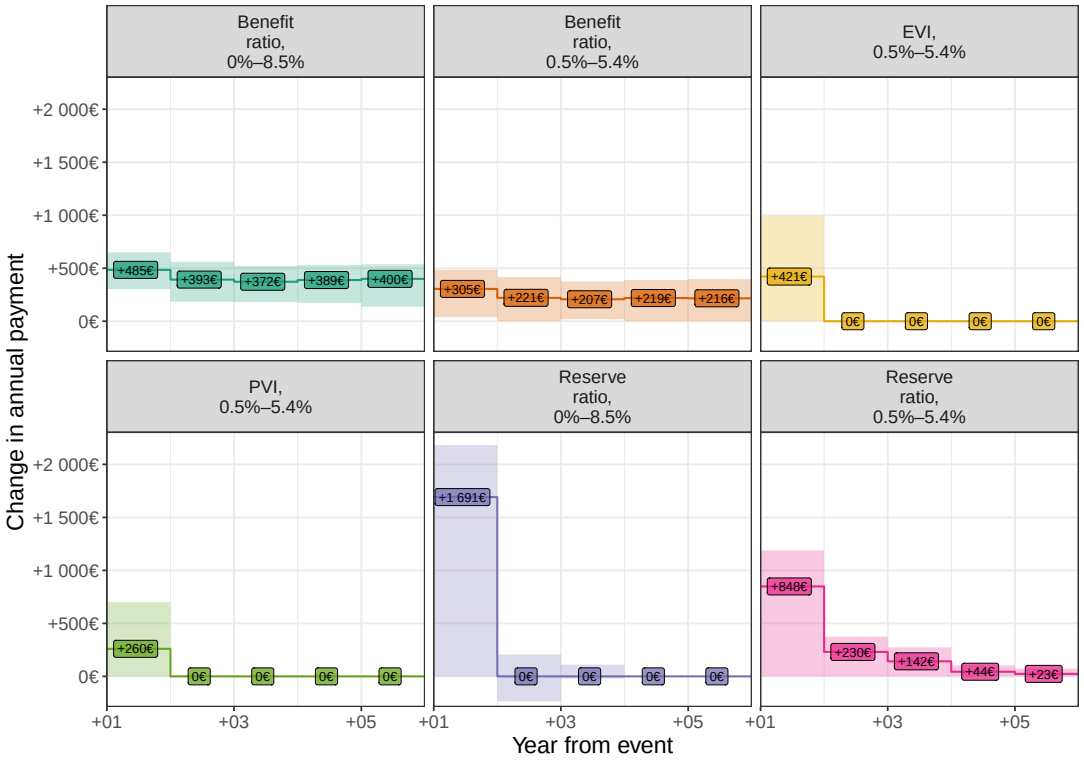


Figure 39: Marginal responses to a long unemployment spell over the next five years

