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Are payroll tax cuts absorbed by insiders? Evidence from the Swedish retail industry

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It is commonly argued that payroll tax cuts are inefficient for increasing employment among outsiders because insiders will use their power to bargain for higher wages at the expense of outsiders' possibility of becoming employed. The extent to which insiders or outsiders reap the rewards of payroll tax cuts is a longstanding issue, and previous literature has largely focused on the employment effects of outsiders. Using wage statistics of employees in the Swedish retail sector, we investigate the effects of a youth payroll tax cut in 2007 on insiders' wage earnings and the number of hours worked. In accordance with earlier studies, the results show that the payroll tax cut increased insiders' total wage earnings. However, only 21 percent of the increase in wage earnings was a result of higher bargained wages, 57 percent of the wage increase corresponds to a higher intensive margin of employment, and the rest was attributed to the number of hours worked by insiders with a higher hourly wage rate. There is, thus, little to suggest that insiders can absorb large amounts of payroll tax cuts in the form of higher bargained wages, even in the case of a small number of workers with the most bargaining power.

Keywords: Retail, labor market, wage, payroll tax, DiD, employment, inconvenience allowance
JEL classification: D24, L25, L26.

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1. Introduction

The insider-outsider theory (Lindbeck and Snower 1988) stipulates that individuals who are established in the labor market, the insiders, are protected by the turnover costs associated with replacing them with less established individuals, the outsiders. To increase employment among outsiders, governments can increase labor demand by implementing reforms that reduce firms' labor costs. However, in Scandinavian welfare states, minimum wages are not set by politicians but rather in negotiations between trade unions and employer organizations. An alternative way to reduce firms' labor costs in this institutional setting is to implement payroll tax cuts. Payroll taxes are levied on employers, resulting in higher wage costs and, thus, stronger employment security for insiders (Forslund et al. 2014; Skedinger 2015).

One frequent objection against payroll tax cuts is that changes to the payroll tax have been known to shift back to workers in the form of wage changes (Holmlund 1983; Gruber 1997; Kim, Kim, and Koh 2021; Vroman 1974; Deslauriers et al. 2022). Payroll tax cuts can thus be depleted by higher wages or various employment substitution effects among nontargeted workers (Fullerton and Metcalf 2002). The mechanism behind this effect is that labor unions might use payroll tax cuts to negotiate higher wages for those that already are employed, and employers might need to raise wages to keep experienced workers within the firm. Payroll tax cuts can therefore increase the wages of insider workers, i.e., those who are already employed, rather than providing employment opportunities for outsiders. If this is the case, the efficiency of payroll tax cuts for increasing the number of employees must be questioned.

This paper contributes to the literature by distinguishing between the effect of a youth payroll tax cut in Sweden on insiders' wages and the number of hours worked. Recent contributions (Daunfeldt, Gidehag, and Rudholm 2021; Saez, Schoefer, and Seim 2019) have found that the youth payroll tax cut had significant positive effects on both total wage earnings and employment, indicating that both insiders and outsiders were affected by the payroll tax cut. It is still an open question, however, whether the reported effect on wage earnings is due to an increase in insiders' wages or the number of hours worked. This is important to consider because the latter is an employment effect on the intensive margin, whereas an increase in contracted wages suggests that insiders can partially absorb the tax cut and thus counteract the intention of the reform.

The analysis is made possible due to access to wage statistics from the Confederation of Swedish Enterprise (*Svenskt Näringsliv*) on employees in retail firms. The data allow a detailed investigation of how the payroll tax cut affected total wage earnings, contracted wages, and the number of hours worked. The retail sector is of particular interest to study, as it accommodates many job positions that do not require higher education or previous labor market experience (Skedinger 2015). Labor demand is thereby likely to be elastic, suggesting that retail firms will respond sharper to labor cost changes than firms active in many other industries. However, elastic labor demand combined with the high bargaining power of insiders might also imply that retail workers are able to shift the payroll tax cut into higher wages (Boeri and van Ours 2013).

The study is restricted to employees who have been working in the retail sector at least five years prior to the reform and at the same firm throughout the study period 2004-2008. This means that the paper investigates the effects of payroll tax cuts on employees with high insider status, whereas

previous studies have focused on a very heterogeneous group of incumbent workers. If payroll tax cuts are shifted into higher wages rather than increased employment, then the effect should be particularly visible for the sample of insiders analyzed here. The paper thus contributes to the literature by providing a deeper understanding of whether insider power absorbs labor cost-reducing reforms that are directed to increase employment for outsiders.

Similar to (Saez, Schoefer, and Seim 2019), a reform intensity measure is constructed by relating firms' labor cost savings induced by the payroll tax cut as a fraction of their total labor cost. Firms are then divided into five groups based on this measure, ranging from firms receiving a low to high reform intensity dose. A difference-in-difference model is then used to estimate the effect of the reform intensity dose on insiders' bargained wages, the number of hours worked and total earnings. The results indicate that insiders who were employed in firms exposed to the highest reform intensity dose increased their total wage earnings by 5.3 percent compared to insiders employed in firms with low or no cash savings. However, only one-fifth of the increase in total earnings is explained by an increase in the contracted hourly wage. Most of the effect on total wage earnings is a consequence of a positive and significant effect on the number of hours worked. The higher wage earnings of insiders can, to a large extent, be explained by a higher intensive margin of employment rather than higher bargained wages.

When relating the wage increase for insiders to firms' total labor cost savings for firms exposed to the highest reform intensity, insiders are calculated to absorb 22 percent of the total labor cost savings. However, only 4.7 percent of firms' total labor cost savings are absorbed by higher bargained wages; 12.5 percent are absorbed by an increase in hours worked, and the remaining 4.8 percent correspond to an increase in extra earnings. Hence, the concern that payroll tax cuts are mainly transferred into higher wages for insiders is not supported.

The rest of the paper is organized as follows: Theoretical predictions, the features of the Swedish payroll tax reform of 2007, and prior literature analyzing the effects of the youth payroll tax cut in Sweden are described in the next section. Section 3 presents the data and some descriptive analysis, while the empirical model is presented in Section 4. The results are presented in Section 5 and then summarized and discussed in Section 6.

