What if they take it all?

Heterogeneous impact of sickness absence reform.[1]

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Abstract

This paper investigates the effect of sickness absence reform in the Czech Republic, which reduced benefits paid during the first three days of sickness absence to zero. Using data on about 900,000 workers in each quarter, I find a substantial decrease in the incidence of sickness absence, which is about 15 percent of the pre-reform mean. The richness of the data allows study of the heterogeneity of the effect in several dimensions, in particular by industry and occupation. I find that workers in occupations with high flexibility and fewer routine tasks are more likely to reduce their sickness absences.

Key words: sickness absence and incidence, policy reform, heterogeneous impact

JEL: J22, I13

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1. Introduction

In many European countries, sickness absence entails high costs for society and for the entire economy through the loss of working hours and production. According to OECD statistics, in many countries, sickness absence and disability spending constitute more than 2.2 % of GDP, and sickness absence expenses represent about 12 % of all public social spending.

High rates of sickness absence is an important issue particularly in post-Communist countries. For example, before 2008, the Czech Republic had one of the highest sickness rates in Europe (Bardby et al., 2002). After 2008, policy makers decided to change the sickness insurance system, and decreased benefits to zero for the first three days of absence. This policy change was substantial compared to those previously implemented in many other European countries and is similar to many sick leave plans in the US.

The existing literature evaluates many reforms, which commonly reduce wage compensation during sickness absence at a lower rate but for a longer period. For example, De Paola (2014) studied a reform in Italy in which there is a 10-20% decrease in wages during the first 10 days of sickness absence. The German change from full wages to sick pay of 80% of gross wages during the first 6 weeks of absence has been examined (Ziebarth and Karlsson, 2010) and a similar Swedish reform has also been analyzed (Johansson and

Palme, 2005). These authors find substantial declines in sickness absence, and their results are usually presented as evidence of the moral hazard of employees, mainly when controlling mechanisms are weak or non-existent.

I contribute to this literature by studying a reform which reduced compensation to zero during the first three days of sickness absence in the Czech Republic. Using rich linked employee-employer data, I analyze heterogeneity in response to the reform by occupational categories and gender. Sickness absence literature recognizes the importance of occupations. For example, Mastekaasa and Olsen (1998) find that occupational characteristics significantly explain variations in sickness absence behavior. However, no research has been carried out that would study the relationship between job flexibility in different occupations and incentives provided by the sickness absence system. Goldin (2014) proposes a simple theoretical framework demonstrating the relationship between within-occupation time flexibility and remuneration. She suggests that women in less flexible occupations where overtime work is highly rewarded tend to have lower wages than men conditional on working hours. Goldin's theory can be easily transformed into predictions about women's different relative motivations to be absent across occupations. Occupations, which, for example, require shift work and do not allow working from home increase motivation for workers to be officially sick more often. I thus hypothesize that sickness would be

unchanged after the reform in occupations with more flexibility and diminished in occupations where workers have incentives to be registered as sick more often.

Using a dataset containing about 900,000 individuals per I find that the number of sickness days per quarter per worker decreased by 2.3 days, which is about 15 percent of the pre-reform average. This is mainly driven by the change in the incidence of sickness – the share of sick workers per quarter decreased by about 3.5 percentage points, also about 20% of the pre-reform mean. This effect corresponds approximately to the previous findings in the literature, in which benefits change at a lower rate, but for longer periods of sickness. When I compare aggregate trends in Slovakia and the Czech Republic, I find a similar trend in both countries in sickness absence before the Czech reform was implemented.

I further find that the estimated effects are generally negatively correlated with the flexibility of occupations as classified by the O*NET dictionary of occupations. In jobs in which the work is highly structured (for example, craft workers), workers reduced their sickness absence more than workers in occupations with more flexibility and less structured tasks are. In line with the Goldin theory, I further show a statistically important interaction of occupational characteristics. In occupations with more structured work, such as machine operators and retail clerks, women reduced their sickness

absence due to the reform more than men. This change is much less pronounced in occupations with more flexible work arrangements. These results point to the importance of work arrangement for labor market outcomes, in this case, sickness absence behavior. My results, however, do not necessarily point to different levels of moral hazard across occupations.

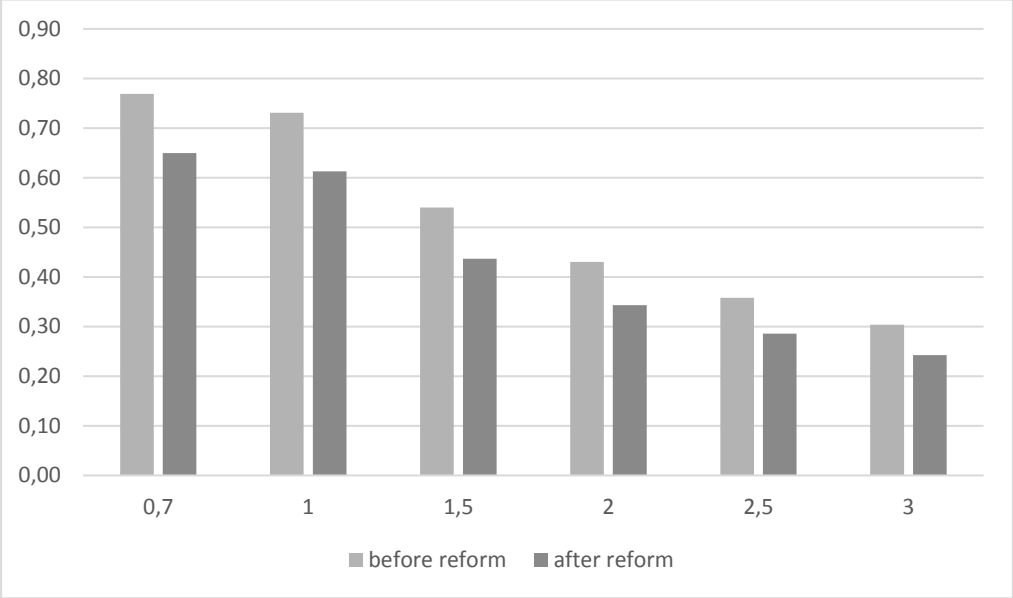
The following section of the paper describes the main institutional details. Section 3 provides a regression analysis of the aggregate impact of the reform. Section 4 gives estimates of the impacts of the reform for different sub-groups and Section 5 outlines my conclusions.

2. Institutional Background, Data and Descriptive Statistics

Czech sickness insurance is a comprehensive system administered by the government. All employees are insured by default and currently pay a standard contribution of 2.5% of their gross wages into the system. In case of sickness absence, a worker receives benefits calculated from the sickness scheme. Benefits are calculated according to an official formula that incorporates a high degree of redistribution. For example, the replacement ratio (sickness benefits to net wage) for low income workers was about 70 % of their net wage in 2007, while workers earning double the average wage received about 40% of their net wage during the first 30 days of their sickness. Figure 1 shows in detail how

net replacement rates differ by levels of net average wage for 30 day long sicknesses.