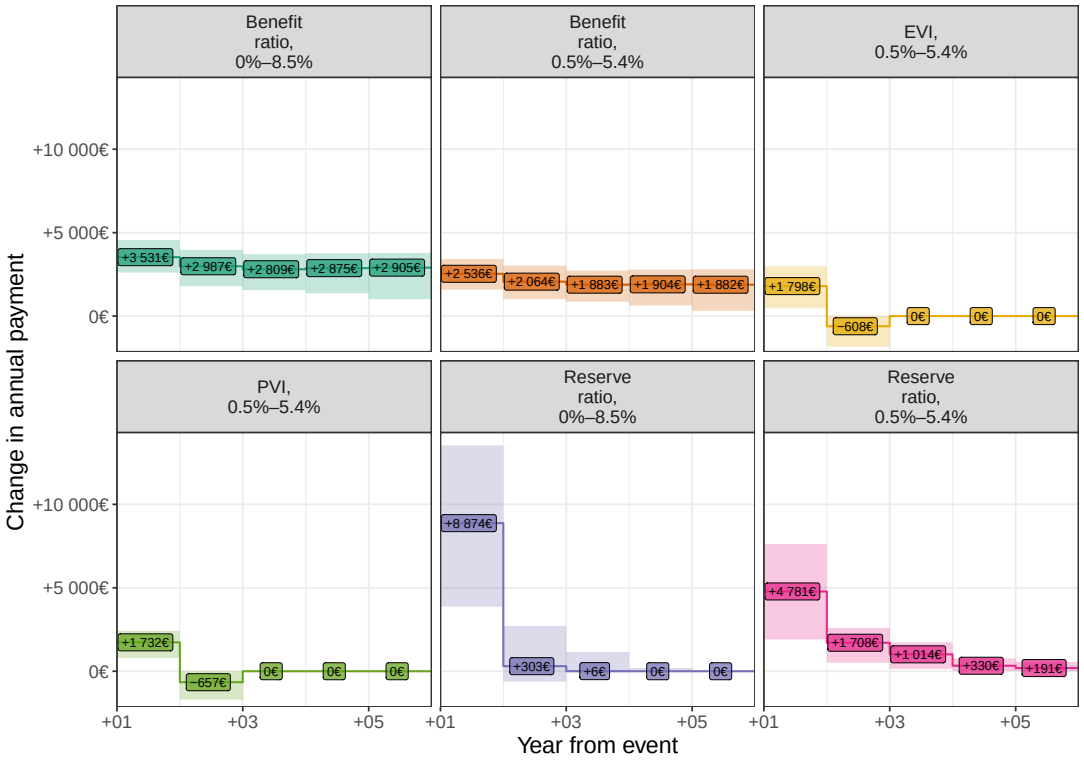
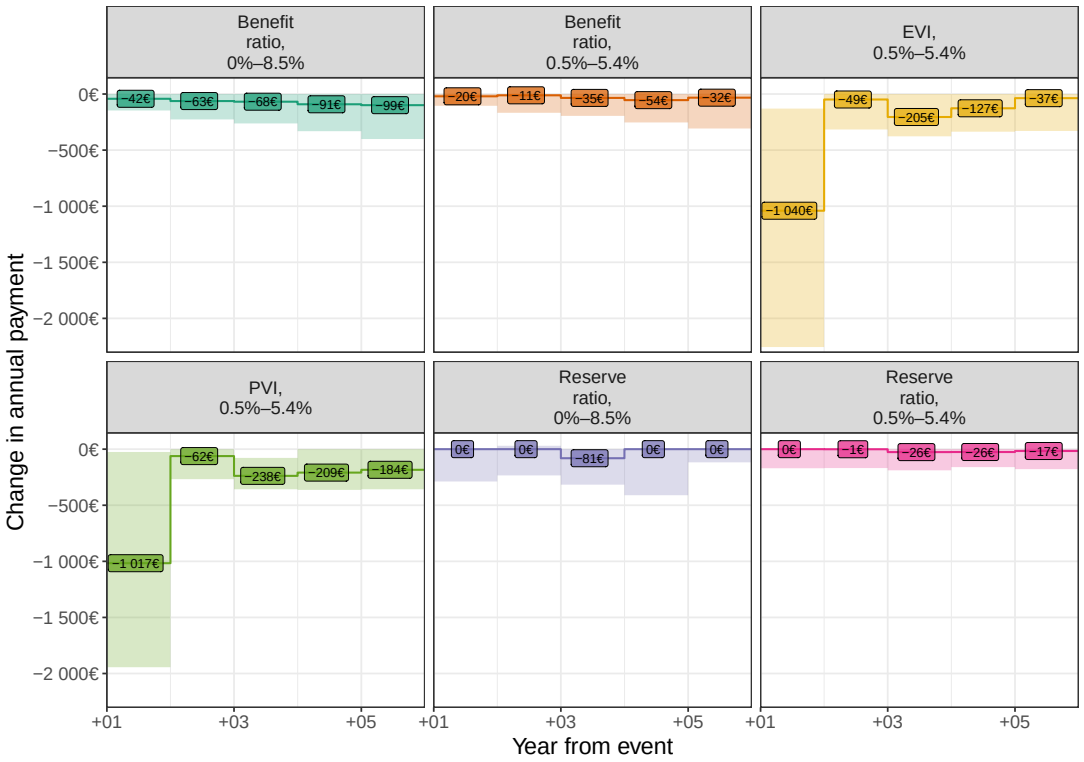


Figure 40: Marginal responses to a hiring over the next five years



Appendix Q Marginal taxes in the current system

In the existing system, there are two marginal tax rates: a lower one for wages up to roughly 2 million euros, and a significantly higher one for wages exceeding the threshold. This threshold was roughly doubled in 2008, after which the threshold has been indexed to wage growth in the economy. 41 shows the evolution of the marginal tax rates above and below the thresholds and the average (aggregate) tax rate over time.

