The Perverse Effect of Flexible Labor Regulation on Informality

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Abstract

Several developed countries are introducing more flexible work arrangements–with a multitude of different contracts–ranging from Germany's mini-jobs, to UK's zero-hours contracts. Back in 2008 Italy introduced what is arguably the most flexible alternative work arrangements (AWA), called "labor vouchers."

Apart from allowing for quick labor demand adjustments, such contracts were seen as a way to fight undeclared work. Until recently labor vouchers could be purchased online and from mom and pops stores to pay for all sorts of occasional work, with little to no additional paper work. Between 2008 and 2016 the use of labor vouchers went up from 500,000 (less than 1 per 100 inhabitants) to almost 300 million vouchers (5 times the Italian population). Using random timing in labor inspections as well as the abolition of labor vouchers we document a perverse effect of badly designed AWAs: they lead to more rather the less undeclared work. The reason is that when inspected firms use vouchers to hide any undeclared work, which we define as gray work.

1 Introduction

Alternative labor arrangements (AWAs) are becoming more and more widespread, both, in the US (Katz and Krueger, 2019) and in many European countries (Adams et al., 2018, Datta et al., 2019).[1] Since there are no guaranteed working hours, these contracts are seen as a way for firms to quickly adjust labor demand and for workers to have more flexible work schedules (Chan, 2018, Chen et al., 2019).

These work arrangements lower bureaucracy and push hiring and firing costs towards zero. Policy makers see these flexible labor contracts as a way to lure undeclared work out of the shadow. But alternative labor arrangements may lead to the exploitation of workers, to dead-end jobs, and to more job insecurity (Mas and Pallais, 2017). This is why labor unions have traditionally been against these labor arrangements. Their main argument has been that firms may use the flexibility to exploit workers. And labor unions have also hinted at the possibility that extremely flexible labor contracts may actually hide undeclared work. Hence, policy makers have set legal constraints to limit the use of such contracts. In many countries, firms are not allowed to sign alternative labor arrangements with their regular employees. Work has to be casual. Sometimes firms are not allowed to pay flexible worker more than a given amount per year.

The empirical evidence on alternative labor arrangements is still scarce, and one of the main obstacles is the lack of data. Labor force surveys contain too little detail to identify such contracts (Katz and Krueger, 2019), while administrative data from the social security systems often do not contain any information on these arrangements. On top of this, undeclared work is by definition hard to measure. These limitations make it almost impossible to understand whether AWAs increase or decrease legitimate labor relationships.

Italy is well-suited for this research question. It is one of the European countries with the

[1] For an overview on this early stage literature see Boeri et al. (2020)

largest amount of undeclared work[2] and about 10 years ago, in an attempt to incentivize firms to regularize such workers, it introduced what is arguably the most flexible work arrangement: labor vouchers.

Employers can purchase 10 euro vouchers from the Italian Social Security Administration, or from banks or tobacco shops, fill in the worker's name, and use it to pay for work without the need of a proper labor contact. The worker can exchange vouchers for money. For every 10 euro paid by the employer the worker receives 7 euro and 50 cents. 1 euro and 30 cents cover the social security contributions, 70 cents cover the health insurance, and 50 cents are the commission fee that is paid the administration. Compared to the common Italian labor contracts, vouchers simplify the bureaucracy considerably, and this is believed to encourage employers to reduce the use of undeclared work.

The most comprehensive study about Italian AWA is a study commissioned by the Italian Social Security Administration (Anastasia et al., 2016). The authors' describe the evolution of AWA , which in Italy are called labor vouchers. Indeed, at the regional level a strong negative correlation emerges between the average number of vouchers per worker and the fraction of irregular workers, which may suggest that vouchers *reduce* the amount of undeclared work. In 2015 workers under AWAs in Lombardy use an average of 78 vouchers, in Calabria slightly more than 40. Given that the fraction of undeclared work is estimated to be 9 percent in Lombardy and 23 percent in Calabria, the implied elasticity is close to -1.

However, vouchers are widespread in the wealthier and more economically active northern part of Italy, which historically has suffered less from illegality. This may cast some doubts on interpreting as causal these simple correlations.

[2]According to the Italian Statistical Office (ISTAT) the value added of the shadow or underground economy is worth about 12 percent of the Italian GDP and is on the rise (ISTAT, 2015). Approximately half of it is driven by undeclared economic activity, one third by irregular work, and the large part of the rest by unlawful activities. For example, according to the Eurobarometer (2014), 23 percent of Italians have purchased undeclared goods and services from health care providers (with only Malta and Cyprus doing worse in Europe).

Our approach is quasi-experimental, and we start by producing predictions based on an economic model (see Section 2). Our model shows that whenever AWA do not interfere with labor inspections, more flexible jobs lead to a reduction in hiring and/or firing costs, which is expected to reduce the amount of undeclared work (see Albrecht et al. (2009), Bosch and Esteban-Pretel (2012), and Ulyssea (2018)).

A slight twist to the model dramatically changes these predictions. The economic literature has generally disregarded the job of labor inspectors, whose main job is to uncover undeclared work. We add to our model the possibility that flexible labor arrangements may complicate the work of labor inspectors. If contracts are allowed to be very flexible, firms may simply underreport the number of hours worked by their "casual" employee. For example, in the UK where causal workers may work under "Zero Contract Hours" workers may only appear to work close to 0 hours. In Italy, workers paid with vouchers may receive a single voucher, so as to justify their physical presence in the workplace, and be paid the rest of their work under the table.

The main prediction is that by lowering the probability that undeclared work is detected, which typically comes with hefty fines (including the risk of a complete shutdown of production) AWAs may actually lead to more rather than less undeclared work.

We use a quasi-experimental approach to uncover the causal effect of AWAs on the demand for undeclared work, drawing from three separate Italian administrative datasets: firm level data on all firms covering the period 2008-2017, data on all individual vouchers used between 2008 and 2017, and, finally, data on the universe of labor inspections between 2008 and 2017. Given that firms cannot predict when they are going to be inspected, the main evidence we provide in support of an ill use of AWAs is that firms tend to increase the use of these contracts by about 25 percent starting from the day they are inspected.