Fig 1: Replacement rates for different levels of net average monthly income for 30 days of a sickness spell



Note: The horizontal axis shows multiples of average monthly income

The Czech sickness absence policy was significantly changed on January 1, 2008, when a sharp decrease in benefits from 25% to 0% of the base during the first 3 days of a sickness was instituted. According to the Czech Ministry of Social Affairs, the decreased average benefits by 20%, corresponding to 7 percentage points of the average wage. These calculations were made for a 30-day long sickness spell (detailed calculations provided in Figure 1).

To analyze the effect of this reform on sickness absence behavior, I employ linked employer-employee data from the information system of average earnings for the 2006-2010 period. This is a representative sample of private

sector workers. The data contains information for each quarter of each year for approximately 900,000 workers employed in firms which are usually larger than 10 employees, and were extracted from firms' payroll information systems, with maternity leave excluded. In Table A.1 in the appendix, I illustrate that in all the observable characteristics, except for the outcome variable, the structure of the sample is similar over time. This suggests that re-sorting of workers across firms and employers immediately after the reform is highly unlikely.

I also analyze occupation-specific sickness absence elasticities and their relationship to the flexibility of jobs in occupational categories. For this, I match two-digit occupations coded by the Czech occupational system, with occupational characteristics as provided by the O*NET database. The O*NET database requires that I apply manual matching facilitated by the crosswalk between SOC (the occupational classification used by the US Bureau for Labor Statistics) and ISCO (the occupational classification used in Europe). The Czech occupational classification exactly matches ISCO at the 2-digit level. The occupational classification used in the O*NET database is, however, more detailed than SOC. Thus, in the first step, I aggregate the occupational characteristics as provided by O*NET to the 6-digit SOC system by using simple averages. Next, I match ISCO occupations with their SOC counterparts using

the crosswalk provided by the Bureau for Labor Statistics and aggregate the occupations to the 2-digit ISCO level.

Figure 2 shows the development of the main outcome variable before and after the reform. It depicts the total number of sickness absence days per quarter per worker two years before and two years after the reform in the Czech Republic. One can see a high degree of seasonality, with regular spikes in each fourth quarter of the year. The horizontal lines highlight the average number of absence days before and after the reform, per worker. This graph indicates that the potential response to the policy change is substantial. In fact, I observe an average 35% decrease in days absent and a 38% decrease in the share of absent workers. It is also clear that a simple before- and-after comparison ignores possible aggregate trends that may bias the changes. In the empirical strategy I take these factors into account by controlling for overall time trend and quarter-specific effects.

Figure 2: Number of Sickness Days per Worker in the Czech Republic

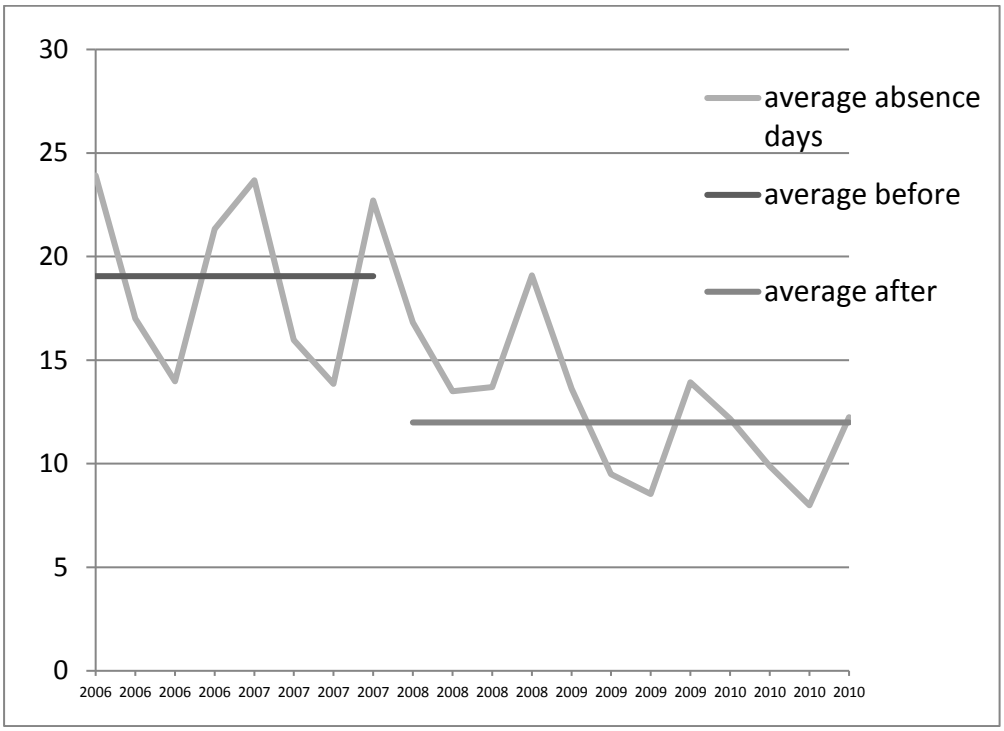
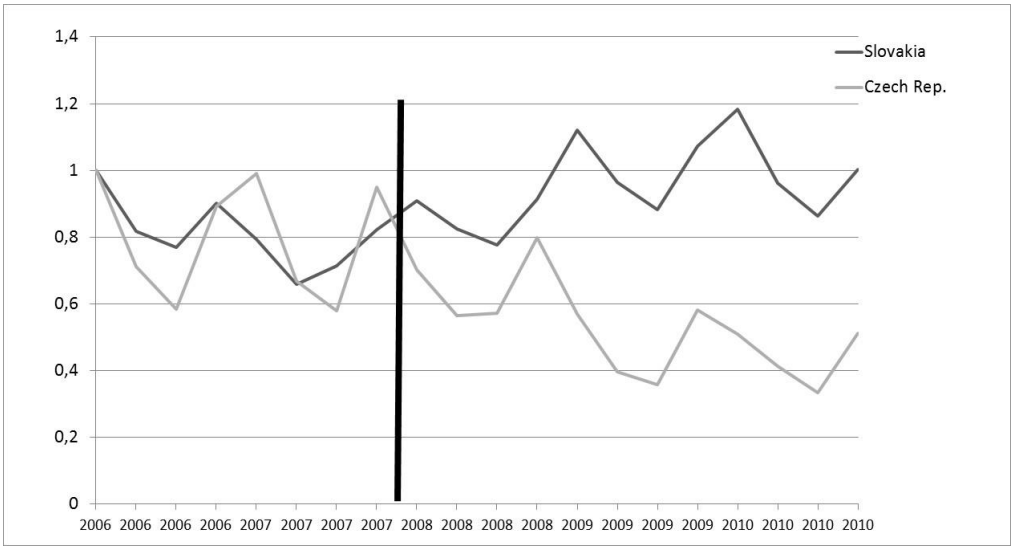


Figure 3: Comparison of Sickness Absence with Slovakia



Source: Slovak ministry of labour and Czech information system of average age. Each time series corresponds to the number of days of absence in a quarter.