Despite the sharp change in the marginal tax rates, there is no easily observable bunching of wages around these thresholds in the data. Figure 43 demonstrates the distribution of employers by wages, while Figure 44 shows the wage growth rates. If the tax rate threshold had a significant impact on the development of wages by employers, one would expect growth rates to be smaller just below the prevailing threshold and larger just above it. While the LOESS fit of growth rates suggests a jump in growth rates at the new threshold in 2008, this appears to be driven by a few outliers.

In general, despite the very clear shift in marginal tax rates in 2008, strong conclusions about the effects of UI taxes based on this event appear unwarranted for several reasons. First, the number of employers in the near vicinity of this particular wage threshold appears small. Second, employers have limited leeway in wage setting, and typically face the choice between hiring and firing an individual at a fixed wage, rather than directly choosing their total wage bill. The end result is that in realistic scenarios, only part of a marginal employment choice is affected by the higher rate. Third, the change in the threshold coincides with the onset of the financial crisis, making cross-year comparisons difficult.

Appendix R Cost-to-payment ratios split into rated and shared parts

In the main text, the cost-to-payment ratios were compared by comparing the simulated per-employer UI tax to a per-employer cost measure that combines UI costs attributed to the employer and the employer's "fair share" of the costs shared across all employers. The fair share was defined to be each employer's share of aggregate wages. For simplicity, the new employer rate (the mean rated rate) is considered part of the rated tax.

Because rated and shared costs and rated and shared taxes are calculated separately, they can also be compared separately to construct separate cost-to-payment ratios. To visualize them across industries, the two ratios are normalized so that the representative (aggregate) employer still has a ratio of 1 rather than 2. The rated ratios are not split equally, since the rated taxes are quantitatively more important; rather they are weighted by the share of rated taxes of all UI taxes (about 0.7), and the shared ratios are weighted by the share of shared taxes (about 0.3).

To compare the simulated methods to the existing tax system, the existing tax is also artificially split into two. The rated and shared taxes in this hypothetical setup are the actual taxes paid, multiplied by the shares of aggregate rated and shared taxes of the total tax revenue in the benefit ratio system.

Figure 41: UI tax rates above and below a threshold. Marginal tax rates are defined in legislation, while the average rate are calculated by the Employment Fund in its annual reports. These tax rates covers most employers that do not have special exemptions or exceptions in the law.

