

Employment Effects and Welfare Consequences of Short-Time Work Programs

Giulia Giupponi Camille Landais *

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Abstract

Short-time work programs subsidize reductions in hours worked in firms experiencing temporary shocks, with the explicit goal of limiting potentially excessive layoffs. In spite of the massive use of short-time work programs during the recent crisis, little is known about their effects on individuals and firms. Using a novel administrative dataset on the Italian short-time work program and various sources of quasi-experimental variation brought about by the Italian short-time work regulations, we provide well-identified estimates of the effects of short-time work on individual and firm outcomes. After documenting a large increase in take-up by eligible firms since the onset of the Great Recession, we adopt a triple difference strategy to estimate the short-run effect of the program: we find positive and significant effects on the probability of firm survival, small and mostly insignificant effects on firm size, and sharp reductions in employment at the intensive margin. We complement the short-run analysis with an event study approach that allows us to uncover the dynamic effects of program take-up. We find that the positive effects on the probability of firm survival and individual employment dissipate after two years, which coincide with the maximum duration of the subsidy. Conversely, intensive margin responses appear to persist in the longer run.

*Giulia Giupponi: Department of Economics, London School of Economics (g.giupponi@lse.ac.uk); Camille Landais: Department of Economics, London School of Economics (c.landais@lse.ac.uk). We thank Steve Pischke for helpful discussions and suggestions. Giulia Giupponi acknowledges financial support from the Visitinps “Valeria Solesin” Fellowship and from ESRC.

1. Introduction

Short-time work programs subsidize reductions in hours worked in firms experiencing temporary shocks, with the explicit goal of limiting potentially excessive layoffs and the resulting increase in unemployment. Recent years have witnessed a strong and renewed interest in short-time work programs across OECD countries. With the onset of the crisis, many governments reformed the program to stimulate take-up, which indeed grew massively. Participation in the program reached 3-6% of the workforce in Italy, Belgium, Germany, Turkey and Japan in 2009 (Hijzen and Venn, 2010), while government expenditure amounted to 0.1-0.3% of GDP in the same countries (Boeri and Bruecker, 2011). Eminent academics and policy makers have praised *Kurzarbeit*, the German short-time work program, as the main factor responsible for Germany's job miracle – the stability of employment and unemployment in spite of a 6.6% cumulative drop in GDP.

Yet, notwithstanding the fiscal size and the scope of these programs, little is known about their effects on labor market outcomes. Existing studies consist essentially of cross-country analyses of the impact of take-up rates on employment and hours worked (Hijzen and Venn, 2010; Boeri and Bruecker, 2011; Cahuc and Carcillo, 2011; Hijzen and Martin, 2013). Empirical research at the individual level or at the firm level is extremely scarce (Boeri and Bruecker, 2011; Brenke et al., 2013; Calavrezo et al., 2009a and 2009b). Due to the limited availability of good-quality data coupled with useful quasi-experimental variation, no paper has been able to credibly identify the effects of access to short-time work on the layoff probability of individual workers, their subsequent wages and careers, or on firms' outcomes and dynamics. As a consequence of the scant empirical evidence, we are still lacking a clear conceptual framework to understand the welfare consequences and the optimal design of short-time work programs.

Short-time work programs are public schemes with a twofold objective. On the one hand, they can be seen as a natural complement to unemployment insurance, since they are intended to provide insurance for workers against income fluctuations caused by variations in employment at the intensive margin, rather than at the extensive margin as in the case of unemployment insurance. On the other hand, short-time work may help preserving jobs at firms experiencing temporary shocks. In the presence of frictions such as wage or hour rigidities – which may induce excessive layoffs in response to demand or productivity shocks (Hall and Lazear, 1984) – short-time work can also have welfare-enhancing effects by preserving jobs and reducing unemployment. But like any social insurance program, it may bear sizeable welfare costs. Moral hazard may induce firms to excessively reduce hours of work in response to the program, and thus distort the optimal allocation of employment at the intensive margin (Burdett and Wright, 1989). Short-time work may also prevent the reallocation of workers from firms facing structural problems to firms with a strong growth potential, thereby reducing the cleansing effect of recessions.

This paper aims at filling the gap in the existing literature. Firstly, we ask whether short-time work schemes are effective in preserving jobs at firms experiencing temporary shocks and, secondly, we analyze the long-term consequences of having access to short-time work on individual and firm outcomes.