In Figure 3, I add a time series of sickness absence days in Slovakia, where the first three days of sickness absence are paid across the whole period, and compare the aggregate time series with the development in the two countries. Both time series are normalized by the level of sickness absences in the first quarter of 2006. One can see that the countries have similar trends before the reform in the Czech Republic. After the reform, the time series diverge and the level of sickness absence in the Slovakia remains much higher, and even increased. Based on a difference-in-differences calculation, the drop in sickness absence in the Czech Republic was approximately 25 percent of the pre-reform mean across a window of one year. As shown in the next part, estimates based on before/after estimations provides the most likely lower bound of the effect of the reform. In this analysis, I employ only micro-data from the Czech Republic.[2]

Descriptive analysis further focuses on the heterogeneous response to the reform. I exploit the richness of the data and, in particular, analyze gender, education, and more importantly, occupation. Table 1 shows unconditional means before and after the reform.

The comparison of males and females shows that the rates of sickness differ substantially, although the response to the policy reform may be similar for both genders. Maternity leave is excluded from the data. However, the

[2] Data from Slovakia are not available.

regression analysis presented in the next section shows that, conditionally depending on other controlled variables, the impact of the reform on the sickness absence of women is greater.

In the next categorical variable, I distinguish between four levels of educational attainment: some college (more than 13 years of schooling), high school (approximately 13 years of schooling), lower secondary education (11 years), elementary school or less (9 years). It should be noted that a college-educated worker is, on average, 4 times less absent compared to a worker with lower high school education, which suggests a potentially substantial effect of schooling on sickness absence behavior. The classification of specific individuals into education categories does not allow me to interpret this finding as causal and thus this data is added to the regression analysis only as control variables.

` Further, I use occupational categories as a job characteristic. The unconditional means presented in Table 1 show that workers in generally less-skilled occupations decreased their sickness absence much more, compared to highly skilled workers, except for *teaching professionals*. The variation across occupations is substantially larger than across industries. *Craft workers* and workers in *other manual professions* are, on average, three times more often sick compared to white collar workers. However, the unconditional change in sickness absence exhibits a smaller variation than the cross-sectional variation

in levels. Blue collar workers decreased their sickness absence by far more than white collar workers, though teaching professionals were an exception (the unconditional mean decreased by 48%).

Table 1: Sickness absence before and after the reform (two year average per quarter)

		Absent days				Incidence of sickness		
		Before	After	Change (%)		Before	After	Change (%)
Male		15.06	9.51	-36.85		0.13	0.08	-38.76
Female		20.74	13.09	-36.90		0.18	0.11	-37.71
College		5.77	4.49	-22.11		0.07	0.05	-26.39
High school		12.24	8.47	-30.80		0.12	0.08	-35.54
Lower secondary ed.		22.05	14.01	-36.46		0.18	0.11	-39.20
Elementary		29.96	18.67	-37.68		0.22	0.14	-37.10
Occupations								
Corporate managers		6.01	4.36	-27.50		0.06	0.04	-33.33
General managers		7.31	5.51	-24.59		0.07	0.05	-34.78
Physical, mathematical and engineering science professionals		6.00	4.37	-27.14		0.08	0.05	-29.33
Life science and health professionals		5.93	4.85	-18.24		0.07	0.05	-28.17
Teaching professionals		3.25	2.54	-21.85		0.04	0.03	-27.50
Other professionals		8.77	6.51	-25.72		0.11	0.08	-29.63
Natural and engineering science associate professionals		8.75	5.94	-32.18		0.09	0.06	-36.67

Life science and health associate professionals		12.13	9.23	-23.88		0.11	0.07	-32.71
Teaching associate professionals		12.53	6.40	-48.90		0.14	0.06	-52.59
Other associate professionals		10.06	7.27	-27.75		0.11	0.08	-31.25
Office clerks		16.64	11.43	-31.32		0.16	0.10	-36.13
Customer services clerks		18.66	13.07	-29.93		0.17	0.12	-33.33
Personal and protective services workers		19.10	12.47	-34.71		0.16	0.10	-39.63
Models, salespersons and demonstrators		21.24	15.01	-29.32		0.18	0.12	-32.04
Service workers in the armed forces and civil service		29.35	20.58	-29.89		0.20	0.13	-35.18
Extraction and building trades workers		25.79	17.85	-30.76		0.20	0.13	-33.67
Metal, machinery and related trades workers		21.30	13.15	-38.27		0.17	0.10	-40.80
Precision, handicraft, printing and related trades workers		26.98	14.36	-46.80		0.22	0.12	-47.25
Other craft and related trades workers		29.72	19.89	-33.05		0.22	0.14	-33.64
Stationary-plant and related operators		21.37	12.71	-40.53		0.17	0.10	-41.82

Machine operators and assemblers	28.38	17.00	-40.09		0.22	0.14	-39.19
Drivers and mobile-plant operators	19.29	12.38	-35.83		0.15	0.09	-37.67
Sales and services elementary occupations	22.08	14.81	-32.92		0.17	0.11	-35.12
Agricultural, fishery and related laborers	35.42	22.95	-35.20		0.23	0.15	-37.50
Laborers in mining, construction, manufacturing and transport	27.71	17.11	-38.26		0.22	0.13	-39.81
Industry							
Agriculture	19.48	13.61	-30.13		0.14	0.09	-35.51
Mining	18.10	13.43	-25.84		0.16	0.10	-33.97
Manufacturing	20.10	12.05	-40.07		0.17	0.10	-40.61
Electricity, gas, water	10.20	6.79	-33.47		0.10	0.06	-39.00
Construction	18.34	12.47	-32.00		0.14	0.09	-35.97
Maintenance, retail sales	17.29	12.22	-29.32		0.15	0.10	-33.12
Hotels and restaurants	17.96	11.14	-37.99		0.16	0.10	-36.94
Transport	15.95	10.19	-36.14		0.14	0.09	-39.29
Financial sector	10.49	7.85	-25.17		0.12	0.09	-29.84
Real estate	14.62	9.64	-34.08		0.14	0.09	-33.57
Public administration	12.54	9.43	-24.81		0.13	0.08	-33.60
Education	6.65	4.62	-30.60		0.07	0.05	-35.21
Health services	14.82	10.55	-28.78		0.12	0.08	-34.96
Other services	12.83	9.15	-28.65		0.12	0.08	-32.17
Total	17.38	10.99	-36.77		0.15	0.09	-38.51

I continue with regression analysis, which employs an identification strategy based on the policy change described in the previous section. In particular, I focus on the hypothesis that different occupations are organized in different

ways, which might lead to the different incentives to be out sick, and which is identified by the heterogeneous effect of the policy change across jobs.