2 Theory and empirical studies

2.1 Theoretical predictions

Standard theory predicts that irrespective of whether levied on employers or workers, a payroll tax reduction will increase the demand for labor, resulting in higher employment. This effect is partly or entirely offset by a higher equilibrium wage depending on the elasticities of labor demand and supply. The more inelastic labor demand is relative to labor supply, the higher share of the tax reduction received by firms, which in this case implies higher employment and a corresponding smaller wage increase.

[1] Consequently, if labor supply is inelastic relative to labor demand, the higher share of the tax reduction is received by workers in the form of higher wages with smaller increases in employment.

The extent to which insiders can realize a payroll tax cut into higher wages is also a matter of bargaining power and conflict between insiders and outsiders. Insiders, in contrast to outsiders, possess market power through the process of wage determination and can use their market power to pursue their own interests at the expense of the outsiders' possibilities of becoming employed (Lindbeck and Snower 1990).

Following Boeri and van Ours (2013), bargaining power can be added as an institutional factor. Here, the surplus of the employee is given by the difference between the bargained wage and the reservation wage, $w - w^r$, and the surplus of the employer is given by the difference between revenues and costs, $\Pi(w) = y[L^d(w)] - wL^d(w)$, where $L^d(w)$ is labor demand and y is income. Employers will, given the bargained wage, choose employment to maximize profits. The wage level that maximizes the Nash product is defined by:

$$[L^d(w)(w - w^r)]^{\beta}[y(w) - wL^d(w)]^{1-\beta} \qquad (1).$$

Here, β represents the bargaining power of the insiders and ranges between 0 and 1; β=0 defines perfect competition, and β=1 when insiders hold all bargaining power. The first-order condition of the Nash product, solving for the wage level, is given by:

$$\frac{w-w^r}{w} = \frac{\beta}{\beta\epsilon_w^d + (1-\beta)\epsilon_w^{\pi}}. \qquad (2).$$

Here, $\epsilon_w^d = \frac{\partial L}{\partial w}\frac{w}{L}$ is the wage elasticity of labor demand, and $\epsilon_w^{\pi} = \frac{\partial \pi}{\partial w}\frac{w}{\pi}$ is the elasticity of profits with respect to wages. Given that insiders hold all bargaining power, $\beta = 1$, it is easy to see that equation 2 is reduced to $\frac{w-w^r}{w} = \frac{1}{\epsilon_w^d}$, which tells us that the more elastic labor demand, the closer the bargained wage will be to the reservation wage. In contrast, when $\beta = 0$, we have $\frac{w-w^r}{w} = 0$, meaning there is no insider wage markup. Workers are, therefore, paid the reservation wage, irrespective of labor demand elasticity. The combination of elastic labor demand and high insider power implies that insiders are able to absorb more of a payroll tax cut through higher wages.

Whether insider retail workers absorb the payroll tax cut through higher wages is thus a question of elasticities and bargaining power. The labor supply of regular full-time workers is, in general, unresponsive to tax changes (Disney 2000), while standard theory predicts that labor demand is highly elastic[2] in low-skilled sectors such as retail (Lichter, Peichl, and Siegloch 2015). Under the assumption that labor demand is equally elastic for retail insiders, labor demand will be more responsive relative to labor supply. If retail insiders also hold considerable bargaining power, the

[1] Higher profits or lower consumer prices are also a possibility, but beyond the scope of this analysis.

[2] Assuming that there are i) close substitutes to retail workers (computers, for instance), ii) that the minimum skill factor is low, iii) the pool of available labor is large, or iv) that employment can be adjusted with relative ease.

effect of the payroll tax cut on insiders can be expected to increase wages (Fullerton and Metcalf 2002) and absorb some of the payroll tax cut, which dampens the reform intention of increasing employment among outsiders.

2.2 The Swedish youth payroll tax cut and prior empirical findings

The purpose of targeted payroll tax cuts is often to increase employment for specific groups. One concern, however, is that payroll tax cuts might be absorbed by higher wages for insiders. This concern stems from earlier findings suggesting that payroll taxes are partly or entirely borne by workers (Kim, Kim, and Koh 2021; Gruber 1997; Holmlund 1983). Hence, firms' labor costs might be left unchanged following payroll tax cuts (Korkeamäki and Uusitalo 2009; Deslauriers et al. 2022). The labor market status and skills of employees might also be important, as low-wage workers have been reported to increase hours worked (Huttunen, Pirttilä, and Uusitalo 2013) and transition to higher wages by working more (Kramarz and Philippon 2001). There is also evidence that ineligible workers are substituted for eligible workers (Collischon, Cygan-Rehm, and Riphahn 2018), that the labor supply elasticity decreases with age and that younger workers are more responsive to payroll taxes than older individuals (Elias 2015).

In this paper, the effects of a youth payroll tax cut in Sweden on insiders' contracted wages, the number of hours worked and total earnings are investigated. The reform implemented a payroll tax reduction of 11 percentage points on July 1, 2007,[3] for all employees who had turned 18 but were younger than 25 years at the beginning of the year (Proposition 2006/07: 84). A further reduction of six percentage points was implemented in 2009 (Proposition 2008/09: 7), when the payroll tax cut was also expanded to include all individuals under 27 years of age. The payroll tax was incrementally returned to a uniform rate for all workers, at 31.42 percent, in 2016.

When reforms include age thresholds, as in the case of the Swedish youth payroll tax cut, effects are often estimated by comparing individuals who are just below and above the threshold using a difference-in-difference regression design (Egebark and Kaunitz 2018; Skedinger 2014). The treatment group consists of individuals who are targeted by the reform, while the control group consists of slightly older individuals who are not eligible for the reform. Studies using this methodology indicate negligible effects on employment and positive effects on wage earnings of the Swedish youth payroll tax cut. However, a problem with the age-threshold approach is that the youth payroll tax cut was levied on employers, not employees. This implies that it was the firms, and not their employees, that were affected by the payroll tax reform. An age-threshold approach, therefore, means that variation in reform intensity between firms is not taken into account and that the reform might not affect ineligible workers (Gidehag 2019; Saez, Schoefer, and Seim 2019; Daunfeldt, Gidehag, and Rudholm 2021).