To do so, we make use of a novel matched employer-employee administrative dataset available at INPS – the Italian Social Security Institute –, which has detailed information on eligibility, applications and actual usage of short-time work at the individual and firm level. Importantly, the administrative records can be matched with firm-level balance sheet data. The latter are an invaluable source to explore dimensions of heterogeneity at the firm level, as they can be used to construct – among others – measures of performance, demand shocks, liquidity constraints and financial constraints.

We combine the wealth of administrative data with credible sources of quasi-experimental variation brought about by Italian policy rules to identify the causal effect of short-time work on the extensive and intensive margins of employment, and on long-term individual and firm outcomes.

An interesting feature of the Italian short-time work regulation is that eligibility for one of the program schemes is conditional on the firm being active in specific sectors of the economy and on having employed at least 15 employees in the 6 months prior to the program application. We exploit the exogenous variation in access to the scheme by industry and firm size, together with the shock of the Great Recession to implement a triple difference strategy that allows us to identify the short-run effects of the program. Specifically, we compare outcomes between firms above and below the 15 threshold, and in eligible and non-eligible sectors, relative to the pre-crisis year 2007. We start by documenting a sharp increase in program take-up by eligible firms since the onset of the Great Recession. We then provide reduced-form graphical evidence of the effects of program take-up on firm- and worker-level outcomes. We find positive and significant effects on survival probabilities, small and mostly insignificant effects on firm size and sharp reductions in employment at the intensive margin.

We complement the short-run difference-in-differences analysis with an event study approach that allows us to uncover the dynamic effects of short-time work by documenting the evolution of a range of firm's and worker's outcomes around their first short-time work spell. We match each treated firm (i.e. a firm with at least one short-time work spell between 2005 and 2015) to a control firm (i.e. a firm who never experienced short-time work) via nearest-neighbor matching and assign placebo events to matched control firms. A similar procedure is adopted to match treated workers (i.e. workers that experienced at least one short-time work event after 2005) to control workers (i.e. workers that never experienced a short-time work event) and assign placebo events to the latter. We proceed by comparing the evolution of different outcomes for treated and control individuals or firms around their first short-time work event. The results confirm the main patterns identified in the difference-in-difference analysis. Additionally, we find that the probability of firm survival and the probability of individual employment increase in the first two event years and then dissipate in the longer run. Conversely, intensive margin responses appear to persist in the longer run.

In a context in which both firms and workers are characterized by substantial heterogeneity, it is important to understand which firms take up short-time work and which workers that are put on reduced hours. Indeed, the type of selection into the program can be relevant for its effectiveness and welfare implications. We exploit the richness of balance sheet data to explore the presence of heterogeneity in the probability of take-up across firms with different pre-crisis characteristics and we provide some initial evidence of larger take-up rates by firms that exhibited higher degrees of liquidity constraints and lower labor productivity in the pre-crisis years.

The paper is structured as follows. In Section 2, we illustrate the Italian short-time work program *Cassa Integrazione Guadagni*. Section 3 describes the administrative and balance-sheet data. Sections 4 and 5 lay out our difference-in-differences strategy and event-study approach respectively, and present our empirical estimates of the short- and long-run impact of short-time work on firms' and workers' outcomes. Section 6 provides some preliminary evidence on heterogeneous take-up rates across different types of firms. Section 7 offers some concluding remarks.

2. Institutional framework

The analysis focuses on the Italian *Cassa Integrazione Guadagni*, which represents, with the German *Kurzarbeit*, one of the largest and most comprehensive short-time work programs in the world. Figure 1 illustrates short-time work take-up as a percentage of the workforce across different OECD countries before and at the onset of the Great Recession. Italy represents one of the most interesting examples of how the recent crisis triggered a large increase in program take-up, going from less than 1% of the workforce to more than 3%.