3. Identification and the Regression Analysis

As the reform affected all workers in the Czech economy, I cannot employ the concept of a treatment and a control group. In the estimation, I therefore follow the strategy suggested in Johansson and Palme (2005) and Paola et al. (2014). This strategy is based on a before-and-after comparison, in which a change in two periods around a reform is compared to a change one year earlier. This empirical strategy reflects the policy design, in which all workers are affecte, by the reform. Therefore, proper treatment and control groups are difficult to construct.[3]

In the estimation strategy, I estimate a linear model that has the following form:

1) $Sickness_{it} = \alpha + \beta After_{it} + Z_{it}\gamma + \delta Quarter_t + trend_t + \varepsilon_{it}$

The key left-hand-side variable is the number of sickness days per quarter. Alternatively, I employ sickness incidence (the probability of becoming sick) as a left-hand-side variable. Vector *Z* contains observable characteristics related to the job type, individual demographics and firm characteristics. In some

[3] In the previous section I provide a simple comparison of aggregate trends of sickness absence in the Czech Republic and Slovakia, showing a potentially high impact of the Czech reform on absence behavior.

specifications, I include monthly wages, which may be an endogenous variable. In other specifications, I run separate regressions for different levels of wages. *After* is a dummy variable that is equal to one for the period after the reform and zero for the period before the reform. *Quarter* stands for a set of indicator variables for each quarter of a year and captures the seasonal effect, while *Trend* is a variable that increases by one unit each quarter during the whole period of interest.

The results from the baseline specification are provided in Table 2. The preferred specification is (4), and it shows that the estimated effect is 2.2 days per worker and quarter. The effect of the reform is substantially less after the time trend is added into the estimation. This is a rather conservative approach, because I employ a relatively short time series with quarterly frequency (two years before and three years after the reform). On the other hand, controlling for age, gender and education does not change the estimated coefficient. Nonetheless, the estimated effect is rather large and corresponds to 15 percent of the pre-treatment average. In the previous section, I present a back-of-the-envelope calculation which shows that, in comparison to Slovakia, sickness absence fell by 25 percent of the pre-reform mean. I thus believe that the estimate is a lower bound of the effect of the reform.

Table 2: Number of absence days and the effect of the reform

	(1) absence_q	(2) absence_q	(3) absence_q	(4) absence_q
After	-6.389***	-2.356***	-2.241***	-2.241***
	(0.027)	(0.060)	(0.059)	(0.072)
q_2	-4.291***	-3.735***	-3.779***	-3.779***
	(0.038)	(0.039)	(0.038)	(0.033)
q_3	-5.475***	-4.421***	-4.506***	-4.506***
	(0.038)	(0.040)	(0.040)	(0.039)
q_4	0.437***	1.933***	1.809***	1.809***
	(0.038)	(0.043)	(0.043)	(0.046)
trend		-0.991***	-0.932***	-0.932***
		(0.014)	(0.014)	(0.018)
trend2		0.028***	0.027***	0.027***
		(0.001)	(0.001)	(0.001)
Age			0.006***	0.006***
			(0.001)	(0.001)
College			-16.806***	-16.806***
			(0.055)	(0.072)
Highschool			-12.479***	-12.479***
			(0.048)	(0.072)
Lower sec.			-4.250***	-4.250***
			(0.047)	(0.074)
Male			-4.603***	-4.603***
			(0.027)	(0.034)
_cons	19.707***	22.702***	33.167***	33.167***
	(0.030)	(0.052)	(0.084)	(0.113)
N	15368024	15368024	15368024	15368024
R^2	0.006	0.007	0.019	0.019

OLS, Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Further, Table 3 presents the results for sickness incidence with similar specifications as in Table 2. The findings are qualitatively the same, meaning that the observable individual characteristics do not change the estimated results, but the estimated effect of the reform does change substantially after controlling for the time trend. It should be stressed that the data are treated as pooled repeated cross-sections. The estimated standard errors are clustered on an individual basis.[4]

Table 3: Sickness incidence and the effect of the reform

	(1) incidence	(1) incidence	(2) incidence	(3) incidence
After	-0.025***	-0.015***	-0.015***	-0.015***
	(0.000)	(0.000)	(0.000)	(0.000)
q_2	-0.029***	-0.028***	-0.028***	-0.028***
	(0.000)	(0.000)	(0.000)	(0.000)
q_3	-0.031***	-0.033***	-0.034***	-0.034***
	(0.000)	(0.000)	(0.000)	(0.000)
q_4	0.006***	0.008***	0.007***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)
trend		-0.012***	-0.011***	-0.011***
		(0.000)	(0.000)	(0.000)
trend2		0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)

[4] The data does not allow tracking of individuals across firms. Only within firm identifiers are provided.

Age		-0.001***	-0.001***
		(0.000)	(0.000)
College		-0.107***	-0.099***
		(0.000)	(0.000)
High school		-0.078***	-0.076***
		(0.000)	(0.000)
Lower sec.		-0.028***	-0.028***
		(0.000)	(0.000)
Male		-0.037***	-0.035***
		(0.000)	(0.000)
Mwage			-0.000***
			(0.000)
_cons	0.205***	0.338***	0.340***
	(0.000)	(0.001)	(0.001)
N	15368024	15368024	15356200
R^2	0.012	0.028	0.029

Note: Results are from linear probability model, OLS

4. Heterogeneity in the impact of the reform

The main focus of this paper is to study heterogeneous responses to the reform, which have not been extensively studied in the literature. In particular, I am interested in quantifying the varying effects of the reform with respect to occupation, industry and level of earnings.

For heterogeneous treatment effect I estimated the following model:

2) $$Sickness_{it} = \alpha + \beta After_t + Z_{it}\gamma + (After_t * Z_{it})\theta + \delta Quarter_t + trend_t + \varepsilon_{it}$$

where the main difference with specification 1) is the interaction term *After*Z*, which estimates the effect of the reform on the particular group of interest. I start with industry, and test whether industries are affected significantly differently. I continue with occupations, and ask whether workers in occupations with relatively more fixed work schedules – for example shift work - are more likely to reduce their sickness absence after the reform. In relation to occupation, I correlate the estimated effects of the reform with the variable of O*NET occupation classification. I further test if a change in gender gap in sickness absence is associated with flexibility of occupations. Last, I hypothesize that low-wage workers are much more elastic with respect to changes driven by the reform.

Industries

In this section, I show that there is a potential heterogeneity of the effect across industries. Figure 4 presents the estimated effect of the reform in different industries conditional on education, age and gender[5]. The effects are recalculated from the regressions presented in Table A.3 in the appendix using an? intercept and the estimated slope parameter. Although previous literature recognized the importance of job characteristics in sickness absence (Frick and Malo, 2008), the role of industries has not been specifically studied.

[5] I also add wage into the regression, in order to control for potential unobserved characteristics. However, wages as a control variable also add into the estimation additional endogeneity arising from simultaneous changesin wages due to the implementation of the reform. I thus present the results without controling for individual wages.

In this case, I find substantial heterogeneity in the response to the reform. Interestingly, the largest effect is in *manufacturing* and *hotels and restaurants*. A substantially smaller effect is estimated for services, such as *real estate*.

I offer the following explanation. The production process in *manufacturing* and *hotels and restaurants* requires workers to be physically present in the workplace. For these employers, it is very costly to allow for greater flexibility in working hours or, for example, to allow working from home. They may strictly require a doctors' confirmation of sickness for any absence. In such an environment, workers are generally more sensitive to changes in sickness benefits and the wage replacement rate. On the other hand, industries (*finance*, *other services*) which potentially allow for more flexible work arrangements exhibit much smaller changes in sickness absence.