Moreover, October 2016, when the government closed this loophole, requiring firms to announce the use of vouchers with at least a one hour notice, the change in the use of

vouchers upon inspection ceases. 60 minutes where believed to give inspectors enough time to uncover any undeclared work. This may not have solved the problem completely, as firms could have simply shifted towards using one voucher per worker, irrespective of labor inspections.

Having established that AWAs are used to hide undeclared work, we follow up our research, documenting that AWAs displace regular work. We do this by dividing inspected firms into those that upon an inspection on average increased their use of vouchers and those that did not, and analyze what these two sets of firms do in March 2017, when vouchers were abolished. Given that individual-level changes in the use of AWA around labor inspections are a noisy measure of a systematic misuse of AWA, these estimates should be lower-bounds of the true effects.

Our model predicts that firms may either revert back to informal jobs or hire fixed term or part-time workers. We do find that firms who misused vouchers revert to the next most flexible work contracts, hiring more fixed term as well more part-time workers. As for the total wage bill, which includes vouchers, there is no evidence of significant changes. Firms appear to switch in full from AWA to the second most flexible contracts.

1.1 The Italian Alternative Labor Arrangements: Vouchers

Italy's labor regulations added AWAs in the extreme form of vouchers in 2008, but restricted their use considerably: employers could only spend a maximum of 5000 euro in vouchers for each employee; only students and retirees were allowed to receive vouchers, and only in the agricultural sector. Several small changes to the initial conditions have led to a steep increase in the use of AWAs.

Right after their introduction, the center-right government extended vouchers to all workers in the agricultural sector, not just students and retirees. More limitations were lifted in the

following years. Figure 2 displays the rapid growth in the monthly number of 10 euro vouchers sold: from a few thousands in 2008 to a peak of almost 20 million in 2016.

In 2009 vouchers became available in the retail sector, tourism and service sector, and for house keepers. One year later they were completely liberalized, opening up to all sectors and all workers. In 2012 the 5000-euro limit became more stringent, as the sum of vouchers for a single worker across employers was not allowed to exceed 5000 euro. A big step upwards happens with the "Jobs Act," the 2014 labor reform. Vouchers did not have to be related to occasional work, and their annual limit increased to 7000 euro. Finally, right after the 2016 peak, in October of that same year the Renzi government made it compulsory to inform the Social Security Administration at least 60 minutes before signing an AWA, and a few months later, March 2017, under pressure by the Labor Union, vouchers were completely abolished.

Before exploiting some of these changes in our empirical analysis, we develop a model that allows us to build predictions about how AWAs influence the firms' hiring and firing decisions, as well as the decision to employ irregular workers.

2 A Model of Jobs, Temporary Jobs and AWAs

2.1 The environment and the institutions

We consider a stylized simple labor market with a measure one of workers. Jobs last one period and firms post vacancies. Workers and firms go through a round of matching for one period only. The structure of the search market is a static version of the Diamond-Mortensen-Pissarides model, while the modelling of contracts through different destruction probability borrows from Cahuc et al. (2017).

Firms and workers are risk neutral and live one period. The productivity of an operational or productive job is homogeneous at value y. The model is solved from the labor demand

standpoint and we thus take the wage as fixed at ω. Yet, since the model is static, the model could also be solved with rent sharing. Firms are modelled as consisting of single jobs.

Firms meet workers by posting a vacancy. We let θ be the measure of vacancies posted by the firms. There is stochastic rationing and firms have a probability of meeting a worker that is strictly less than one. Specifically, we say that $q(\theta)$ is the firm probability of meeting a worker and $q'(\theta) < 0$ and further $lim_{\theta \to \infty} q(\theta) = 1$. Conversely, the probability that a worker meets a vacancy is a function of θ, $\mu(\theta)$ with $\mu'(\theta) > 0$. The cost of creating a job is K.

Each job can be productive or unproductive with some probability. When the firm and the worker meet they draw a fraction λ of job duration from a continuous distribution with cumulative density function $\Omega(\lambda)$, and support $\lambda \in [0, 1]$. λ can be interpreted as the probability that the job will not be productive over a unit of time. The job is productive for the period $1 - \lambda$, while it is not for the rest of the time. λ can also be interpreted as a technological destruction rate. With probability λ the productivity of the job drop turns out to be zero for the remaining fraction of time.

Firms learn the value of λ related to the job upon meeting the worker. Labor regulations allow for three type of jobs: open ended jobs, fixed term jobs and AWAs/voucher (we use the words AWAs or vouchers interchangeably). The key decision that firms face is about the type of job to offer. For open ended jobs that are not productive firms are forced to pay a firing tax equal to $-F$. The tax F is dissipated outside the match and is a multiple of the wage $F = f\omega$. In what follows, we shall indicate with $J^{op.e}(\lambda)$ the value to the firm of an open ended job. Fixed term jobs are active for a fraction $1 - \rho$ of the time. When a firm opens a fixed term job it commits to paying the worker for an expected duration equal to $1 - \rho$, regardless of the job specific value of λ. The advantage of a fixed term job is that the firm does not pay any firing costs when the expected duration ρ strikes. The cost associated of such job, however, is that the firm can be forced to pay the worker even if λ strikes and productivity drops to 0. In what follows, $J^F(\lambda)$ indicates the value to the firm of a fixed term

job. Finally, the firm can open AWAs. AWAs do not have any cost, but are characterized by an expected duration $1-\rho^v$ where ρ^v is large, and certainly such that $\rho^v > \rho$. In addition, AWAs that come to maturity can always be freely terminated. In other words, AWAs are super flexible jobs but very low expected duration. In what follows, we shall indicate with $J^{AWA}(\lambda)$ the value to the firm of a AWA.

As anticipated, we solve the model for a fixed wage ω. In addition, the labor market is characterised by a payroll tax τ regardless of the type of job. The tax is paid on a flow basis by the firm and at first we assume that the tax cannot be evaded. Later, in Section 2.3 we consider the case of tax evasion.