The Italian *Cassa Integrazione Guadagni* is a subsidy for partial or full-time hour reductions, replacing approximately 80% of the earnings forgone by the worker due to hours not worked. The subsidy is available

to workers in the private sector and is administered by the Italian Social Security. Firms intending to use the program must file an application to the Social Security or the Ministry of Labor, providing a justification of economic need and a recovery plan. Once authorized, the usage of *Cassa Integrazione Guadagni* is subject to weak conditionality requirements for both firms and workers: there are no provisions for compulsory training nor prohibitions of dismissal by firms, and no job-search requirements for employees. Eligible employers and employees finance the program via ordinary contributions and, when taking up the program, an extra contribution proportional to the amount of the subsidy.¹

The program is based on three main pillars: (i) *Cassa Integrazione Guadagni Ordinaria* is applied in case of a transitory reduction of activity due to exogenous reasons (e.g. adverse weather conditions, power cuts), has a maximum duration of 13 weeks and is available to firms in the manufacturing, construction and transportation sectors; (ii) *Cassa Integrazione Guadagni Straordinaria* targets more severe shocks involving a firm's crisis, restructuring, reorganization or insolvency, can last up to 2 years and is available to firms in the manufacturing, construction, retail and transportation sectors, provided that firm size exceeds certain thresholds; (iii) *Cassa Integrazione Guadagni in Deroga* has been introduced in 2009 to extend the coverage and duration of the other two pillars to industries and workers previously not covered or whose benefits have exhausted. The latter is administered at the local level and granted *ad-hoc* on the basis of regional decrees.

One of the remarkable specificities of *Cassa Integrazione Guadagni* is the presence of various provisions of the law that create quasi-exogenous variation in eligibility across firms and individuals, offering the unique possibility of identifying the causal effect of short-time work programs on firm and individual outcomes. Eligibility for *Cassa Integrazione Guadagni Straordinaria* – one of the three pillars of the program – is based on: (i) the firm having employed on average more than 15 employees in full-time equivalent units in the six months prior to the application; (ii) the firm being active in the manufacturing or the construction sector.² As further detailed in Section 4, we exploit the discontinuity in the probability of treatment at the 15 threshold in eligible sectors to identify the effect of the short-time work subsidy on outcomes at the individual and firm level. Additionally, we compare the difference in outcomes around the 15-threshold in eligible and non-eligible sectors, to control for the confounding effect of other policy rules changing at the same time. Specifically, the Italian regulation on employment protection applies to firms above the 15 size threshold across all industries. Industry variation in the eligibility to *Cassa Integrazione Guadagni Straordinaria* is thus very useful to control for the confounding effect of employment protection legislation and isolate the effect of short-time work.

3. Data

We use a novel administrative dataset on the universe of employer-employee matches and social security payments in the private sector in Italy from 1983 to 2015. The dataset is available at the Italian Social Security and includes information on workers' demographics, working histories, participation in social assistance and social insurance programs, and firm characteristics such as employment, labor-force composition and industry. Most importantly, starting from 2005, the data contains detailed information on eligibility, applications, authorizations, duration and payments of the Italian short-time work program at the individual and firm level.

Moreover, the administrative archives can be linked with firm-level balance-sheet data via a unique identifier. Balance-sheet data are an invaluable source to identify idiosyncratic shocks and explore dimensions of

¹ A reform in 2015 made the experience rating component of the costs to the employer progressive, i.e. the tax rate is increasing in the amount of subsidized hours.

² Travel agents and retail firms have become eligible for *Cassa Integrazione Guadagni Straordinaria* since January 2013, conditional on having more than 50 employees. Firms in the publishing and air transportation industries (the latter eligible since January 2013) are exempted from firm-size requirements and are therefore excluded from the analysis.

heterogeneity at the firm level, as they can be used to construct – among others – measures of performance (e.g. total factor productivity or value added per employee), demand shocks (e.g. change in net revenues), credit constraints (e.g. change in cash flows or indices such as Whited-Wu or Kaplan-Zingales) and liquidity constraints (e.g. share of liquid assets or the current ratio). In addition to standard balance-sheet data, we can make use a statistical score of the economic and financial riskiness of a firm relative to its industry and geographical context, which is used to calculate standard ratings of creditworthiness.