More recent contributions acknowledge that the employment and wage effects depend on firms' labor cost savings following the youth payroll tax cut. These studies indicate a nonnegligible positive effect on the total employment of the reform, although wages also seem to be adjusted upward as a consequence of the reform. However, the wage effect does not seem to be large enough to eliminate the positive employment effects (Gidehag 2019; Saez, Schoefer, and Seim 2019; Daunfeldt, Gidehag,

[3] The payroll tax was reduced from 32.32 to 21.315 percent for young employees.

and Rudholm 2021). Note also that these studies investigate the effect on total wage earnings, which means that the wage effect might be driven by an employment increase on the intensive margin rather than higher contracted wages. Additionally, the positive effect of the payroll tax reform on employment seems to be attributed to an increase in the employment possibilities of young individuals to a great extent, although the results indicate an effect on ineligible individuals as well. One interpretation is that the effects on ineligible workers capture insider power and the ability to realize the firm-level tax cut into higher wages. However, this particular group is in previous contributions broadly defined as incumbents or individuals older than 25 years of age (Gidehag 2019; Saez, Schoefer, and Seim 2019; Daunfeldt, Gidehag, and Rudholm 2021).

3 Data and descriptive statistics

3.1 Data

The analysis is based on a dataset that includes all employees aged 18-65 years who worked in firms that were members of the Swedish Trade Federation (*Svensk Handel*) from 2000 to 2015. The data are collected annually in September and cover approximately 75 percent of the total number of workers in the Swedish retail trade industry.[4] It includes information about, for example, contracted hourly wages, various breakdowns of each individual's total earnings, employment location, and the number of hours worked. In total, the dataset consists of 2,625,333 observations, corresponding to 639,060 individuals and 9,787 firms.

To investigate the effect of the youth payroll tax cut in 2007 on insiders' wages and the number of hours worked, the sample is restricted to the period 2004-2008, leaving less than one-third of the observations.[5] The reason for restricting the postreform period to 2008 is that the payroll tax cut was lowered once more in 2009, and the age threshold was also extended at that time.[6] White-collar workers are also excluded to keep the sample as coherent as possible. This means that all employees in the sample are manual workers that are bound by the same collective agreement. Next, the sample is restricted to insiders by requiring employees to be present every year during the study period. These employees are also required to have at least two years of sector experience prior to the study period (i.e., prior to 2004) to be classified as insiders. Hence, entrants and employees that were employed as a consequence of the youth payroll tax cut are not included in the analysis, nor are employees that were hired or left the firm in close proximity to the reform year. Firm tenure is added as a final restriction, limiting the main sample to employees who are working in the same firm throughout the entire study period (i.e., 2004-2008). This leaves 86,470 observations, corresponding to 15,320 employees. Of all manual workers who were working in a retail firm from 2004 to 2008, only approximately one-fifth remained in the sample following the restrictions to qualify as an insider.

[4] The Swedish retail trade industry is estimated to employ 260,000 workers in 2016 (HUI Research, 2018), and the data includes approximately 200,000 observations in 2015.
[5] As a robustness check, the postreform period is also extended to 2011.
[6] This period is also distinguished by contemporaneous reforms including the incremental introduction of earned income taxes during 2007-2010, which, according to Bennmarker et al., 2014), contributed to lower wage pressure. Moreover, the financial crisis may distort results as the reform was introduced in close proximity to a temporary depressed labor market. However, neither of these exogenous changes constitute a problem unless they are correlated with the reform intensity variable.

The sample selection criteria are displayed in detail in Table 1 below.

Table 1: Sample selection

	Individuals	Firms	Observations
Full sample	639,060	9,787	2,625,333
Time period, 2004-2008	134,370	5,385	765,340
Only manual workers	83,374	4,006	487,402
Present all years	27,553	462	137,765
Prereform retail tenure	19,942	324	99,710
Same employer	15,320	229	86,470

The effects of firms' labor cost savings following the youth payroll tax cut are investigated using five different dependent variables. The first is the *contracted hourly wage*, which is the hourly wage rate in the employment contract that applies during normal office hours. *Hours worked* is the total number of hours worked during the month. *Total earnings* are the monthly wage salary payments, which can be influenced by the hourly wage, the number of hours worked, and when the employees are working. *Normal earnings* and *extra earnings* are finally included to investigate whether there are any effects on total wage earnings that are based on when the employees are working. Normal earnings correspond to the sum of earnings when working normal office hours, while extra earnings correspond to productivity-related earnings or the type of job shift. The latter is important, as job shifts outside office hours imply extra payment in the form of an inconvenience allowance. In this case, the hourly wage is between 1.5-2 times higher than the contracted hourly wage. Early evening shifts pay 1.5 times the contracted hourly wage, while late evening shifts pay 1.7 times the contracted hourly wage. On weekends and holidays, the hourly wage rate is twice the size of the contracted hourly wage.

Descriptive statistics for the dependent variables that are included in this study are presented separately for insiders and noninsiders in Table 2. The results show that earnings, wages and the number of hours worked, as expected, are higher among insiders. Insiders' total earnings exceed the total earnings of the less experienced workers by 25 percent, while the contracted wage is approximately 5 percent higher on average. The reason is that insiders work approximately 20 percent more than less established workers. Note also that normal earnings comprise a larger share of total earnings for insiders, showing that they work less during evenings and weekends.

Table 2: Mean and standard deviations (in parentheses) for the dependent variables, insiders and less tenured workers during 2004-2008.