2.2 Optima Job Contracts without Tax Evasion

Indicating with V the value of a newly created job, its value is

$$V = q(\theta) \int_0^1 Max \left[J^O(z), J^F(z), J^{AWA}(z), 0 \right] dF(z) \tag{1}$$

The key decision is about the type of contract to offer, conditional on observing the job-specific expected destruction probability λ. The superscript to J refers- as mentioned above- to open ended jobs, fixed term and AWAs. Equation 1 allows for the possibility that expected duration of the job is so low that the firm does not open any job. Competition among vacant firms implies that the value of a vacancy is equal to the entry cost K, and in equilibrium the job creation solves

$$\frac{K}{q(\theta)} = \left\{ \int_0^1 Max \left[J^O(z), J^F(z), J^{AWA}(z), 0 \right] dF(z) \right\} \tag{2}$$

To solve for the maximization on the right hand side, we need to specify the expected value of different jobs The value of an open-ended job is

$$J^O(\lambda) = (1-\lambda)(y-\tau-\omega) - \lambda F. \tag{3}$$

The value of the firing tax $F = f\omega$ has the restriction that $f > 1 + \frac{\omega}{\tau}$. In other words, firing tax for open ended jobs must be sufficiently larger than the wage. Conversely, the value of a λ type fixed term job reads

$$J^F(\lambda) = (1-\rho)\left[(1-\lambda)(y-\omega-\tau) - \lambda(\omega+\tau)\right] \tag{4}$$

where at rate ρ the job is destroyed at no cost. Yet, as argued above- with probability $\lambda(1-\rho)$, the firm is forced pay the wage until expected duration. Finally, the value of a AWA is

$$J^{AWA}(\lambda) = (1-\rho^v)\left[(1-\lambda)(y-\omega-\tau)\right] \tag{5}$$

The maximization problem satisfies the reservation property, since all the job values are decreasing and monotonic in λ. Further, one can easily show that $J^O(0) > J^F(0) > J^{AWA}(0)$. Further, $J^{AWA}(1) = 0 > J^F(1) = -(\omega+\tau) > J^O(1) = -F$. The maximization is thus an envelope of three downward sloping lines, and the firm's choice can be described by two reservation values $\tilde{\lambda}^F$ and $\tilde{\lambda}^v$. The reservation probability can be characterized (see appendix for details) as the solution to

$$J^O(\tilde{\lambda}^F) = J^F(\tilde{\lambda}^F); \qquad \text{and} \qquad J^F(\tilde{\lambda}^v) = J^{AWA}(\tilde{\lambda}^v). \tag{6}$$

$\tilde{\lambda}^F$ is the expected duration that makes the firm indifferent between an open ended job and a fixed term job. Similarly, $\tilde{\lambda}^v$ makes the firm indifferent between a AWAs and a fixed term

job.

The intuition of this result is very strong. For a given net flow productivity $y-\omega-\tau$, firms have a strong ordering of which type of job to open according to its expected destruction rate, with open ended jobs suitable for jobs with long expected duration and AWAs suitable for jobs with very low duration. In addition, AWAs create labor demand opportunities that would not otherwise be exploited if the AWAs were not there. In other words, AWAs respond to firm demand of flexibility for jobs with very low expected duration. For simplicity, in what follows we indicate with $\tilde{y}$ the net flow value of the job so that $\tilde{y} = y - \omega - \rho$.

The threshold λs are:

$$\begin{cases} \tilde{\lambda}^F & = & \frac{\rho\tilde{y}}{\rho\tilde{y}+(f\omega-\omega)} \\ \\ \tilde{\lambda}^{AWA} & = & \frac{(\rho^v-\rho)\tilde{y}}{(\rho^v-\rho)\tilde{y}+\omega} \end{cases} \tag{7}$$

Figure 1 shows the job values (upper panel) and its envelope (lower panel) against the destruction probability λ. Note that existence of two thresholds- and thus two fixed term contracts- require that the duration of AWAs is sufficiently short, or that

$$\rho^v > \frac{\rho f}{f-1}.$$

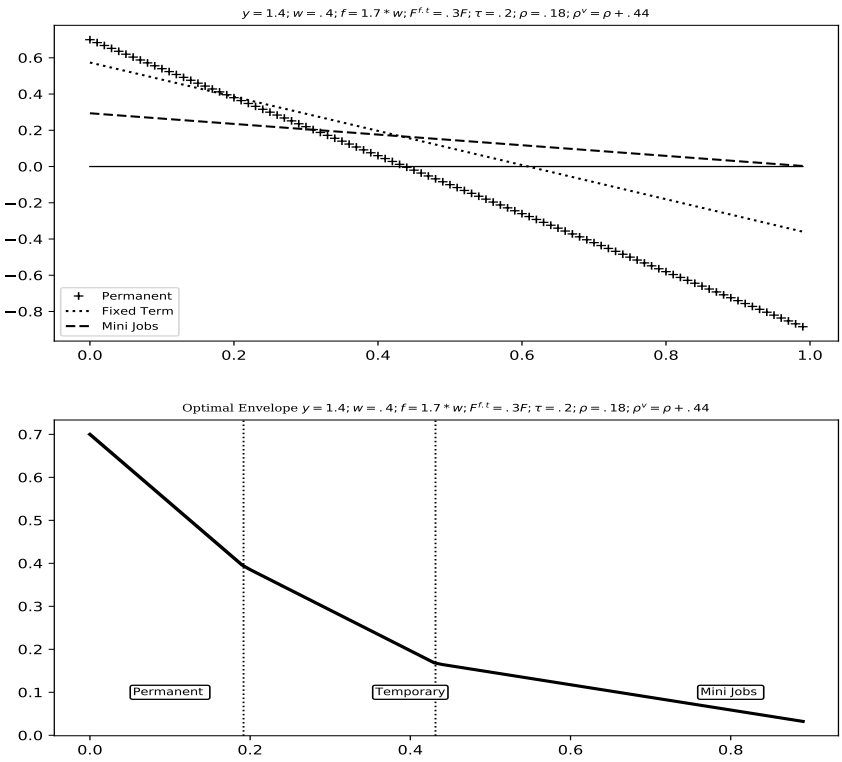
Now let is consider the stocks. Given the reservation λs and a measure one of workers, total employment is simply $e = \mu(\theta)$ while unemployment is $u = 1 - \mu(\theta)$. In an equilibrium with AWAs the fraction of employment with open ended contracts is simply $n^O = F(\tilde{\lambda}^F)$, the fraction with fixed term contracts is $n^F = F(\lambda^{AWA}) - F(\tilde{\lambda}^F)$ while the fraction with AWAs is $n^{AWA} = (1 - F(\lambda^{AWA})$.