4. The effects of short-time work during the Great Recession

Our first identification strategy is a dynamic difference in differences, where we compare the evolution over time of a set of individual and firm outcomes across firms who have access to the program and firms who do not. In order to identify the causal effect of the program, we exploit the exogenous variation brought about by the Italian rules on eligibility for *Cassa Integrazione Guadagni Straordinaria*, which – as detailed in Section 2 – is available to firms operating in specific industries and having employed on average more than 15 employees in full-time equivalent in the 6 months prior to their application for accessing the program. Based on this provision of the law, we define eligibility at the firm level in a dynamic fashion, by combining information on a firm's industry affiliation and maximum 6-month average size in each year.³

Our empirical strategy consists in estimating a difference-in-differences by comparing outcomes between firms above and below the 15 threshold, and in eligible and non-eligible sectors. The comparison of firms just above and below the 15 threshold within eligible and within non-eligible sectors allows controlling for sector-specific effects. Differencing across eligible and non-eligible sectors, instead, accounts for the confounding effect of other policy rules changing at the 15 threshold, such as employment protection legislation. Furthermore, we exploit the aggregate shock of the Great Recession, which triggered a large increase in program take-up of the program by eligible firms, and compare the evolution of the double difference to its level in the pre-crisis year 2007, thus implementing a triple difference. The estimates provide full non-parametric control for 5-digit industry fixed effects, calendar year effects and time-varying 5-digit industry fixed effects, separately for firms above and below the 15 threshold.

Our dataset is a panel of all firms active in 2008 and that have been active at least since 2005. The panel ends in 2015 or before in case of firm closure. The estimated effect in a given year is based on the sub-population of firms whose maximum 6-month average size in full-time equivalent falls in the (5; 25] interval. For what concerns workers, our sample is composed of all workers who – at some point in their working history – worked for one of the firms in the firm dataset just described. Additionally, only workers whose contract type makes them eligible for short-time work are included.⁴

A short-time work event is defined as any month in which a spell of *Cassa Integrazione Guadagni Straordinaria* is reported in the workers' files for at least one of the workers in the firm. To be considered a short-time work event, the spell must also fall within a period in which the firm is authorized to use the scheme according to the authorization records. Once aggregating the data at the annual level, an event is therefore defined as having at least one short-time work spell during the year.

³ Therefore, for each calendar year, we identify four groups of firms: (i) firms in eligible sectors whose firm size is above the 15-threshold, (ii) firms in eligible sectors whose firm size is below the 15-threshold, (iii) firms in non-eligible sectors whose firm size is above the 15-threshold and (iv) firms in non-eligible sectors whose firm size is below the 15-threshold.

⁴ These include white and blue collar workers, and excludes managers and apprentices. Workers on both open-ended and fixed-term contracts are eligible for *Cassa Integrazione Guadagni*.

We start by providing compelling graphical evidence of the sharp increase in program take-up that was triggered by the Great Recession. Figure 2 shows the probability of treatment at the firm level for firms above and below the threshold in eligible sectors, whilst Figure 3 reports the same probabilities for firms in non-eligible sectors. As implied by the regulation of *Cassa Integrazione Guadagni Straordinaria*, only eligible firms are able to take-up the program and they do so by increasing program take-up by up to 10 percentage points above a pre-crisis level of less than 1%. Figure 4 plots the triple difference in the take-up of *Cassa Integrazione Guadagni Straordinaria*. Figure 5 reports the triple difference in the take-up of any of the three types of *Cassa Integrazione Guadagni*, showing that – even taking into account other programs – firms eligible for *Cassa Integrazione Guadagni Straordinaria* experience a sharp and significant increase in short-time work take-up during the crisis.

Having established the existence of a first stage, we investigate the effect of program take-up on a set of individual and firm outcomes via a reduced-form approach. Figures 6 and 7 investigate the intensive margin response to short-time work, by reporting the triple difference in annual labor earnings and annual weeks worked. Both graphs provide evidence of a negative and significant impact of the program on the intensive margin of employment. In particular, earnings drop by up to 500 euros per year – which translates into an effect of 3% –, while annual weeks worked drop by approximately 2%.

Turning to firm level outcomes, we find a significant 0.5 to 1 percentage point increase in the survival probability of firms during the years of the crisis (Figure 8). Conversely we find small and mostly insignificant effects on firm size (Figure 9).⁵ When looking at job flows as measured by the annual hiring and separation rates⁶ (Figures 10 and 11) we do not find significant effects except for an increase of both the hiring and separation rate in 2008 and a decrease in 2012, which we intend to investigate further.