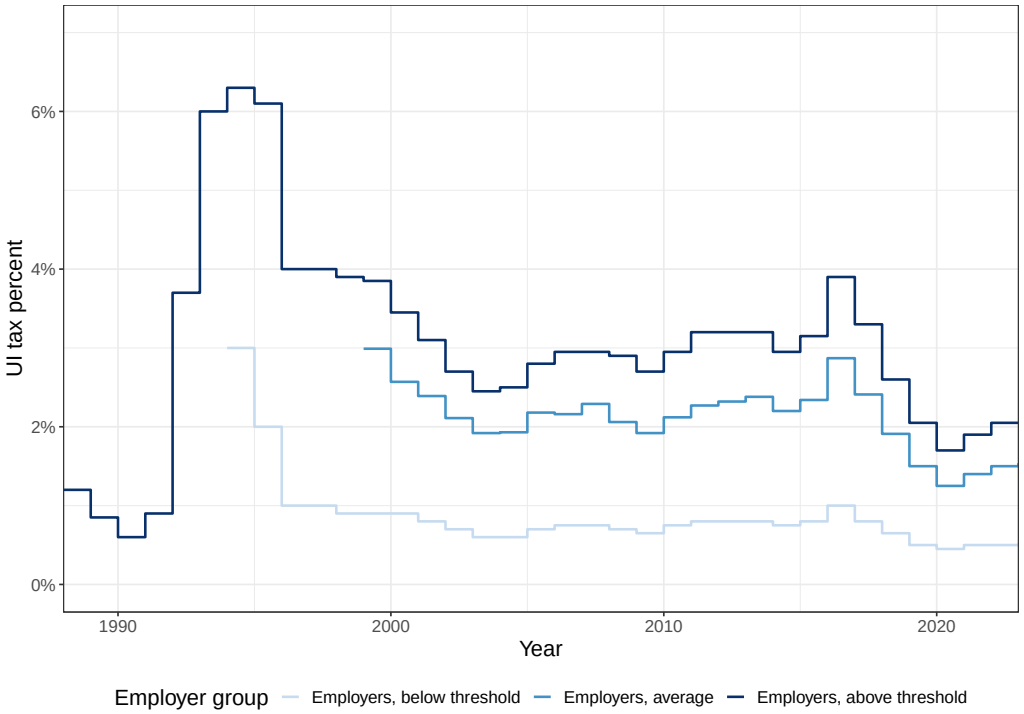


Figure 42: UI tax threshold by year

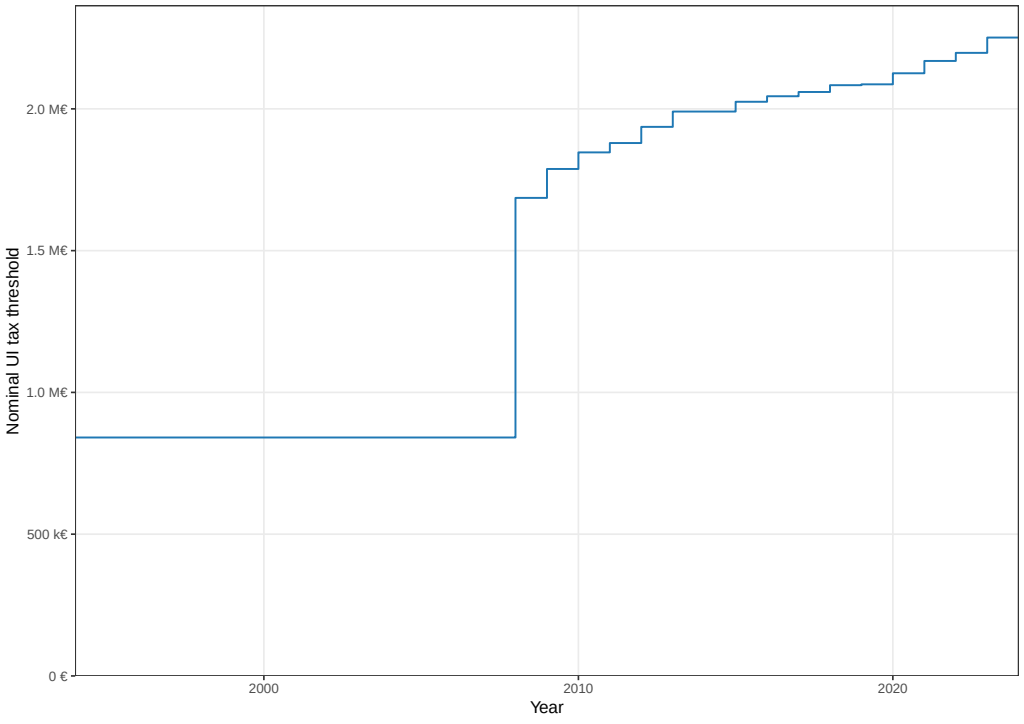


Figure 43: Density of employers by wages around the UI tax threshold. The vertical dashed lines correspond to the tax thresholds in 2006–2007, 2008 and 2009. All monetary values are undeflated, unlike elsewhere in the paper.