Definition 2.1. Equilibrium With AWAs *Given a distribution of arrival rate $\Omega(\lambda)$, a labor market equilibrium with AWAs is a set of value functions $\{J^O(\lambda), J^F(\lambda), J^{AWA}(\lambda)\}$, a*

market tightness θ^**, two reservation probability* $\tilde{\lambda}^v, \tilde{\lambda}^F$*, and a t-uple of stocks* $[u, e, n^O, n^{AWA}, n^F]$ *that satisfy*

1. *Optimal job creation (Equation 2)*
2. *Reservation arrival rates (equation 7)*
3. *Total labor force condition* $u+e=1$ *and distribution of employment by type of contract* $e = n^O + n^F + n^{AWA}$

Figure 1: Optimal Contracts for Different Destruction Probabilities



Next we can analyze what happens when AWAs are introduced. Here the model's main predictions:

1. AWAs allow very flexible jobs to exist.

2. The introduction of AWAs increase employment (in head counts term, so that e increases).

3. While the introduction of AWAs increase total employment, they also crowd out fixed term jobs, but the share of employment covered by temporary jobs increases.

The abolition of AWAs generates opposite predictions.

2.3 Shadow Employment and the Misuse of AWA

In this section we introduce the possibility of evading taxes by underreporting jobs. A shadow job allows firms to avoid paying the tax τ. In terms of the type of contract, we talk of a general λ job, since it is difficult to argue that a black job is either open ended, fixed term or a AWA. We let $\tilde{J}^i(\lambda)$ be the value of a representative λ job that is shadow, or irregular. Yet, the discussion of the previous section implies that that for each λ job there is one and only one type of contract governed by the envelope property. In other words, $J^i(\lambda)$ is the corresponding optimal contract where i can be open ended, fixed term or AWA.

Further, γ is the probability of inspection, and C is fine imposed on the firm with undeclared work upon inspection.

The decision to go shadow is simply

$$\tilde{J}^i(\lambda) = (1-\gamma)(J^i(\lambda)+\tau) + \gamma(J^i(\lambda)-C) > J^i(\lambda) \qquad i = \{O; F; AWA\}$$

which implies the standard conditions found in most of the shadow employment literature.

$$\underbrace{(1-\gamma)\tau}_{expected\ \ tax\ \ evaded} > \underbrace{\gamma C}_{expected\ \ fine}$$

In real life, different firms may face different probabilities of inspection γ, and also different fines C.

In this section we are mostly interested in what happens to the option to go shadow, when vouchers are available and can potentially be activated at the moment of inspection. We can imagine that- once the labor inspectors are at the door- firms have the option to declare that the job is covered by a voucher. We thus formalize the idea that firms use vouchers as an insurance mechanism. Let $\hat{J}^i(\lambda)$ be the value of an irregular job that has the option to activate the voucher conditional on inspection, or the the value of a shadow job that has the option to misuse vouchers. Formally, the existence of vouchers adds an extra decision from the firm stand-point, or an extra option value in the firm decision regarding shadow employment.

The decision to go shadow with misuse of vouchers solves

$$\hat{J}^i(\lambda) = (1-\gamma)(J^i(\lambda)+\tau). + \gamma \underbrace{\left(Max[J^i(\lambda)-C; J^{AWA}(\lambda)]\right)}_{option\ to\ misuse\ vouchers} > J^i(\lambda)$$

We thus have that if

$$J^{AWA}(\lambda) > J^i(\lambda) - C, \tag{8}$$

firms activate vouchers upon inspection.

Let us assume that for a subset of firms equation 8 is satisfied. This, in turn, implies that

$$\underbrace{(1-\gamma)\tau}_{expected\ tax\ evaded} \quad > \quad \underbrace{\gamma(J^i(\lambda) - J^{AWA}(\lambda))}_{expected\ cost\ of\ misusing\ voucher} \tag{9}$$

Yet, since from equation 8 we know that $J^i(\lambda) - J^{AWA}(\lambda) < C$, *the possibility of misusing voucher makes it more profitable to exercise the option to go shadow.*

Three results follow from equation 8.

1. Some firms may misuse vouchers.

2. The amount of shadow work (through the misuse of vouchers) increases.

3. Regular employment increases if vouchers are prohibited.

Next we test the predictions of our model.

3 Data

We merge 10 years firm level data from the social security administrative records (2008-2017) with the universe of labor inspection and with the universe of vouchers used by individual firms. The data on vouchers are at the daily level, while the firm level employment and wage data are at the monthly level.

4 Empirical Model and Identification

4.1 The Misuse of AWAs: Evidence from Labor Inspections

From a firm's perspective it is safe to say that labor inspections are unpredictable. In 2016 there were a little less than 29,000 inspections and a total of 1.6 million firms. This implies that without conditioning on type of firm, less than 2 out of 100 are expected to be inspected in any given year.

Given the random nature of inspections, our model predicts a fairly simple test for whether a firm is using vouchers to hide undeclared work. Upon being inspected, in an attempt to avoid to be fined for employing irregular workers, firms should exercise the option to use vouchers. Our detailed daily data allows us to compare the daily use of vouchers just before and after an inspections, following firms several days before and after the inspection.

We look at AWAs signed by firm j 180 days pre and 90 days post an inspection that happens starting day τ_j. Since a single voucher would be sufficient to avoid the fine, we use an event study approach, where the main outcome is the use of at least one voucher by firm j on day t ($DV_{j,t} = 1\{\#Vouchers_{j,t} > 0\}$):

$$DV_{j,t} = \sum_{k=-90}^{90} \beta_{t-\tau_j+k} D_{t-\tau_j+k} + \alpha_j + f(t) + \epsilon_{j,t} \ . \tag{10}$$

$D_{t-\tau_j+k}$ is a dummy variable equal to one for day $t - \tau_j + k$ and zero otherwise. The reference days are between -180 and 91 days from the day of inspection. The function of time $f(t)$ controls for year, month, day of the month, and day of week fixed effects. The results are also robust to using date fixed effects.

Figure 3 plots the coefficients $\beta_{t-\tau_j+k}$, that is the difference in the use of vouchers between event date $t - \tau_j + k$ and days between 90 and 180 prior to the inspection.