The null effects on firm size that were shown in Figure 9 mask some interesting patterns once we take into account the duality of the Italian labor market. Figures 12 and 13 illustrate the effects of the program on employment under open-ended and fixed-term contracts respectively. As can be appreciated from the graphs, there is a positive and significant effect of having access to the program on open-ended contracts and an almost specular negative effect on fixed-term ones. This evidence suggests that short-time work might be altering the composition of employer-employee matches towards more stable but less flexible contractual forms.

5. Dynamic effects of firms and workers

While the previous analysis identifies the contemporaneous effects of short-time work, we are also interested in uncovering the long term effects of the program on firms and workers. In order to do so, we adopt an event study approach and document the evolution of a range of firm's and worker's outcomes around their first short-time work spell.

The data consist of a panel of all firms that have been active at any point in time between year 2000 and 2015, and that employed between 5 and 25 employees in the year prior to their first short-time work spell (or placebo spell, as described below). Each treated firm (i.e. a firm with at least one short-time work spell between 2005 and 2015) is matched with a control firm (i.e. a firm who never experienced short-time work) via Mahalanobis distance nearest-neighbor matching without replacement. Practically, for each calendar year j from 2004 to 2014, we select all treated firms that are at event time $t = -1$ in calendar year j and all (unmatched) control

⁵ We measure employment as of March of each year to address issues of seasonality.

⁶ The annual hiring rate is computed as the ratio of the number of new contracts in the firm in year j over total employment in December of year $j-1$. Both new hires and fixed-term contract renewals/conversions are included in this measure. The annual separation rate is defined analogously and encompasses layoffs, quits and fixed-term contract ends.

firms active in calendar year j . We compute the Mahalanobis distance between two firms on the basis of firm size, wage bill, and hiring and separation rates at event times $t = -1, -2, -3$ and -4 , and 2-digit industry at event time $t=-1$, and match each treated firm to its nearest-neighbor control firm. Matched controls are assigned a placebo event in calendar year $j+1$, which becomes event time $t=0$. We end up with a sample of 2505 treated firms matched to 2350 control firms.

A similar matching procedure is adopted to match treated workers (i.e. workers that experienced at least one short-time work event after 2005) with control workers (i.e. workers that never experienced a short-time work event) and assign placebo events to the latter. The initial dataset is composed of all employees of firms active at some point between 2000 and 2015, and with firm size between 5 and 25 employees in the year prior to the worker's first short-time work spell (or placebo spell, as described below). Analogously to firms, treated individuals are matched with control individuals via Mahalanobis nearest-neighbor matching without replacement, based on the following covariates: gender, age, job characteristics (such as whether the individual works full time or part time, whether he/she is on an open-ended or fixed-term contract and the worker's qualification) at event time $t=-1$, employment status, annual weeks worked, earnings and firm size at event times $t=-1, -2, -3$ and -4 , and 2-digit industry at event time $t=-1$. The final sample consists of 21273 treated and 18472 control workers. The distributions of actual and placebo events over time for firms and workers are reported in Figures 14 and 15 respectively.

By comparing the trajectories of outcomes for treated and control firms around their first event, we find that receipt of treatment appears to be associated with a significant increase in the probability of survival in the first two event years, which interestingly coincide with the maximum duration of the program (Figure 16). Conditional on a firm survival, we document a persistent reduction in the annual wage bill and in the workforce (Figures 17 and 18).

At the worker level, we find a short-run increase in the probability of employment that dissipates after two years (Figure 19) and a permanent decrease in employment at the intensive margin, as measured by either annual earnings or weeks worked conditional on employment (Figures 20 and 21). One interesting exercise is to compare the insurance role of short-time work with that of unemployment insurance. Indeed, one can think of them as alternative social insurance programs a worker might end up in when his/her firm is affected by a negative shock. Figures 22 and 23 compare the evolution of annual earnings and annual weeks worked conditional on employment for three groups: a treatment group that consists of workers experiencing their first short-time work spell at time 0; a baseline control group of individuals that are never treated; and a third group of workers experiencing their first unemployment insurance spell at time 0.⁷ Both control groups are matched to the treatment group based on pre-event individual and firm level characteristics as described above. When compared to the UI control group, the intensive margin response of the treatment group appears rather modest. While we acknowledge the fact that the matching strategy is unlikely to fully account for the selection of workers into the two programs, these graphs provide some *prima facie* evidence that the insurance role of short-time work is much stronger than that of UI.