Figure 4: Estimated Effect of the Reform across Industries

Occupations

Further, I test for heterogeneity in the response to the reform across occupations, conditional on wages, gender, education and age. Goldin (2014) provides a simple theory regarding occupation-specific characteristics which is also reflected in remuneration. She classifies occupations based on their flexibility and the ability to reschedule work. Based on this classification of occupations, I hypothesize that workers in occupations with flexible schedules and shifts are less motivated to use an official sickness absence system to their advantage. Therefore, I expect that in occupations where flexibility is greater and the work requires fewer routine tasks, the effect of the reform on sickness absence would be much smaller, because before the reform the incentive to use sickness absence reform was much less. I should, however, note that I do not claim that the behavior of workers employed in less flexible occupation is subject to greater moral hazard.

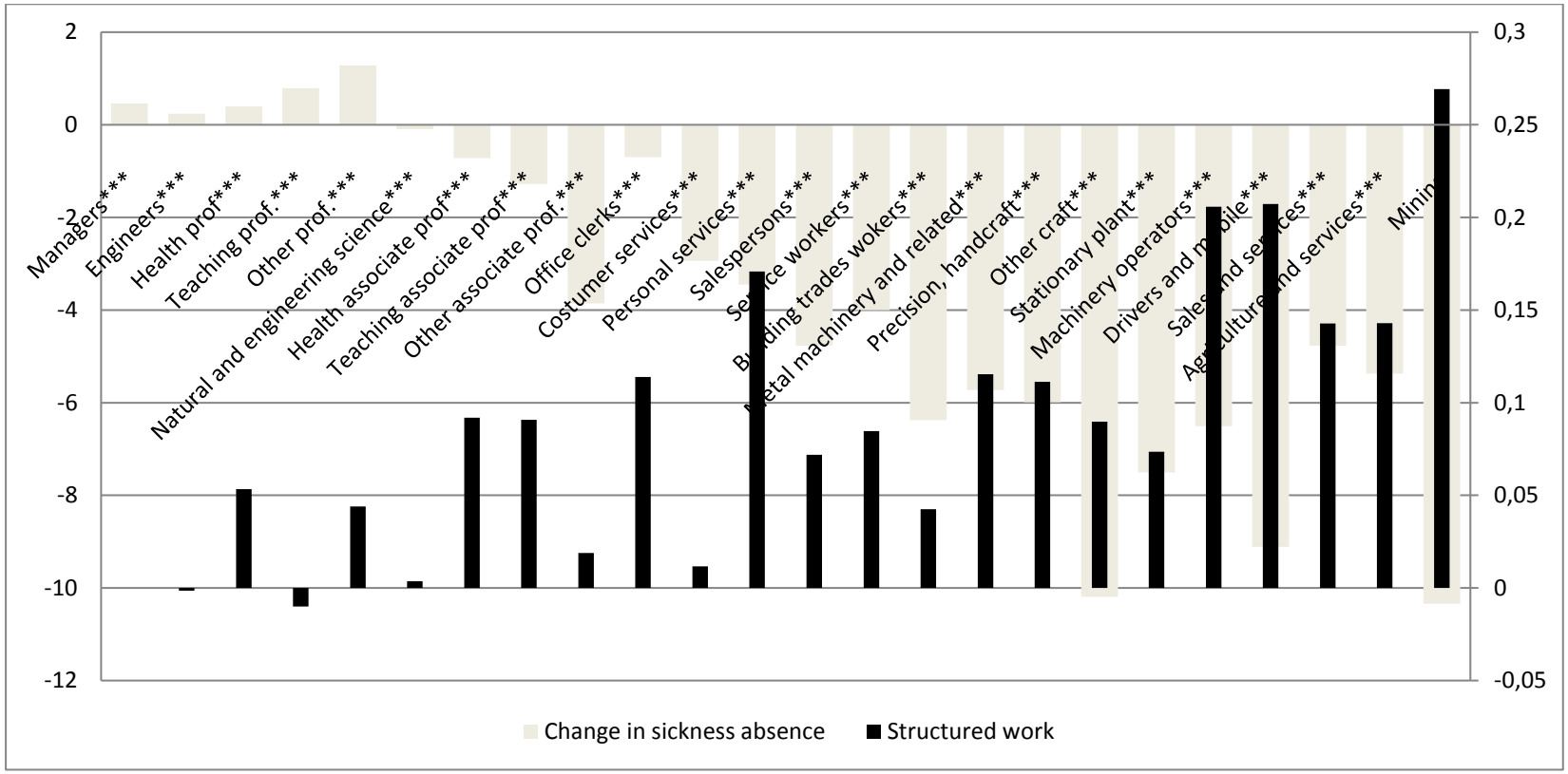
Empirically I adopt the following approach. First, I take the O*NET database to quantify a characteristic related to the flexibility of a given occupation. In particular, I take an index for structured work in a given occupation. For example, this index is highest for professionals, whose work is

the least structured (meaning that professionals have a small proportion of routine tasks), the smallest index corresponds to machinery operators, whose jobs involve a substantial number of routine tasks. I assume that this index is strongly associated with the flexibility of working hours, or possibility to the advantage of working from home.

The results presented in Figure 3 are in accordance with the descriptive analysis and with the classification used in Goldin (2014). Workers in low-skilled occupations tend to react more to changes in the wage replacement rate. For example, I find drivers and craft workers to be the most elastic occupations, where flexibility of working hours is probably among the lowest. If one focuses only on low-skilled occupations, it is clear that services (sales and service workers) are much less affected than craft workers or drivers. This is in accordance with the proposed theory that flexibility of working hours may be an important factor for labor market outcomes (Goldin 2014). I further correlate the estimated occupation-specific impact of the reform with the index of structured work in a given occupation.

Figure 5 shows the correlation between the O*NET index of structured work in occupations and the estimated effect of the reform for occupations. The horizontal axis contains the values of the index relative to the occupation designated as managers. For example, the value 0.2 corresponds to 20% more routine tasks than in managerial occupations (which is normalized to zero).