There is a clear increase in the use of vouchers as soon as labor inspectors start their inspections. The likelihood of using at least one voucher in the pre-SMS period is 4.9 percent, meaning that the average increase of 0.88 (SE 0.16) percentage points represents an 18 percent increase in the likelihood of using at least one voucher. The largest effects are on the day of the inspection and the day after, respectively 1.5 and 1.4 percentage points. If we consider that firms may also have the option to put "gray" jobs on hold these are large effects. Moreover, the figure shows that these effects persist for at least 90 days, which implies that the average 18 percent increase in the use of vouchers is likely to be distributed over the large share of firms.

As mentioned earlier, at one point the government introduced the requirement of sending an SMS at least 60 minutes before using a voucher. That would break the on the spot insurance mechanism. Firms would still be able exercise the option on a daily level, buying at least one voucher per worker, but this would not show up in the event study.

Figure 4 shows, indeed, that once the SMS was introduced there is no more jump in the use of vouchers when the inspections start.[3]

The data contain a great deal of detail about firms. We look at whether pre-SMS effects are heterogenous across economic sectors and across firm's characteristics. Given that the parallel trend assumption is clearly satisfied, we simply present the difference in difference results, where $\sum_{k=-90}^{90} \beta_{t-\tau_j+k}$ is set to be a constant difference.

Table 1 shows that the jump is about the same in the retail sector, the tourism sector and the manufacturing sector. For the for the "Other sectors" the jump is slightly lower, while it is completely absent in the construction sector. This is likely to depend on the fact that in the construction sector work injuries are very common. As a consequence firms have a strong incentive to always use at least one voucher per worker per day, to be insured against job accidents.

In Table 2 we perform additional heterogeneity regressions. Column 1 to 4 show that the jump is fairly constant across Italian regions, although it is slightly larger in the more productive North than in the South, with the Center of Italy being in between. Columns 6 to 8 show that medium aged firms (those that started between 5 and 14 years earlier) are more likely to use vouchers to cover undeclared work compared to young and old ones. Firm size is highly predictive of the size of the effects, with large firms (more than 15 employees) being the ones with larger jumps. Finally, the last column shows that the jump is about 40 percent larger for firms whose share of part-time workers is above the median. This is inline with the common opinion that part-time work is sometimes used to hide what are truly full time workers, as it lowers the social security contributions as well as the tax burden.

[3]The reason why the whole figure is shifted below zero is that the SMS requirement led to a reduction in the use of vouchers, which implies that in the control period (90 and 180 prior to the inspection) vouchers are on average more common.

4.2 The Effect of Vouchers on Regular Employment and Total Wage Bill

Section 4.1 has show that vouchers are being misused to hide undeclared work. The next relevant question is whether vouchers crowd out regular work, or whether they simply hide work that would otherwise be completely undeclared (work that goes back to being black rather than gray).

We shed light on this question combining the results from the previous section with the March 2017 abolition of vouchers. Our model predicts that firms who misuse AWAs would either fall back into signing cheaper part-time or fixed term contracts, or simply revert back to hiding work altogether. We use the previous results to identify firms who are likely to misuse vouchers: for each inspected firm we compute their average use of vouchers before and after the inspections and classify firms into those who on average increase their use and those who do not. Since both categorizations are likely to be subject to type I and II errors, the estimates are going to be biased towards not finding any difference between the two groups of firms].

The empirical model is a difference-in-difference, before and after March 2017 for firms who presumably misused AWAs and those who did not. In order to test for the parallel trend assumption we estimate differences for up to 8 monthly lags and show 10 leads. The number of lags are constrained by the period spanned by the data, and we exclude January 2017, that is two months before the abolition, allowing for some anticipation effect.

We look at 7 different outcomes ($m = 1, ..., 6$), measured at the monthly level for each firm j: total number of workers, part-time workers, full-time workers, fixed-term workers, workers with open-ended contracts, seasonal workers, and finally the log of total wage bill (including vouchers). We also control for firm fixed effects and year fixed effects and month

fixed effects:

$$L_{j,t}^{m} = \sum_{k=-10}^{8} \beta_k D_k + \lambda_j + \lambda_t + \varepsilon_{j,t} \ . \tag{11}$$

The results are shown in Figures 5 to 7. The difference in the total number of employees is fairly flat in the months leading to the March 2017 abolition of the vouchers and then starts to immediately go up. Across all workers the effects are close to 1.5 additional workers. Considering that the average number of workers is 21, this is a fairly small 7 percent increase (while there are no effects for seasonal workers). But this masks much larger relative effects for temporary workers. The first panel in Figure 6 shows that for temporary workers the effects reach almost 2 and settle down at about 1.5. Since firms employ on average just 4.8 temp workers, the relative effect is above 30 percent. There are no effects, and if anything negative effects, for open-ended contracts (upper right panel).

As for part-time workers versus full-time ones, both groups show similarly sized effects, indicating that firms seek flexibility with respect the duration of the labor contracts and not the duration of a working day.

But the one type of worker that appears the closest substitute for an AWA is the combination of part-time and temporary worker (see the left panel of Figure 7).

In terms of total wage bill, the right panel of Figure 7 shows that the monthly deviations around the abolition are not different from all the other deviations. This implies that the labor costs saved on vouchers is perfectly offset by the labor costs on all other contracts.

5 Conclusions

In an attempt to keep up with an increasing demand by firms for flexible work contracts, legislators around the world are coming up with labor contracts that at times allow firms to hire workers for just a little amount of work, i.e. on-call work, zero-hour work, labor

vouchers, mini-jobs, etc.

Research has show that these contracts help firms deal with rapidly changing demand and help workers, especially in the gig economy, smooth their work. But the same research has also mentioned that these contracts may lead to poor career development prospects, stagnating wages, and excessive exposure to uninsurable income risk, in the short and long run (Boeri et al., 2020). This paper documents an additional important risk: these labor contracts may complicate the job of labor inspectors, whose task is to uncover undeclared work. We show that upon random inspections firms use alternative work arrangements to hide undeclared work. This counteracts the expected reduction in undeclared work coming from the reduced hiring and firing costs.