6. Heterogeneity, selection and reallocation

In a context in which there is substantial heterogeneity in the background characteristics of firms that take up short-time work and of workers that are put on reduced hours, it becomes key to understand which firms and

⁷ These analyses are performed on the fRDB dataset, which is a representative sample of workers extracted from the INPS administrative archives. Specifically, individuals are randomly selected based on their day of birth (24 dates per year).

workers are more likely to select into the program. Indeed, the patterns of selection into program take-up can have important consequences for the effectiveness of the policy and its welfare implications. For instance, if less productive firms are more likely to access short-time work and survive, then the policy is actually subsidizing unproductive firms and hindering the reallocation of labor and capital towards more productive ones. Conversely, if take-up is prevalent among liquidity-constrained firms, then short-time work may provide liquidity to these firms and prevent excess layoff sensitivity to liquidity or productivity shocks (Schoefer, 2015).

We exploit the richness of data on balance sheets to explore the presence of heterogeneity in the probability of take-up and provide some preliminary evidence of heterogeneous take-up rates across firms by their pre-crisis characteristics. We use balance-sheet data to construct measures of heterogeneity such as liquidity and financial constraints, and labor productivity. Liquidity constraints are measured using the proportion of liquid assets out of total assets. Credit constraints are instead proxied by a version of the Whited-Wu index that omits dividends, given that most of the small-medium enterprises we look at do not pay dividends to shareholders. Finally, labor productivity is computed as value added per employee.

We rank firms according to the pre-crisis level of each of these dimensions separately, conditional on 2-digit industry.⁸ Then, we plot the triple difference in short-time work take-up for firms in the top and bottom quartiles of the industry-specific ranking. Figure 24 shows that liquidity-constrained firms are significantly more likely to select into the program: the gap in take-up probabilities reaches 4-5 percentage points in the years of the crisis. A similar pattern emerges when comparing firms in the bottom and top quartiles of the labor productivity distribution (Figure 25), which display a 6 percentage point differential probability of take-up. Finally, as shown in Figure 26, more financially constrained firms appear to have a lower take-up rate than financially healthier ones.

The graphical evidence just described provides some initial evidence of heterogeneity in take-up and suggest that firms may be selecting into treatment differentially depending on their structural financial and organizational characteristics. Coupling this evidence with estimates of heterogeneous effects across firms will help understanding the consequences of different types of selection for the effectiveness of the policy and its welfare implications.

7. Conclusion

This paper provides novel empirical evidence on the effects of short-time work on firms' and workers' outcomes. We exploit the richness of Italian administrative data on short-time work and quasi-experimental variation in the regulations of *Cassa Integrazione Guadagni* to credibly identify the short-run impact of the program via a triple difference strategy. We find positive effects of the program on firm survival, small and mostly insignificant changes in employment at the extensive margin, but sharp reductions at the intensive margin.

We complement the short-run difference-in-difference strategy with an event study approach that helps uncovering the dynamic effects of the program. The positive effect on firm survival and individual employment dissipate after two years, while that on the intensive margin of employment persists in the longer run.

⁸ To account for the potential volatility of balance-sheet data, we average each of these measures across the pre-crisis years 2005 to 2007.

By matching the administrative records with firm-level balance sheet data, we construct measures of liquidity, financial constraints and labor productivity, and provide some initial evidence of heterogeneity in program take-up as a function of the pre-crisis level of these measures.