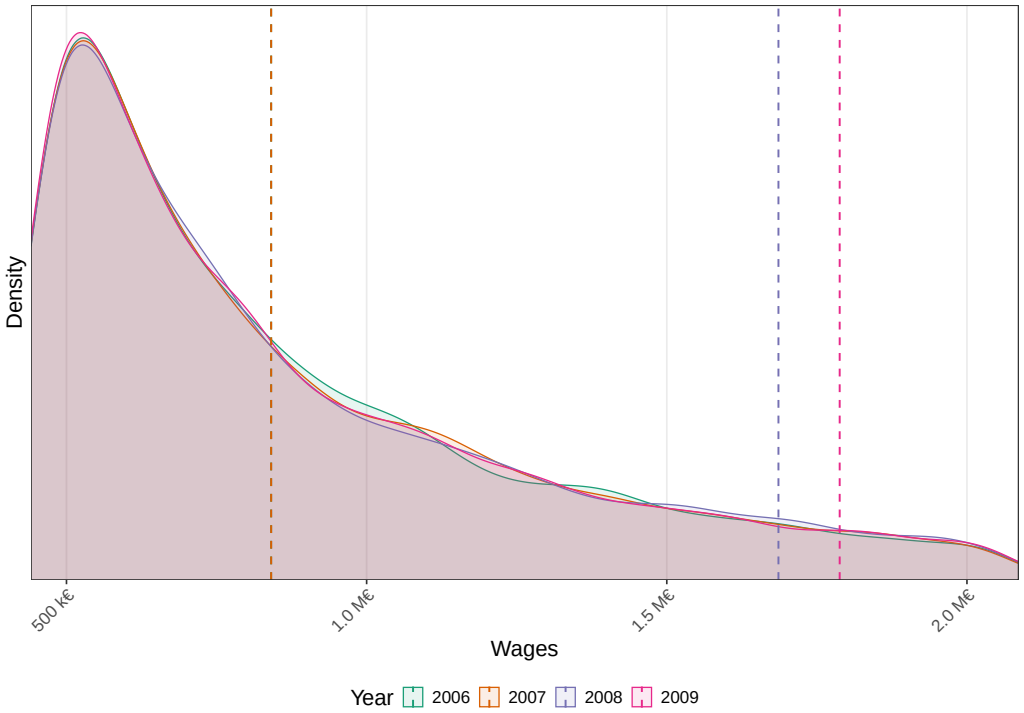


Figure 44: Wage growth around the UI tax threshold. The dim gray lines are moving averages of growth over 10 employers. The solid curves are a LOESS fit of raw growth by wages, fitted separately below and above the year 2006–2007 and 2008/2009 thresholds.

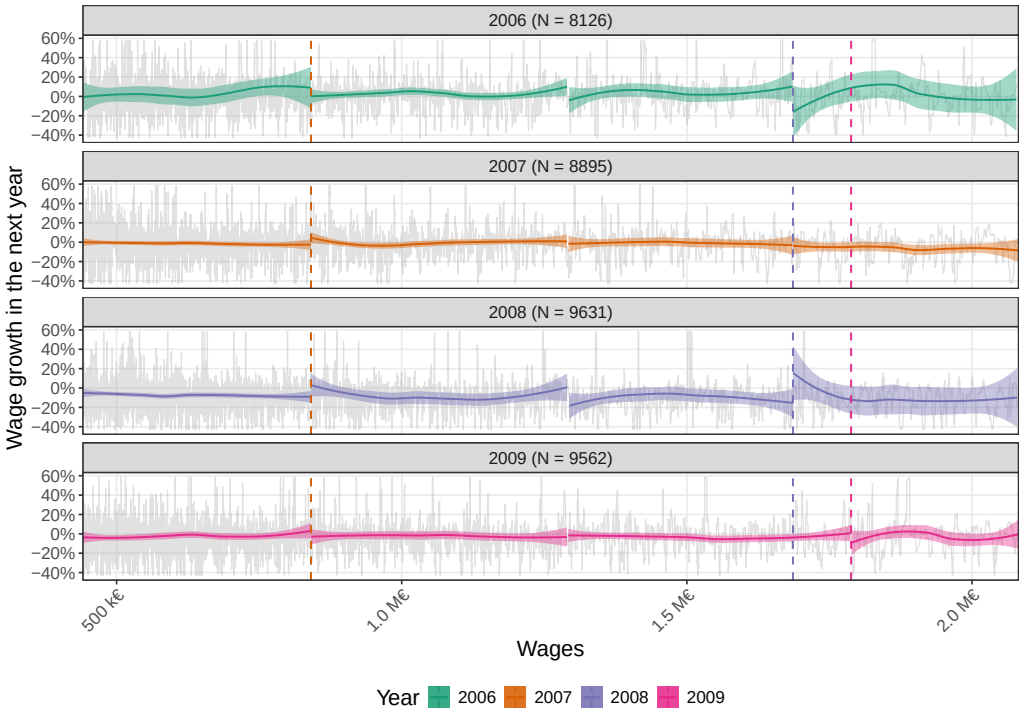


Figure 45: Cumulative benefits-to-payments ratio, by method and industry. Industries that were in either the top 3 or bottom 3 by ratio for at least one of the methods were plotted. If a firm operated in multiple industries, its industry is the one in which it paid the most wages.