	Insiders	Noninsiders
Contracted hourly wage	117.2	109.6
	(36.5)	(31.7)
Hours worked	130.1	103.2
	(44.2)	(56.4)
Total earnings	19,049	14,437
	(7,019)	(8,134)
Normal earnings	16,655	12,299
	(6,344)	(7,343)
Extra earnings	2,509	2,198
	(2,572)	(2,407)
N	86,470	396,777

3.2 Reform intensity and hypotheses

Similar to (Gidehag 2019; Saez, Schoefer, and Seim 2019; Daunfeldt, Gidehag, and Rudholm 2021), a reform intensity measure for each firm is calculated by dividing the prereform cash savings (11 percent of the labor cost of tax cut eligible workers) by the firm's total labor costs. Hence, the reform intensity for each retail firm can be written as follows:

$$Reform\ intensity_{j,t=2006} = \frac{0{,}11 * wage\ costs\ of\ young\ employees_{j,t=2006}}{total\ wage\ costs\ of\ all\ employees_{j,t=2006}}, \quad (3)$$

where $Reform\ intensity_{i,t=2006}$ is the size of the labor cost savings relative to the total labor costs for firm *j* in 2006 (prereform), i.e., it measures what percent of firms' total labor costs were lowered because of the youth payroll tax cut in 2007.

The size of $Reform\ intensity_{j,t=2006}$ is thus determined by the prereform proportion of young employees and the size of their earnings in relation to firms' total labor costs. Firms that had high wage costs for young employees relative to all their employees received a high reform intensity dose, i.e., a sharp drop in labor costs compared to firms with lower wage costs for young employees. In line with recent contributions (Gidehag 2019; Daunfeldt, Gidehag, and Rudholm 2021; Saez, Schoefer, and Seim 2019), the reform intensity variable is divided into several treatment intensity groups. In this case, five different dummy variables are created, where Q1 includes firms that received the 20 percent lowest reform intensity dose, and Q5 includes firms with the 20 percent highest reform intensity dose. Each employee is assigned to a reform intensity dummy depending on the treatment intensity dose for the firm where the individual was employed in 2006.

Table 3 shows descriptive statistics of insiders immediately before and after the reform, i.e., 2006 and 2008, depending on which reform intensity group they belong to. There is a tendency for employees in the lower reform intensity groups to have higher contracted hourly wages and work more hours, which results in higher total earnings. Normal earnings comprise a larger share of total earnings for employees in the lower reform intensity groups, while extra earnings are higher for those employees that work in firms that received higher reform intensity doses. Note also that the number of employees

is not entirely proportional to the reform intensity dose but that firms exposed to a lower reform intensity are, on average, smaller, implying that insiders exposed to Q1 tend to be employed in relatively small firms. Employees in Q1 are exposed to a reform intensity dose of approximately zero percent, while those in Q5 are exposed to an average reform intensity dose of 4.3 percent.

Table 3: Descriptive statistics of insiders employed in the same firm in 2006 and 2008 grouped by reform intensity.

	Q1		Q2		Q3		Q4		Q5	
	2006	2008	2006	2008	2006	2008	2006	2008	2006	2008
Contracted wage	128.1	133.2	124.5	133.7	105.4	110.3	121.1	126.7	123.3	129.0
	(19.1)	(19.9)	(29.7)	(21.3)	(47.5)	(48.3)	(29.3)	(28.5)	(23.2)	(23.3)
Hours worked	144.3	142.6	141.8	146.3	130.0	128.8	125.2	126.3	121.8	122.8
	(34.6)	(40.9)	(39.4)	(42.0)	(43.0)	(43.9)	(43.6)	(45.4)	(45.0)	(47.3)
Total earnings	20,208	20,237	20,514	21,904	18,961	19506	18,718	19,688	17,671	18,642
	(6,851)	(6,894)	(6408.2)	(7031.3)	(6,735)	(7,206)	(6,919)	(7,580)	(7,058)	(7,787)
Normal earnings	18,675	19,215	18,472	19,711	16,685	17,129	15,965	16,761	15,327	16,173
	(5,508)	(6,414)	(5,853)	(6,477)	(5,976)	(6,321)	(6,108)	(6,620)	(6,563)	(7,293)
Extra earnings	1,565	1,105	2,138	2,307	2,396	2,478	2,962	3,133	2,370	2,505
	(3,884)	(1,478)	(2,981)	(3,616)	(2,248)	(2,322)	(2,505)	(2,738)	(2,245)	(2,402)
Average no employees	19.0	22.8	350.9	360.1	1,601	1,387.8	1,333.9	1,480.4	734.1	719.6
	(17.5)	(23.5)	(434.8)	(402.7)	(1691.6)	(1,329.1)	(1,675.3)	(1,876.7)	(1,113.3)	(1,091.9)
Average no insiders	6.4		73.2		369.9		238.4		100.4	
	(4.1)		(89.0)		(378.0)		(303.7)		(117.1)	
Reform intensity	0.0		0.6		1.5		2.7		4.3	
	(0.0)		(0.2)		(0.3)		(0.3)		(0.7)	
Average tax windfall (per 1000 sek)	2.9		57.0		528.3		709.0		426.8	
	(5.9)		(97.6)		(594.6)		(892.6)		(622.2)	
Individuals	465		2,648		5,809		4,608		3,764	

4. Empirical model

The effect of the payroll tax reduction is evaluated by estimating the following difference-in-difference model, which makes pairwise comparisons of employees in the higher reform intensity groups compared to individuals employed in the lowest reform intensity group (Q1):

$$Y_{ijt} = \alpha + \beta_{ij}(Q_{jk} * T_{post}) + T_t + \omega_i + \epsilon_{ijt}, \qquad (4)$$

where the dependent variables, Y_{ijt}, are contracted wages, the number of hours worked, total earnings, normal earnings or extra earnings for individual *i* in firm *j* at year *t*. Q_{jk} is a binary indicator and denotes the reform intensity group to which the employees belong. In equation (4), *k* takes the value 2 to 5, while k=1 denotes the control group, Q_{j1}. This means, for instance, that Q_{j3} takes the value 1 if an individual is employed in a firm that received a medium reform intensity and zero otherwise. T_{post} is the posttreatment variable, taking the value 0 for the years 2004-2006 and the value 1 for the postreform years 2007-2008, and $Q_{jk} * T_{post}$ is the interaction term that produces estimates of the reform effect on the outcome variables. Finally, all estimations include year- and individual-specific fixed effects, denoted by T_t and ω_i, respectively. The latter is included to avoid the possible wage bias related to unobserved time-invariant characteristics of the individual (or the firm) that may interfere with the effect of reform intensity, such as age, educational attainment, ability or motivation of the employee, location, or industry of occupation. With individual fixed effects, we thus allow all sources of time-invariant individual-specific heterogeneity to be eliminated (Knabe and Plum 2013). Therefore, no time-invariant controls on the individual level are included in the specification.