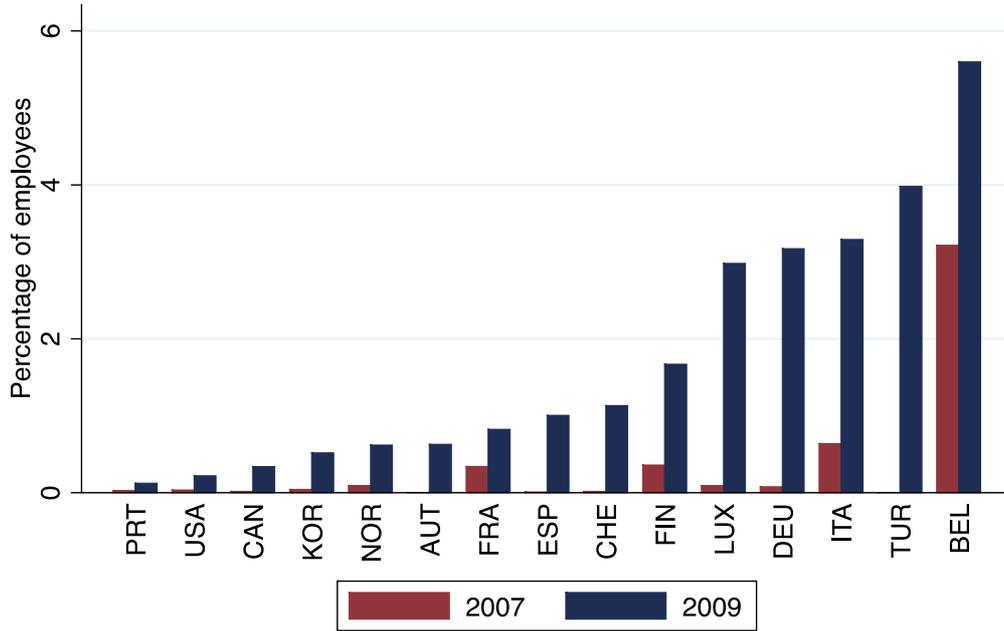
In future work, we will develop a general-equilibrium framework to analyze the welfare consequences of short-time work programs as policy tools to prevent layoffs in the presence of frictions and dual labor market institutions. The model will provide a characterization of the optimal short-time work subsidy as a function of estimable behavioral responses that – once mapped onto the empirical estimates – will inform about the optimality of the current scheme and deliver useful policy recommendations on its design.

References

- Boeri, T. and Bruecker, H. (2011), "Short-Time Work Benefits Revisited: Some Lessons from the Great Recession", *Economic Policy*, Vol. 26(68), Pages 697-765, October.
- Brenke, K., Rinne, U. and Zimmermann, K.F. (2013), "Short-Time Work: The German Answer to the Great Recession", *International Labor Review*, Vol. 152(2), Pages 287-305.
- Burdett, K. and Wright, R. (1989), "Unemployment Insurance and Short-Term Compensation: The Effects on Layoffs, Hours per Worker, and Wages", *Journal of Political Economy*, Vol. 97(6), 1479-1496.
- Cahuc, P. and Carcillo, S. (2011), "Is Short-Time Work a Good Method to Keep Unemployment Down?", IZA Discussion Papers 5430, Institute for the Study of Labor (IZA).
- Calavrezo, O., Duhautois, R., and Walkoviak, E. (2009a), "Chômage Partiel et Licenciements Economiques", *Connaissance de l'Emploi*, Centre d'Etudes de l'Emploi, No. 63, March.
- Calavrezo, O., Duhautois, R., and Walkoviak, E. (2009b), "Short-Time Compensation and Establishment Exit: An Empirical Analysis with French Data", IZA Discussion Papers 4989, Institute for the Study of Labor (IZA).
- Hall, R.E. and Lazear, E.P. (1984), "The Excess Sensitivity of Layoffs and Quits to Demand", *Journal of Labor Economics*, University of Chicago Press, vol. 2(2), pages 233-57, April.
- Hijzen, A. and Martin, S. (2013), "The role of short-time work schemes during the global financial crisis and early recovery: a cross-country analysis", *IZA Journal of Labor Policy*, Springer, vol. 2(1), pages 1-31, December.
- Hijzen, A. and Venn, D. (2010), "The role of short-time work schemes during the 2008-09 recession", *OECD Social, Employment and Migration Working Papers 115*, OECD Publishing.
- Landais, C., Michailat, P. and Saez, E. (forthcoming) "A Macroeconomic Approach to Optimal Unemployment Insurance I: Theory", *American Economic Journal: Economic Policy*.
- Schoefer, B. (2015) "The Financial Channel of Wage Rigidity", Working Paper.