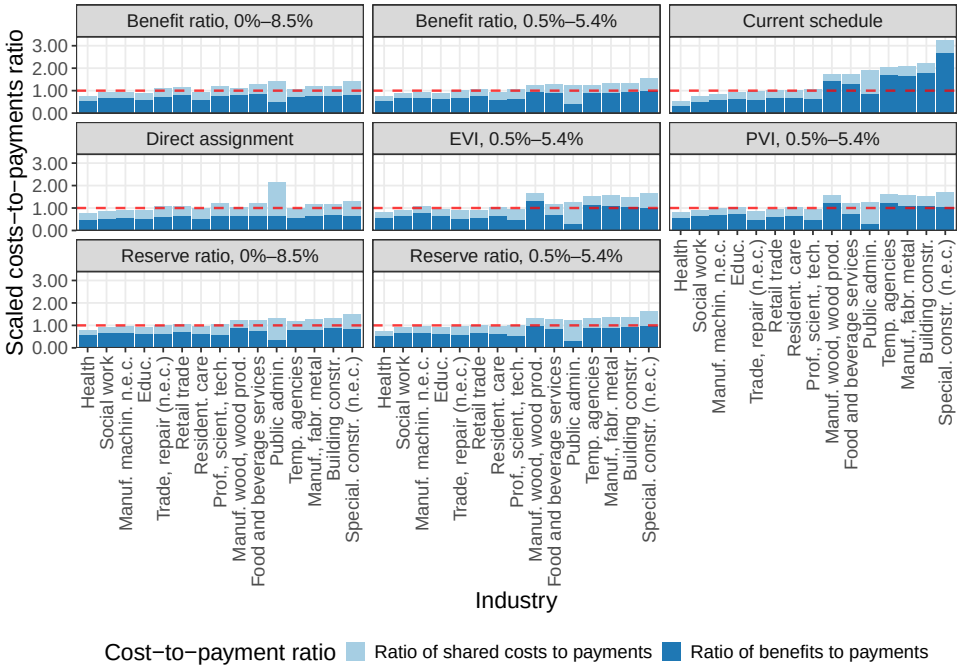
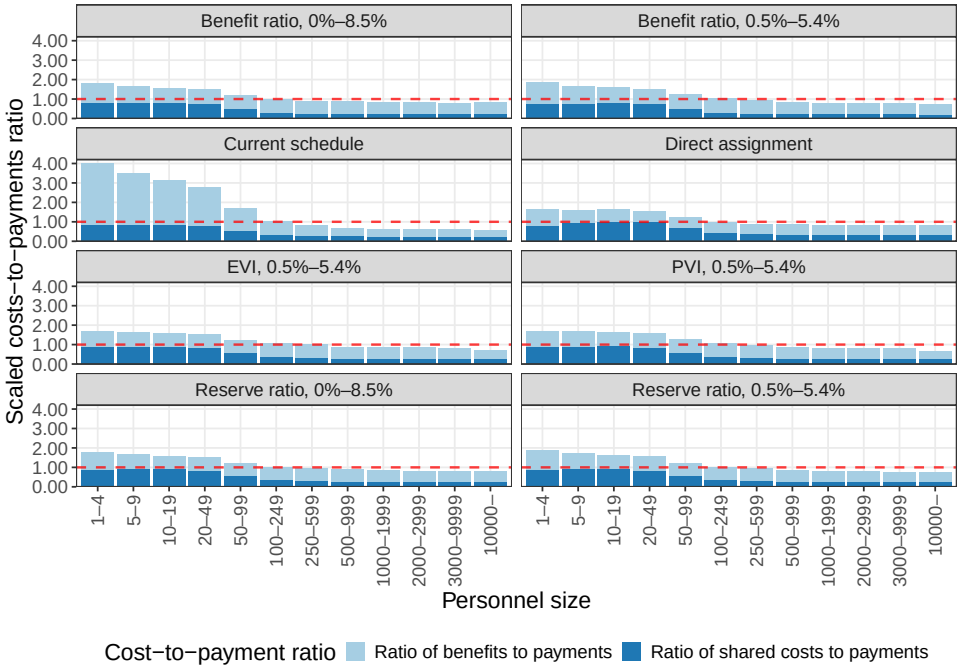


Figure 46: Cumulative benefits-to-payments ratio, by method and size. A firm's size is defined as the sum of annual headcounts, divided by the years it was observed paying wages.



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