The reform effect is captured by the interaction between the reform intensity group quartile and the time indicator. The estimate for $\beta_i(Q_{ik} * T_{post})$ shows the effect of the reform on the dependent variable for individuals employed in firms that were exposed to a reform intensity equal to quartile *k*, and this will be compared to individuals working in firms with the lowest reform intensity exposure, Q1. Hence:

$$\beta_i = [E(y|T_{post} = 1,\ Q_{jk} = 1) - E(y|T_{post} = 0,\ \ Q_{jk} = 1)]\ -$$

$$[E(y|T_{post} = 1,\ \ Q_{jk} = 0) - E(y|T_{post} = 0,\ \ Q_{jk} = 0)]$$

where E is the conditional mean, y is the earnings or the number of hours worked of individuals in firms receiving a payroll tax reduction, $Q_{jk} = 1$ represents treatment intensity and $Q_{jk} = 0$ is, thus, equivalent to the lowest quartile, Q_{j1}, which defines the control group.

A number of robustness checks are conducted. The main specification is re-estimated in a placebo setting to test for any pretrend bias. Using the same sample of employees, regressions are estimated over the period 2002-2006 as if the reform had been implemented in 2005. The model is further tested by incrementally increasing the time period until 2011, which tests for the robustness of the results in the long run.

5. Results

5.1 Main estimates

The estimation results of the payroll tax reform effect on total earnings, contracted hourly wages, the number of hours worked, earnings from working normal hours and extra earnings are presented in Table 4. Note that the estimated reform effects for insiders are compared to insiders employed in the lowest treatment intensity group, i.e., Q1.

Overall, the effect of the payroll tax cut is largest in the group that received the highest reform treatment intensity dose, showing a positive effect on both contracted wages and the number of hours worked. The payroll tax cut is associated with an increase in the contracted hourly wage rate by 1.3 SEK and 1.6 SEK for employees in reform intensity groups Q4 and Q5, respectively.[7] This implies that the bargained wage contributes to an increase in total monthly earnings by 165 and 199 SEK for insiders in groups Q4 and Q5, respectively[8]. In comparison with the share of the average contracted hourly wage in 2006, hourly wages were raised by 1.1 and 1.3 percent[9], respectively, due to the payroll tax cut. This can be compared with the average reform intensity in SEK in these treatment groups, which were 2.7 and 4.3 percent. The results thus indicate that insiders are able to partially absorb the payroll tax cut through higher bargained wages.

The effect of the payroll tax cut on hours worked is much larger in the highest reform intensity group compared to the wage effect discussed above. The estimated effect on the number of hours worked shows that insiders increased their number of hours worked by 4.4 hours per month, which is 3.6 percent of their prereform hours worked[10]. Given the average hourly wage in 2006, the increase in hours worked contributed to an increase in total earnings by 542 SEK, assuming the wage rate at normal office hours[11]. This suggests that an increase in the intensive margin primarily drives the positive effect on wage earnings, i.e., insiders are able to work more hours due to the payroll tax cut, rather than an increase of contracted wages.

The effect of the payroll tax cut on total wage earnings shows that insiders employed in firms with high (Q4) and very high (Q5) reform intensity increased their earnings by 835 and 942 SEK, respectively, compared to insiders employed in firms with the lowest reform treatment intensity. This corresponds to an increase in total earnings by 4.5 percent in Q4 and 5.3 percent in Q5.

However, for a complete understanding of how much of the increase in total earnings can be explained by a higher intensive margin of employment, we must also consider that employees can earn more by working more hours outside normal office hours, which yields supplementary wage earnings. Otherwise, we risk overstating the importance of the intensive margin of employment. The results show that normal earnings, which account for both higher bargained wages and a higher number of hours worked, increased by 543.7 SEK for insiders who are working in firms that received the highest reform intensity. The effect on extra earnings is also significant at the 5 percent level, indicating that extra earnings increased by 382.7 SEK per month due to the payroll tax cut. This means that a part of

[7] Note that there is also a significant effect on contracted wages for employees in Q2, but without a corresponding effect on any other wage component.
[8] Calculated by the product of the average number of hours worked in 2006 and the point estimate of contracted wages, i.e., 1.3*125.2 =165 and 122.1* 1.6=199.
[9] The increase in contracted wages as a share of contracted wages in 2006, i.e., 1.3/121.1=1,1 and 1.6/123.3=1.3.
[10] 4.4/122,1=0,036.
[11] 123,3*4.4 =542

the effect of the reform on total earnings is due to insiders working more inconvenience hours, which results in a wage premium.

Table 4: The effect of the 2007 payroll tax cut on insiders' contracted wages, hours worked, total earnings, normal earnings, and extra earnings, 2004-2008. The sample was restricted to insiders who were employed in the same firm throughout the studied period. Standard errors clustered at the individual level in parentheses. Year-specific and individual-specific fixed effects included.

	Contracted hour wage	Hours worked	Total earnings	Normal earnings	Extra earnings	N
Main estimates						
Q2	2.872***	1.415	443.2	111.0	311.2*	15,565
	(0.662)	(1.476)	(247.8)	(200.5)	(143.6)	
Q3	-0.178	1.971	419.7	116.2	278.9*	31,370
	(0.483)	(1.411)	(238.1)	(190.4)	(139.1)	
Q4	1.323**	1.974	834.7***	157.4	656.6***	25,365
	(0.483)	(1.423)	(240.2)	(191.9)	(140.1)	
Q5	1.633**	4.397**	942.0***	543.7**	382.7**	21,145
	(0.510)	(1.449)	(244.0)	(195.9)	(140.1)	
Placebo estimates 2002-2006						
Q2	-2.696**	2.014	-4.482	126.2	-106.2	15,105
	(0.991)	(1.381)	(232.5)	(197.8)	(116.3)	
Q3	-0.482	-1.114	-434.6	-460.1*	47.34	30,336
	(0.991)	(1.320)	(224.7)	(186.9)	(109.3)	
Q4	0.960	0.175	-136.7	-151.2	83.07	24,435
	(0.988)	(1.335)	(226.9)	(188.4)	(110.1)	
Q5	2.002*	2.158	113.6	263.1	-134.4	19,875
	(1.008)	(1.384)	(233.0)	(194.2)	(111.4)	