Figure 5: Effect of the reform across occupations in days and index of structured work

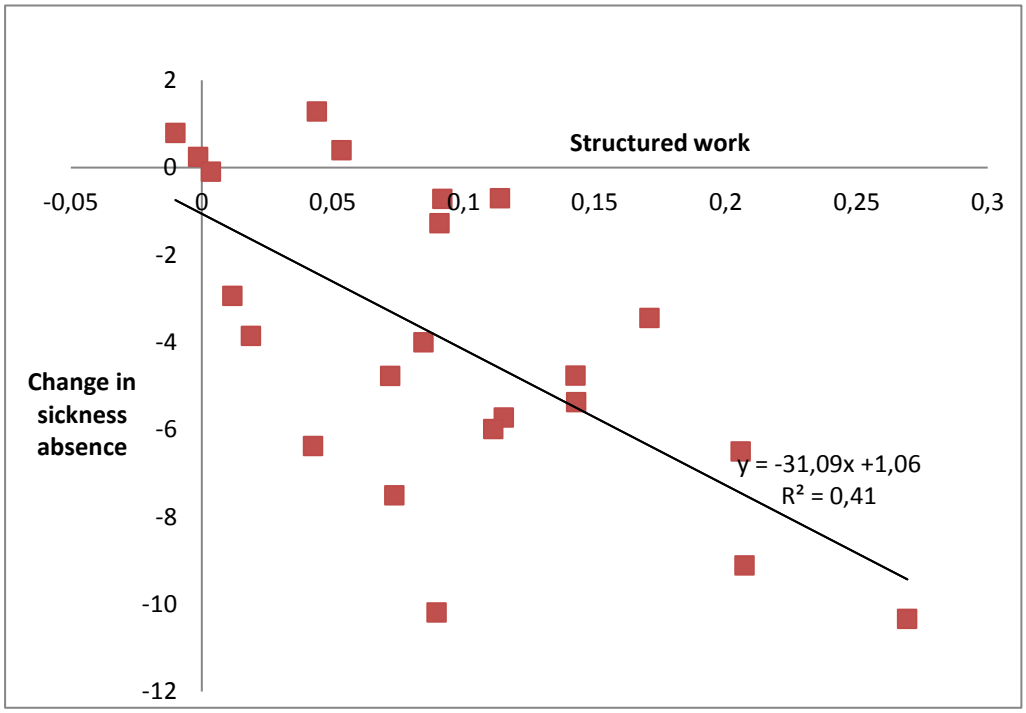


Note: The dark bars are the estimated impacts of the reform (left axis) for occupations. The light bars (right axis) are the relative index of structured work in managerial occupations.

A strong positive and significant correlation exist between the routineness of an occupation and the effect of the reform. I interpret this as suggestive evidence that workers in occupations with fewer routine tasks are also less motivated to use the sickness absence system. The effect of this reform, which decreases the wage replacement ratio, is thus much stronger in jobs where the workers' schedule is fixed and sick leave always requires an official doctor's approval.

This provides additional evidence that the occupation-specific characteristics of jobs could play a role in labour market outcomes and behavior. On the other hand, there are certain limitations in the evidence presented. First, it could be that the estimated impact of the reform is also correlated with other characteristics of occupations that are related to flexibility. It could correspond, for example, to the skill-intensity of the occupation. Occupations can also be divided into two groups – high- and low-skilled – and negative correlations are found in both groups.

Figure 6: Occupation-specific effects of the reform and index of structured work



Note: The horizontal axis consists of the relative values of the index of structured work. The higher the number, the more routine tasks the workers need to perform in their particular occupations. The vertical axis contains the estimated effect of the reform (mostly negative).

Low and high earners

I proceed with analyses of how workers at different wage levels reacted to the reform. The results of this analyses should be interpreted cautiously, as wages might be changed as a consequence of sickness absence behavior. I still consider this analysis potentially useful, because it descriptively shows where on the wage distribution workers reacted most strongly to the reform. For this purpose, I divide wage distribution into four parts and present the results

separately. The division of wage distribution corresponds to the fact that minimum wage is approximately 60 percent of median wage.

In line with the predictions of outside option theory, low-wage workers appear to be much more sensitive to the reform, as they receive lower remuneration for shorter spells of sickness absence (Table 5). In fact, the estimated effect of the reform is insignificant for top earners, whereas all the effect is negative and significant for below-average earners. It could be the case that some? low wage workers have weaker health status. In this case, they would go to work sick more often after the reform. While I cannot exclude such a possibility, anecdotal evidence suggests that many workers truly abused the system prior to the reform by shopping for doctors willing to let them stay home. In addition, it should be noted that high-wage workers might have some unobserved characteristics that cause them to be sick less often, compared to low-wage workers. This difference may be, for example, different types of job as illustrated in previous sections.

Table 5: Effect of the reform with respect to individual wages

	(1) absence_q	(2) absence_q	(3) absence_q	(4) absence_q
After	**-4.460*** **	**-3.034*** **	**-1.114*** **	**-0.088**
	(0.149)	**(0.086)**	**(0.094)**	**(0.113)**
Age	-0.003	0.006***	0.036***	0.031***
	(0.003)	(0.002)	(0.002)	(0.003)
College	-16.327***	-14.391***	-8.714***	-2.228***
	(0.242)	(0.097)	(0.122)	(0.169)

High school	-11.352***	-10.548***	-6.835***	-0.832***
	(0.102)	(0.074)	(0.119)	(0.173)
Lower sec.	-4.141***	-4.122***	-1.631***	6.068***
	(0.086)	(0.072)	(0.123)	(0.214)
Male	-2.454***	-2.573***	-2.985***	-3.542***
	(0.070)	(0.042)	(0.051)	(0.062)
Trend+Year	x	x	x	x
Quarters	x	x	x	x
_cons	38.563***	30.222***	17.787***	8.271***
	(0.183)	(0.128)	(0.171)	(0.224)
N	3926128	7300976	3045444	1095136
R^2	0.014	0.012	0.008	0.007

1) Wage less than 40th percentile
2) Wage less than average
3) Wage less than 70th percentile
4) Wage more than 70th percentile

Standard errors in parentheses. Other control variables are dummies for the year, quarter and trend.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

How is sickness absence affected when sickness benefits are cut to zero during first three days absence? In this paper, I show that sickness absence changed mainly through the incidence of sickness per quarter. I also provide positive evidence for potentially moral hazard behavior in sickness absence among Czech employees, which is in line with anecdotal evidence from newspapers and the general press. However, I cannot exclude the possibility that this reform also increased sickness presenteeism. I also show that the sickness

absence in the Czech Republic decreased compared to Slovakia, where no similar reform was implemented.

Based on Goldin's theory of occupation and remuneration, I test whether workplace as classified by O*NET is related to effect of the reform. I mainly find that workers in more flexible occupations are less likely to reduce their sickness absence compared to workers with less flexibility at work. I interpret this result as evidence supporting the hypothesis that characteristics of occupations can also induce different sickness absence behavior and, in general, more (less) flexible working conditions may stimulate less (more) sickness absence from the workplace.

My research has certain limitations that stem from limitations in the data and from the policy setting, which does not explicitly allow for establishing a proper control group. In order to account for macroeconomic trends, I explicitly added 'trend' as a control variable to my regression specification. The data are cross-sectional in nature, which does not explicitly control for the individual fixed effect. At the same time, I show that my data are balanced over time, representative, and do not exhibit any aggregate changes after the reform except for the outcome variable. The data are also administratively collected, which implies that I cannot account for any potential increase of sickness presenteeism. This should be a topic for further

research. It may also be useful to focus on the role of establishment level characteristics and firm heterogeneity in terms of sickness absence.