But there is also evidence that small changes to the bureaucratic requirements of alternative work arrangement can partially close these loopholes. When employers were forced to signal such arrangements in advance, labor inspectors would have enough time to identify undeclared workers. This killed the incentive to use AWA to hide undeclared work upon inspection. There is also evidence that employers who presumably used AWA to hide undeclared work, used 30 percent more fixed term contracts when AWA were banned. This evidence and the evidence that the total wage bill stayed constant, suggest that firms did not lower the demand for declared labor when AWAs became unavailable. Overall, the evidence suggests that in countries with large shares of undeclared work, alternative work arrangements *erga omnes*, without restrictions, may bring more harm than good. Moreover, if firms use vouchers only when inspected, restricting the total number of vouchers used by workers or firms to be below some threshold, which has been Italy's primary restriction, is unlikely to have any bite. Rules that restrict the use of AWA to certain categories, like students or retirees, are more likely to balance the need for flexibility with legality and the protection of employment rights.

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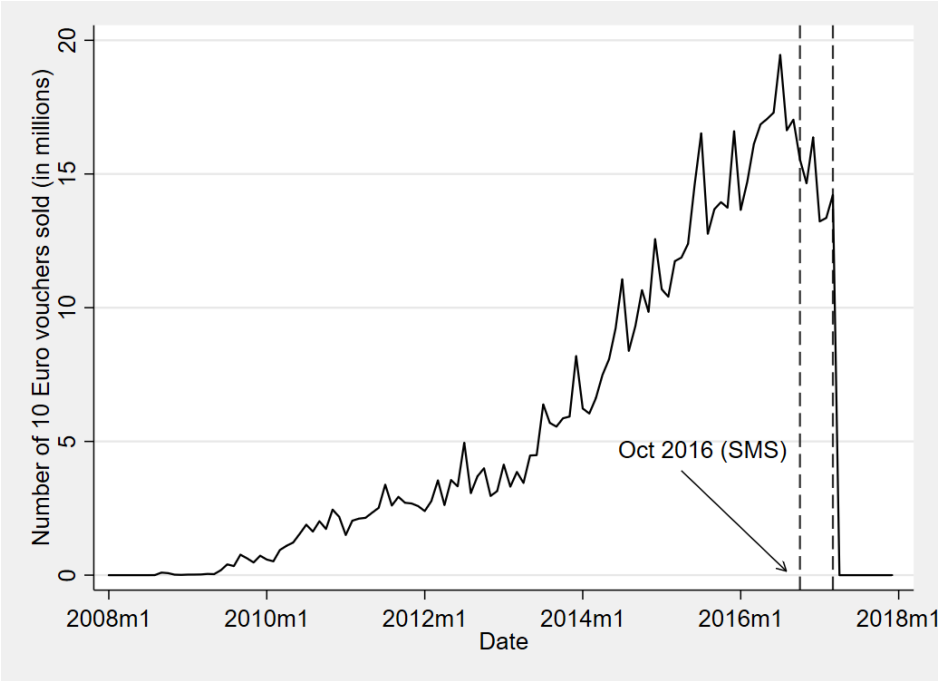

Figure 2: Vouchers Sold

Notes: The figure plots the monthly total number of 10-euro vouchers sold.

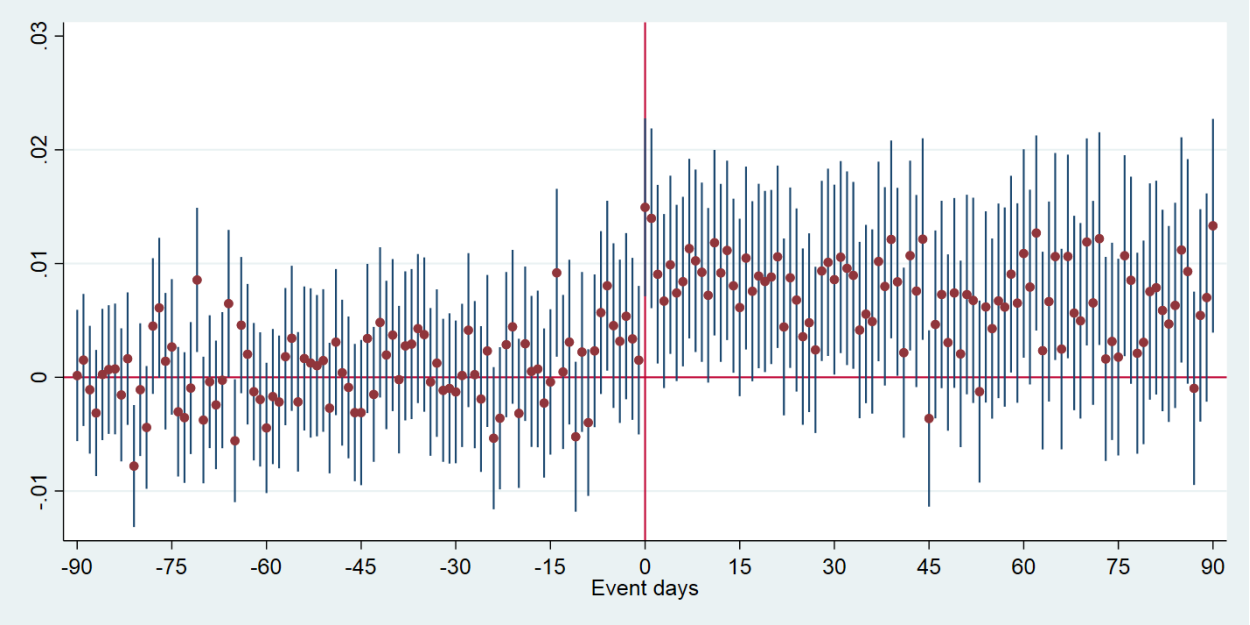

Figure 3: Event Study pre-SMS

Notes: The figure plots event study coefficients, where the event is a labor inspection. The excluded time period is between 180 and 90 days prior to the inspection. Standard errors are clustered at the individual firm level.