While the reform effect is less clear cut in the lower reform intensity groups, a full decomposition of the increase in total earnings can be elaborated for the highest reform intensity group. As we have no information on when each employee works, it is not possible to entirely separate the increase in the hourly wage and hours worked in regard to normal earnings and extra earnings. However, using the prereform wage statistics combined with the estimates of the contracted hour wage, total earnings and hours worked, a rough estimate can be obtained. Deducting the increase in the hourly wage, total earnings increased by 747 SEK (942-195) due to the payroll tax cut. When subtracting these earnings from the increase in hours worked, 211 SEK (747-536) remains, which corresponds to the effect of

extra earnings after deducting the increase in contracted wages and hours worked. It follows that 21 percent of the increase in total earnings corresponds to higher bargained wages, 57 percent is explained by an increase in hours worked, and the remaining 22 percent is due to an increase in extra earnings.

The amount of the payroll tax cut insiders are able to absorb can also be related to the firm's total labor cost savings due to the youth payroll tax cut in 2007. This calculation shows that insiders, on average, were able to absorb 28 and 22 percent of the firm-level labor cost savings in Q4 and Q5, respectively[12]. Wages increased, on average, by 39,300 SEK in Q4 and 19,900 SEK in Q5 due to higher bargained wages. This equals 5.5 and 4.7 percent[13] of the total labor cost savings for firms in Q4 and Q5, respectively. Hence, in proportion to the firm-level labor cost reduction, the effect on bargained wages bears little economic significance. The corresponding firm-level effect of insiders working more hours due to the payroll tax cut shows that they, on average, absorbed 12.5 percent of firms' total labor cost savings in Q5[14].

Hence, out of the 22 percent of the labor cost savings that insiders in Q5 were able to absorb through higher total earnings, 12.5 percent is related to a higher intensive margin of employment while 4.7 are bargained wages and the remaining 4.8 percent represent an increase in extra earnings. Seventy-eight percent of the labor cost savings are thus allocated elsewhere and not absorbed by insiders in terms of wages or the intensive margin of employment.

5.1 Robustness checks

Table 4 also includes placebo estimates where the time period was changed to 2002-2006. Here, the treatment and control groups remain the same, but a fictitious reform treatment year is added and set to 2005. If any of the dependent variables are positively correlated with reform intensity at any given time, unrelated to the payroll tax reform, we should expect significant and positive effects in the placebo estimates. Notably, there is a negative effect on contracted hourly wages in Q2 and Q5, which are significant at the five and ten percent levels, respectively. This indicates an effect independent of the reform, which means that the estimates regarding the effect on contracted wages should be interpreted with some caution. However, the placebo estimate for Q5 is positive, suggesting that we likely have a positive bias and that the effect of the payroll tax cut on contracted wages is likely to be smaller than that reported in Table 4. The placebo estimates otherwise report no indication of any systematic pretrends that stipulate a problem for the main estimates. [15]

Finally, the long-term effects of the payroll tax cut are investigated by expanding the studied time period incrementally for the sample of insiders. Figures A1-A5 in the appendix show the effect for every wage component and hours worked on surviving employees until 2011. Here, the results from

[12] (834.7*238)/709,000 = 0,28 and (942*100)/426,800=0,22

[13] Calculated by the product of the average increase in the contracted hour wage and the average number of insiders, 238*165=39,336 and 100*199 =19,900. These numbers are then related to the total tax windfall, i.e., 39,300/709,000 = 0,055 and 19,900/426,800=0.0466.

[14] (542*100)/426,800=12,7.

[15] Another robustness check is carried out by using an alternative reform intensity used in previous contributions (Saez et al., 2019), and is measured by the prereform share of young employees. The results remain very similar to those of Table 4 and are available upon request.

the highest reform intensity group, where most of the effects we have seen appear, are displayed. The figures are constructed so that each point estimate is significant at the 5 percent level if the confidence intervals are entirely above or below zero, marked by a horizontal line. The results show that the effect on wage components and hours worked, in general, are consistent irrespective of time period and sample. In the sample of insiders, the effect on hours worked and normal earnings are seemingly less accurate as the time period is widened. This suggests that the effects on the intensive margin of employment are the most prominent immediately after the reform but less robust over time. Note, however, that the estimates farther away from the treatment year are less reliable because the extension of the reform in 2009 means that firms might self-select into treatment (Daunfeldt, Gidehag, and Rudholm 2021), and because the likelihood that noise affects the results increases with the length of the posttreatment period (Mian and Sufi 2012).

6. Discussion

Payroll taxes are generally considered to be shifted back to workers (Holmlund 1983; Gruber 1997; Kim, Kim, and Koh 2021), which implies that wages adapt to the tax change, while the effect on employment is considered to be small. Thus, insiders are assumed to use their bargaining power to increase their wages at the expense of outsiders' possibilities of becoming employed. Payroll tax cuts have, therefore, often been opposed by policymakers. Previous studies have, in general, confirmed this hypothesis, indicating a significant increase in wage earnings of incumbent workers due to payroll tax cuts.

However, wage earnings might increase for reasons that are not related to an increase in the contracted wages of insiders. Payroll tax cuts might, for example, result in insiders working more hours or working more inconvenience hours, suggesting an employment effect on the intensive margin. This paper contributes to the literature by distinguishing the effects of a payroll tax cut on contracted wages from the effects on hours worked for a sample of tenured workers within the Swedish retail industry. The analysis is made possible due to the implementation of a youth payroll tax cut in Sweden in 2007, which resulted in firms with high wage costs for young workers lowering their total wage costs by several percentage points.