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Appendix

Table A.1 Structure of data before and after the reform

	Before (2007/8)		After 2009/10	
	mean	(sd)	mean	(sd)
Outcomes				
Days	17.37	(57.16)	10.99	(48.02)
Absence days-share	0.27	(0.87)	0.17	(0.74)
Male	0.59	(0.49)	0.59	(0.49)
Age	41.86	(11.23)	41.88	(11.55)
Education level				
College	0.13	(0.34)	0.15	(0.36)
High school	0.33	(0.47)	0.35	(0.48)
< high school	0.43	(0.50)	0.41	(0.49)
Elementary	0.09	(0.29)	0.08	(0.28)
Type of economic activity				
Agriculture	0.02	(0.14)	0.02	(0.13)

Mining	0.03	(0.17)	0.03	(0.16)
Manufacturing	0.47	(0.50)	0.41	(0.49)
Electricity, gas, water	0.03	(0.17)	0.03	(0.16)
Construction	0.04	(0.19)	0.04	(0.20)
Maintenance, retail sale	0.09	(0.29)	0.11	(0.31)
Hotels and restaurants	0.01	(0.10)	0.01	(0.10)
Transport	0.14	(0.35)	0.14	(0.35)
Financial sector	0.05	(0.21)	0.05	(0.22)
Real estate	0.04	(0.20)	0.07	(0.25)
Public administration	0.01	(0.08)	0.01	(0.08)
Education	0.03	(0.18)	0.03	(0.18)
Health services	0.03	(0.16)	0.04	(0.21)
Other services	0.02	(0.12)	0.02	(0.13)
Size of firms				
w/t employees	0.00	(0.00)	0.00	(0.01)
1-5	0.00	(0.00)	0.00	(0.00)
6-9	0.00	(0.00)	0.00	(0.00)
10-19	0.00	(0.06)	0.00	(0.07)
20-24	0.00	(0.04)	0.00	(0.04)
25-49	0.00	(0.07)	0.01	(0.09)
50-99	0.03	(0.17)	0.03	(0.17)
100-199	0.04	(0.19)	0.04	(0.20)
200-249	0.01	(0.12)	0.03	(0.16)
250-499	0.24	(0.43)	0.23	(0.42)
500-999	0.15	(0.36)	0.16	(0.36)
1000-1499	0.13	(0.34)	0.12	(0.32)
1500-1999	0.05	(0.23)	0.06	(0.23)
2000-2499	0.05	(0.22)	0.05	(0.21)
2500-2999	0.02	(0.15)	0.02	(0.15)
3000-3999	0.04	(0.19)	0.04	(0.19)
4000-4999	0.02	(0.14)	0.02	(0.14)
5000-9999	0.06	(0.24)	0.09	(0.28)
>9999	0.13	(0.34)	0.11	(0.32)
Occupations				

Corporate managers	0.05	(0.23)	0.05	(0.23)
General managers	0.01	(0.11)	0.01	(0.11)
Physical, mathematical and engineering science professionals	0.03	(0.18)	0.04	(0.20)
Life science and health professionals	0.01	(0.08)	0.01	(0.10)
Teaching professionals	0.02	(0.13)	0.02	(0.13)
Other professionals	0.04	(0.21)	0.05	(0.22)
Natural and engineering science associate professionals	0.09	(0.29)	0.10	(0.29)
Life science and health associate professionals	0.02	(0.13)	0.03	(0.16)
Teaching associate professionals	0.00	(0.03)	0.00	(0.02)
Other associate professionals	0.08	(0.27)	0.08	(0.28)
Office clerks	0.05	(0.23)	0.06	(0.23)
Customer services clerks	0.03	(0.17)	0.03	(0.18)
Personal and protective services workers	0.03	(0.17)	0.03	(0.18)
Models, salespersons and demonstrators	0.03	(0.17)	0.04	(0.19)
Service workers in the armed forces and civil service	0.01	(0.07)	0.00	(0.07)
Extraction and building trades workers	0.03	(0.16)	0.03	(0.17)
Metal, machinery and related trade workers	0.15	(0.36)	0.13	(0.34)
Precision, handicraft, printing and related trade workers	0.01	(0.10)	0.01	(0.08)
Other craft and related trade workers	0.02	(0.14)	0.02	(0.13)
Stationary-plant and related operators	0.06	(0.24)	0.05	(0.22)
Machine operators and assemblers	0.10	(0.30)	0.08	(0.28)
Drivers and mobile-plant operators	0.07	(0.25)	0.07	(0.26)
Sales and services elementary occupations	0.02	(0.14)	0.02	(0.14)

Agricultural, fishery and related labourers	0.00	(0.02)	0.00	(0.02)
Labourers in mining, construction, manufacturing and transport	0.04	(0.18)	0.03	(0.17)
N	7391876		7976148	

Table A.1: Descriptive statistics

Table A.2: Effect of the reform with respect to individual wages

	(1) absence_q	(2) absence_q	(3) absence_q	(4) absence_q
After	**-4.460*** **	**-3.034*** **	**-1.114*** **	**-0.088**
	(0.149)	**(0.086)**	**(0.094)**	**(0.113)**
Trend	-0.990***	-0.777***	-0.290***	-0.141***
	(0.033)	(0.020)	(0.023)	(0.028)
Trend2	0.024***	0.024***	0.007***	0.004***
	(0.002)	(0.001)	(0.001)	(0.001)
q_2	-5.964***	-3.980***	-2.125***	-0.789***
	(0.094)	(0.056)	(0.062)	(0.073)
q_3	-7.437***	-4.655***	-2.646***	-1.123***
	(0.099)	(0.058)	(0.065)	(0.076)
q_4	2.657***	1.430***	0.646***	0.451***
	(0.105)	(0.062)	(0.069)	(0.082)
Age	-0.003	0.006***	0.036***	0.031***
	(0.003)	(0.002)	(0.002)	(0.003)
College	-16.327***	-14.391***	-8.714***	-2.228***
	(0.242)	(0.097)	(0.122)	(0.169)

High school	-11.352***	-10.548***	-6.835***	-0.832***
	(0.102)	(0.074)	(0.119)	(0.173)
<HS	-4.141***	-4.122***	-1.631***	6.068***
	(0.086)	(0.072)	(0.123)	(0.214)
Male	-2.454***	-2.573***	-2.985***	-3.542***
	(0.070)	(0.042)	(0.051)	(0.062)
_cons	38.563***	30.222***	17.787***	8.271***
	(0.183)	(0.128)	(0.171)	(0.224)
N	3926128	7300976	3045444	1095136
R^2	0.014	0.012	0.008	0.007

5) Wage less than 40th percentile
6) Wage less than average
7) Wage less than 70th percentile
8) Wage more than 70th percentile

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.3: Heterogeneous effect of the reform: industry