Table 1: Event Study Regressions by Sector

	(1)	(2)	(3)	(4)	(5)
Sector	Manufacturing	Construction	Retail	Tourism	Other Services
Post-Inspection	0.013***	-0.002	0.012**	0.011***	0.006*
	(0.003)	(0.003)	(0.006)	(0.002)	(0.003)
Constant	0.032***	0.021***	0.030***	0.054***	0.051***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)
Observations	157,329	98,087	208,194	614,758	255,718
R-squared	0.014	0.013	0.010	0.022	0.016
Mean dep. var.	0.0381	0.0201	0.0352	0.0592	0.0541

Notes: Clustered standard errors (by firm) in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

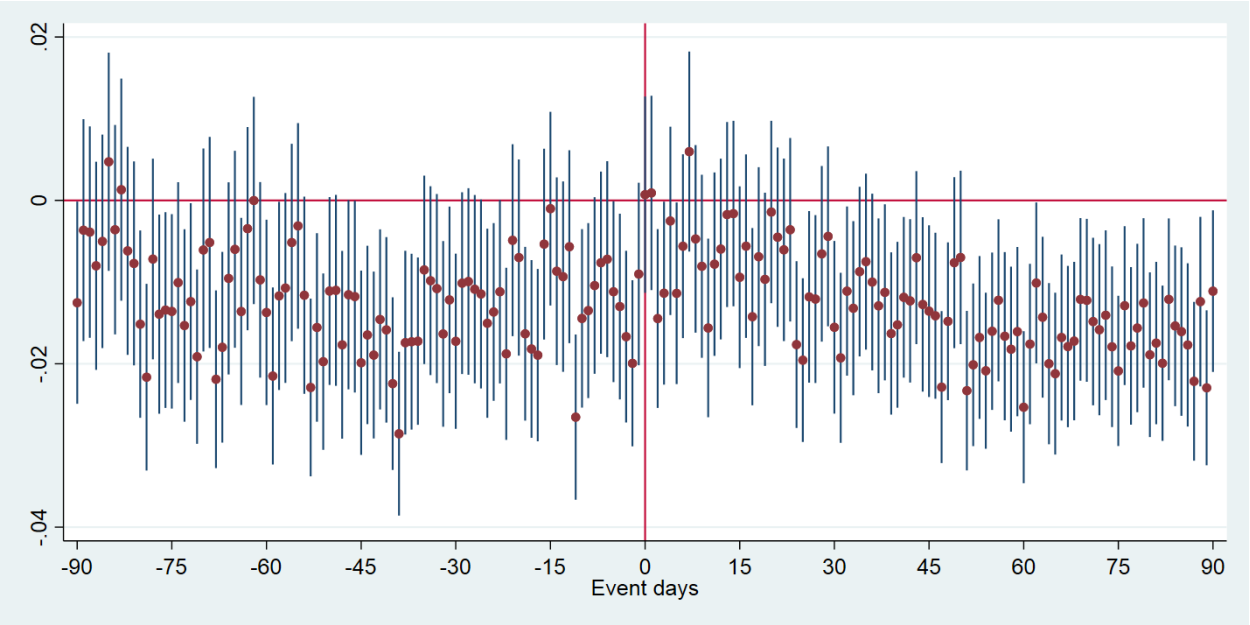

Figure 4: Event Study post-SMS

Notes: The figure plots event study coefficients, where the event is a labor inspection. The excluded time period is between 180 and 90 days prior to the inspection. Standard errors are clustered at the individual firm level.

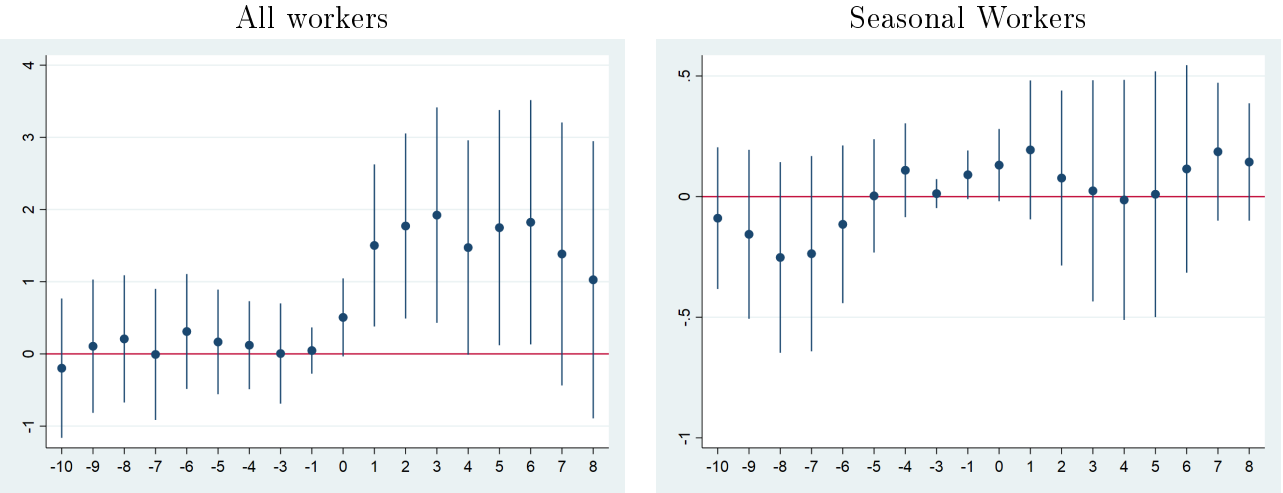

Figure 5: Event Study around the Abolition of Vouchers

Notes: The figure plots differences in the number of workers employed at firms that on average "mis-used" vouchers and those that did not, 10 months before and 9 months after the abolition of vouchers. Standard errors are clustered at the individual firm level.