Following the methodology used (Saez, Schoefer, and Seim 2019), employees are grouped into firms that received different treatment intensities, and the effects of the reform are investigated by estimating a difference-in-difference model based on firms' relative intensity of the reform. Previous attempts to evaluate this reform have inferred that the youth payroll tax cut caused an increase in both the extensive margin of employment and wage earnings among ineligible workers (Saez et al., 2019; (Daunfeldt, Gidehag, and Rudholm 2021). A shortcoming of these studies is their inability to separate changes to bargained wages from changes in the intensive margin of employment, which is the main contribution of this paper.

The results indicate that insiders who worked in firms that received large labor cost savings increased their total wage earnings more than insiders who were employed in firms that received low labor cost savings. This is in accordance with previous results, showing an increase in wages among incumbent workers. However, only approximately one-fifth of the increase in total wage earnings is a consequence of higher bargained wages, indicating that the wage effect of payroll tax cuts on insider workers has been overestimated in earlier studies. The increase in wage earnings of the payroll tax

cut is, instead, mostly due to an increase in the number of hours worked. This effect constitutes almost 60 percent of the observed increase in total earnings, suggesting that most of the wage increase of insiders is driven by an increase in the intensive margin of employment.

Expressed as the share of the firm-level savings from the reform, between 22-28 percent of firms' total labor cost savings are absorbed by insiders through higher earnings. Insiders are employed workers who are likely to have much more bargain power than newly hired workers, but the results show that only approximately 4.7-5.5 percent of the total labor cost savings for firms are transferred to higher bargained wages for insiders. There is, thus, little to suggest that insiders can absorb any larger amounts of payroll tax cuts in the form of higher bargained wages, even in regard to the small proportion of workers with the most bargaining power. Nevertheless, the increase in hours worked could arguably crowd out employment effects on the extensive margin. However, externalities in the form of a higher intensive margin of employment should, by all accounts, be considered less harmful than higher bargained wages without a corresponding increase in employment.

Several earlier contributions have argued that payroll taxes are generally borne by workers and that a payroll tax cut will result in higher wages (Holmlund 1983; Gruber 1997; Kim, Kim, and Koh 2021; Deslauriers et al. 2022). Why, then, are insiders in the context of this study unable to realize more of the payroll tax cut into higher bargained wages? High levels of centralization implies that wages are determined by collective agreements and to a lesser extent firm-specific rent-sharing (Johansen 1999). The implication is that payroll taxes are, to a large extent, shifted to workers in countries with competitive and flexible labor markets, as opposed to countries with centralized union wage bargaining, such as Sweden (Kim, Kim, and Koh 2021). In line with this finding, (Saez, Schoefer, and Seim 2019) argue that pay equity constraints may play a role in the Swedish context, as unions may prevent reduced labor costs from being shifted to insider wages. An alternative explanation is that the unions are unable to bargain for higher wages, as the payroll tax cut of 2007 was targeted at young employees and that the labor cost savings of the reform varied heavily between firms. In centralized collective agreements, trade unions are, thereby, less able to bargain for higher wages, as the reform impact on firms cannot be generalized. A general payroll tax cut might imply a stronger impact on wages because it becomes easier to negotiate for higher wages in centralized collective agreements when all firms are affected in a similar manner.

The reasoning above suggests that insiders' wages and employment might respond differently to a payroll tax cut in countries with different institutional settings or in other industries. An interesting extension of this study would, therefore, be to explore the union membership premium and the ability to bargain for higher wages given a general payroll tax cut and in less centralized wage bargaining contexts.

As only 22 percent of the labor cost savings were allocated among insiders in an average firm exposed to high reform intensity, 78 percent of the savings were allocated elsewhere and not absorbed by insiders. These findings are in line with previous contributions that find relatively large effects on the extensive margin of employment (Saez, Schoefer, and Seim 2019; Daunfeldt, Gidehag, and Rudholm 2021). There is also a possibility that the labor cost savings induced by the reform are distributed to unintended targets other than insider workers. These include the possibility that the payroll tax cut is also partially absorbed by increases in firm profits (Saez, Schoefer, and Seim 2019). Another interesting avenue for further research is to calculate a full decomposition of how labor cost savings

are distributed, but with the inclusion of the intensive margin of employment, which, according to the results in this paper, is an important contributor to the increases in wage earnings.

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Figure A1: The effect on the contracted hourly wage for surviving insiders in the highest reform intensity group; the time period incrementally widened from 2004-2008 to 2004-2011.

Figure A2: The effect on the number of hours worked for surviving insiders in the highest reform intensity group; the time period incrementally widened from 2004-2008 to 2004-2011.

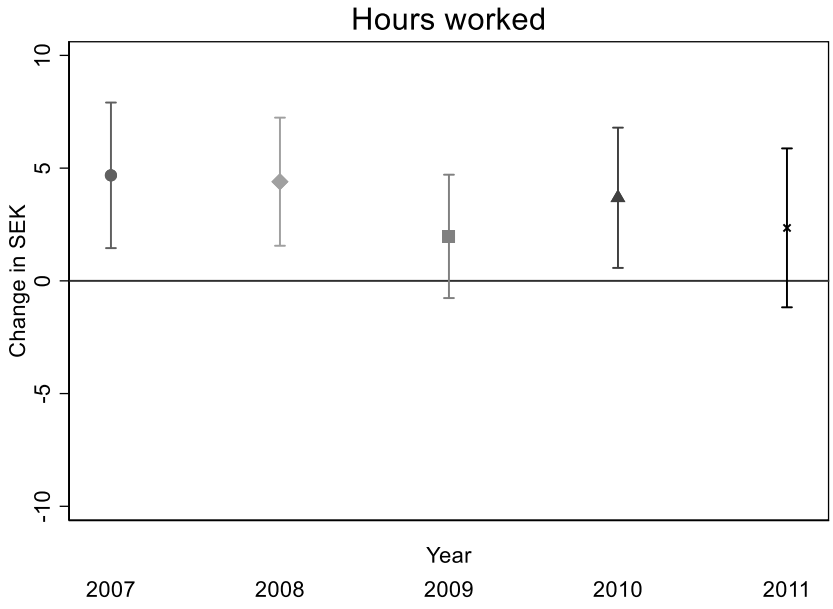


Figure A3: The effect on the total earnings of surviving insiders in the highest reform intensity group; the time period incrementally widened from 2004-2008 to 2004-2011.