	(1) absence_q	(2) absence_q
1.After	-2.176***	-1.755***
	(0.059)	(0.205)
trend	-0.921***	-0.912***
	(0.014)	(0.014)
Trend2	0.027***	0.026***
	(0.001)	(0.001)
q_2	-3.783***	-3.785***
	(0.038)	(0.038)
q_3	-4.514***	-4.518***
	(0.040)	(0.040)

q_4	1.798***	1.794***
	(0.043)	(0.043)
Age	0.011***	0.011***
	(0.001)	(0.001)
College	-15.824***	-15.825***
	(0.058)	(0.058)
High school	-12.047***	-12.031***
	(0.049)	(0.049)
<HS	-4.251***	-4.249***
	(0.047)	(0.047)
male	-5.141***	-5.131***
	(0.029)	(0.029)
Mining	-0.999***	-1.533***
	(0.127)	(0.176)
Manufact.	-0.944***	0.113
	(0.101)	(0.139)
Electricity	-5.751***	-7.027***
	(0.127)	(0.177)
Construc.	0.174	0.312*
	(0.119)	(0.167)
Retail s.	-3.737***	-4.069***
	(0.108)	(0.151)
Hotels, rest.	-4.853***	-4.239***
	(0.167)	(0.240)
Transport	-3.102***	-3.106***
	(0.105)	(0.145)
Finance	-3.467***	-5.041***
	(0.118)	(0.163)
Real estate	-2.531***	-3.291***
	(0.114)	(0.165)

Public ad.	-3.083***	-4.356***
	(0.195)	(0.278)
Education	-5.468***	-7.348***
	(0.125)	(0.174)
Health ser.	-3.272***	-4.241***
	(0.123)	(0.183)
Other serv.	-4.351***	-5.295***
	(0.145)	(0.205)
Interactions after*		
Mining		**1.059***
		(0.253)
Manufact.		**-2.179***
		(0.202)
Electricity		**2.522***
		(0.254)
Construc.		**-0.310**
		(0.238)
Retail s.		**0.535****
		(0.215)
Hotels, rest.		**-1.189***
		(0.334)
Transport		**-0.036**
		(0.210)
Finance		**2.918***
		(0.232)
Real estate		**1.127***
		(0.230)
Public ad.		**2.388***
		(0.388)

Education		**3.556*** **
		(0.245)
Health ser.		**1.359*** **
		(0.248)
Other serv.		**1.767*** **
		(0.289)
_cons	35.050***	34.807***
	(0.132)	(0.161)
N	15368000	15368000
R^2	0.020	0.020

Table A.4: Heterogeneous effect of the reform: occupations

	(1) absnemoc_q	(2) absnemoc_q
1.After	-2.162***	-6.626***
	(0.059)	(0.156)
Trend	-0.911***	-0.893***
	(0.014)	(0.014)
Trend2	0.026***	0.025***
	(0.001)	(0.001)
q_2	-3.783***	-3.788***
	(0.038)	(0.038)
q_3	-4.512***	-4.521***
	(0.040)	(0.040)
q_4	1.804***	1.793***
	(0.043)	(0.043)
Age	0.028***	0.029***
	(0.001)	(0.001)
College	-8.999***	-9.014***

	(0.067)	(0.067)
High school	-7.974***	-7.908***
	(0.053)	(0.053)
<HS	-4.297***	-4.260***
	(0.048)	(0.047)
Male	-5.471***	-5.450***
	(0.032)	(0.032)
_Itwokzam_2	0.248	0.253
	(4.557)	(4.554)
_Itwokzam_3	-6.138	-6.146
	(15.133)	(15.126)
_Itwokzam_4	-3.513**	-10.180***
	(1.707)	(1.714)
_Itwokzam_5	-4.297**	-10.932***
	(1.710)	(1.721)
_Itwokzam_6	-5.280	-5.331
	(13.134)	(13.127)
_Itwokzam_7	-1.531	-8.329***
	(1.708)	(1.715)
_Itwokzam_8	-2.224	-9.636***
	(1.713)	(1.731)
_Itwokzam_9	-4.597***	-11.694***
	(1.710)	(1.719)
_Itwokzam_10	-1.857	-8.318***
	(1.707)	(1.714)
_Itwokzam_11	2.122	2.132
	(26.100)	(26.088)
_Itwokzam_12	-7.077	-7.112
	(13.134)	(13.127)
_Itwokzam_13	-0.891	-6.969***

	(1.707)	(1.713)
_Itwokzam_14	-0.204	-6.268***
	(1.709)	(1.718)
_Itwokzam_15	-0.392	-4.817***
	(1.789)	(1.867)
_Itwokzam_16	-2.011	-8.103***
	(1.707)	(1.713)
_Itwokzam_17	-4.034	-4.084
	(26.100)	(26.088)
_Itwokzam_18	1.674	-3.248*
	(1.707)	(1.714)
_Itwokzam_19	2.747	-1.902
	(1.708)	(1.715)
_Itwokzam_20	-9.478	-9.506
	(26.100)	(26.088)
_Itwokzam_21	-2.732	-2.692
	(26.100)	(26.088)
_Itwokzam_22	-2.788	-2.749
	(26.100)	(26.088)
_Itwokzam_23	-9.872	-9.886
	(15.133)	(15.126)
_Itwokzam_24	3.282*	-0.638
	(1.708)	(1.715)
_Itwokzam_25	3.498**	-0.841
	(1.708)	(1.715)
_Itwokzam_26	-9.755	-9.791
	(26.100)	(26.088)
_Itwokzam_27	11.562***	8.324***
	(1.717)	(1.732)
_Itwokzam_28	11.224***	7.787***

	(1.708)	(1.716)
_Itwokzam_29	6.581***	3.182*
	(1.707)	(1.713)
_Itwokzam_30	7.847***	6.085***
	(1.712)	(1.722)
_Itwokzam_31	11.009***	8.376***
	(1.709)	(1.717)
_Itwokzam_32	5.803***	2.653
	(1.707)	(1.714)
_Itwokzam_33	9.331***	7.444***
	(1.707)	(1.713)
_Itwokzam_34	5.004***	1.046
	(1.707)	(1.713)
_Itwokzam_35	-17.369	-17.328
	(26.100)	(26.088)
_Itwokzam_36	3.022*	-0.628
	(1.709)	(1.717)
_Itwokzam_37	15.217***	14.028***
	(1.829)	(1.948)
_Itwokzam_38	8.909***	6.627***
	(1.708)	(1.709)
General managers		**8.726*** **
		(0.186)
Engineers		**8.506*** **
		(0.280)
Health prof		**8.661*** **
		(0.201)
Teaching prof.		**9.055*** **
		(0.347)
Other prof.		**9.551*** **

	(0.252)
Natural and engineering science	**8.173*** **
	(0.191)
Health associate prof	**7.544*** **
	(0.170)
Teaching associate prof	**6.991*** **
	(0.239)
Other associate prof.	**4.407*** **
	(1.083)
Office clerks	**7.563*** **
	(0.174)
Costumer services	
	5.328* **
	(0.185)
Personal services	**4.819*** **
	(0.209)
Salespersons	
	3.495* **
	(0.209)
Service workers	**4.266*** **
	(0.207)
	1.890* **
Building trades workers	**(0.411)**
Metal machinery and related	**2.537*** **
	(0.215)
Precision, handcraft	**2.274*** **

	(0.163)
Other craft	**-1.924*** (0.320)**
Stationary plant	**0.758*** (0.244)**
Machinery operators	**1.760*** (0.185)**
Drivers and mobile	**-0.849*** (0.171)**
Sales and services	**3.497*** (0.178)**
Agriculture and services	**2.892*** (0.237)**
Mining	**-2.076 (1.323)**
_cons	26.904*** (1.709)
N	15368024
R^2	0.024