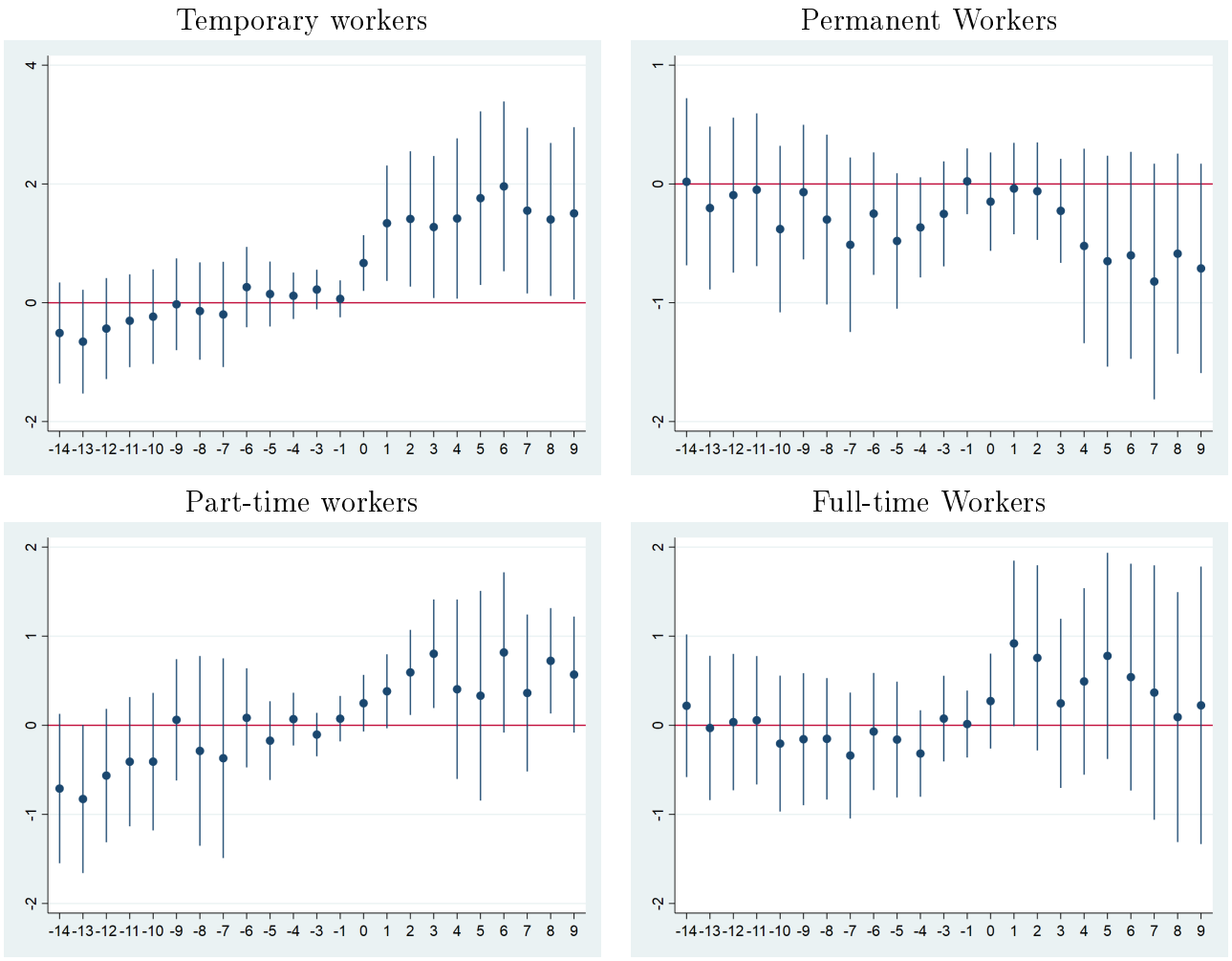

Figure 6: Event Study around the Abolition of Vouchers

Notes: The figure plots differences in the number of workers employed at firms that on average "mis-used" vouchers and those that did not, 10 months before and 9 months after the abolition of vouchers. Standard errors are clustered at the individual firm level.

Table 2: Event Study Regressions

Subsample	(1) South	(2) Center	(3) Nort-East	(4) North-West	(5) Young firms	(6) Medium-aged f.	(7) Old firms	(8) Small firms	(9) Medium-sized f.	(10) Large firms	(11) Above-median use of PT
Post-Inspection	0.009**	0.008**	0.010***	0.011***	0.009***	0.011***	0.008**	0.006***	0.008***	0.012***	0.014***
	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)
Constant	0.047***	0.046***	0.047***	0.043***	0.045***	0.048***	0.044***	0.035***	0.044***	0.058***	0.057***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)	(0.002)
Observations	255,262	256,735	409,649	347,459	581,120	414,932	273,053	461,643	373,953	433,509	446,903
R-squared	0.015	0.015	0.015	0.014	0.014	0.014	0.018	0.012	0.016	0.018	0.006
Mean dep. var.	0.0504	0.0496	0.0512	0.0478	0.0485	0.0529	0.0478	0.0381	0.0482	0.0637	0.0636

Notes: Clustered standard errors (by firm) in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

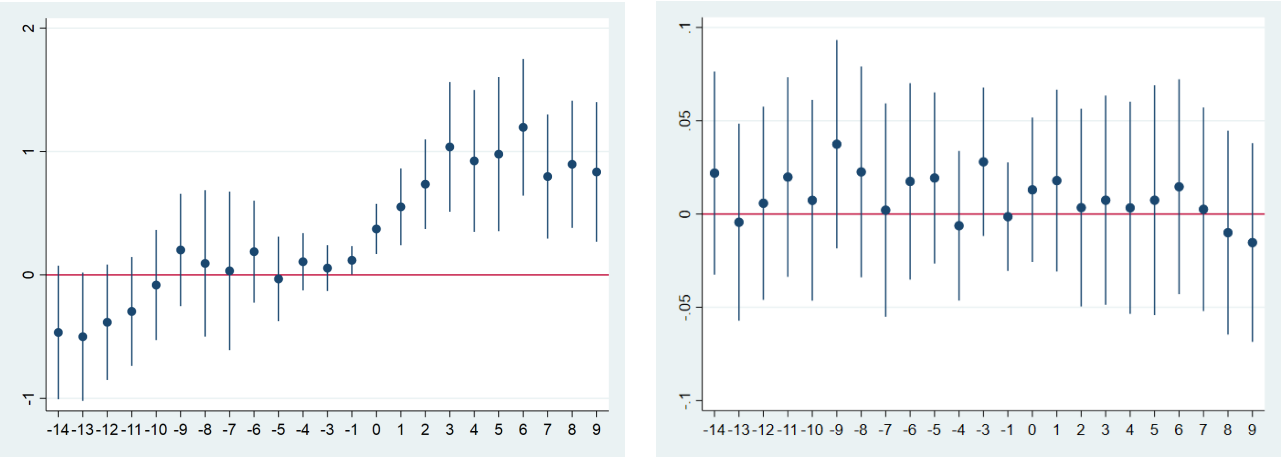

Figure 7: Part-time and Temporary Workers and Log-Total Wage Bill Around the Abolition of Vouchers

Notes: The figure plots differences in the total wage bill between firms that on average "mis-used" vouchers and those that did not, 10 months before and 9 months after the abolition of vouchers. Standard errors are clustered at the individual firm level.