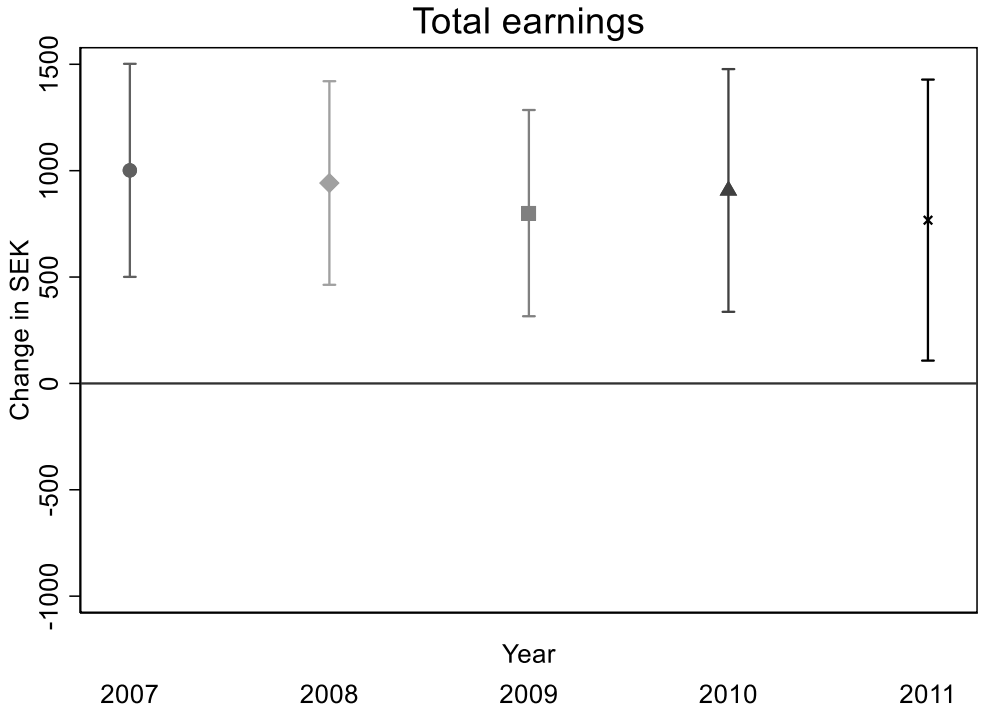


Figure A4: The effect on normal earnings for surviving insiders in the highest reform intensity group; the time period incrementally widened from 2004-2008 to 2004-2011.

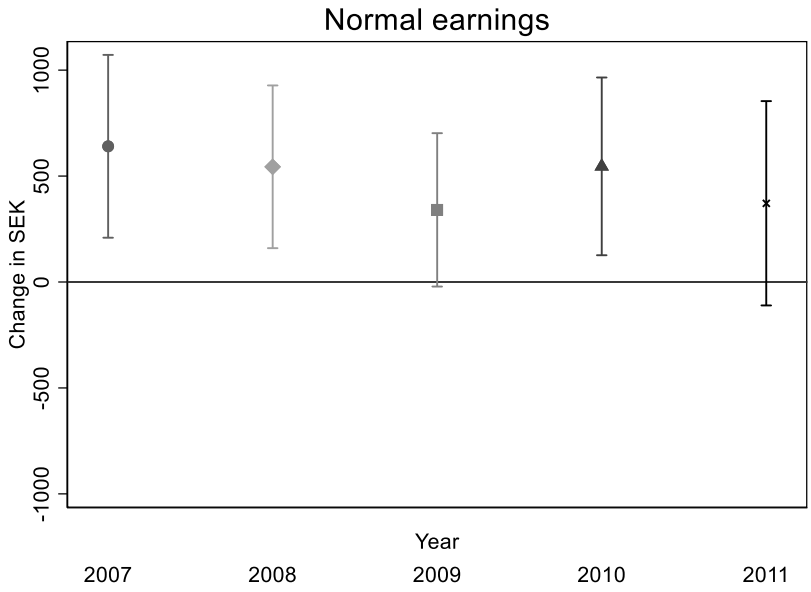
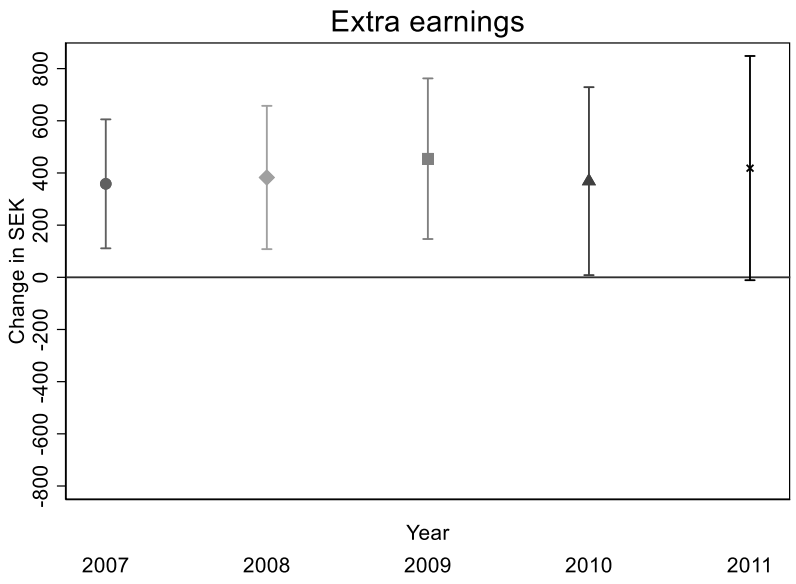


Figure A4: The effect on normal earnings for surviving insiders in the highest reform intensity group; the time period incrementally widened from 2004-2008 to 2004-2011.


Extra earnings
Change in SEK
-800
-600
-400
-200
0
200
400
600
800
Year
2007
2008
2009
2010
2011