Figure 1

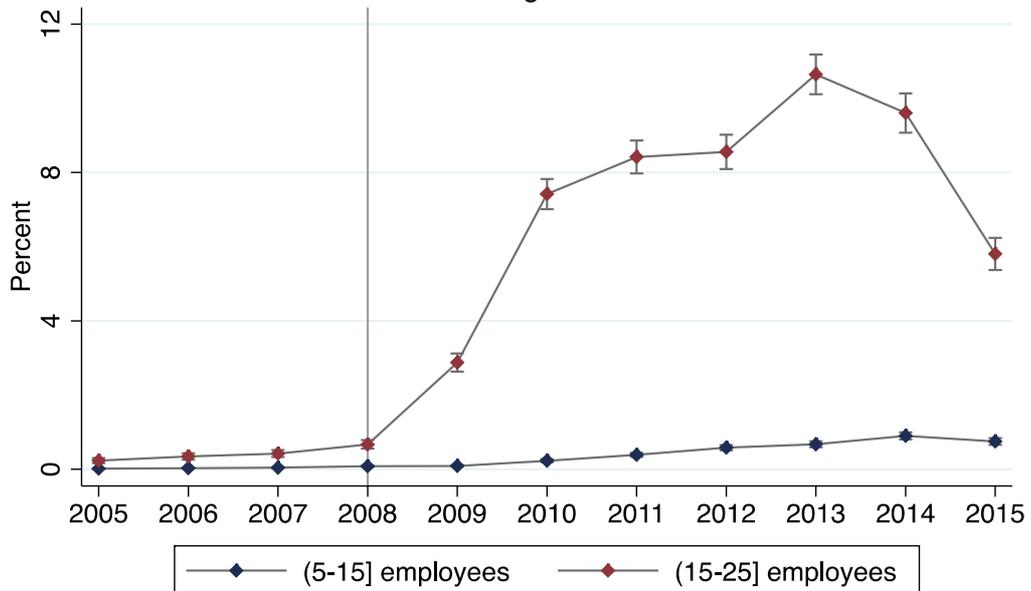
Average monthly take-up rate in 2007 and 2009



Source: Hijzen and Venn (2010), OECD data

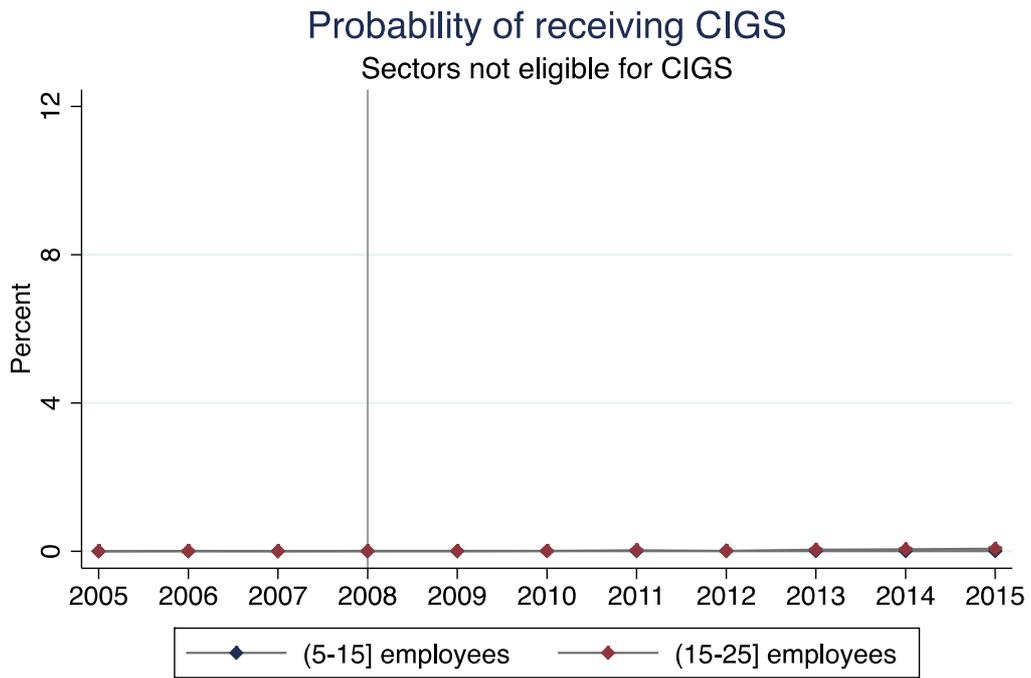
Figure 2

Probability of receiving CIGS
Sectors eligible for CIGS



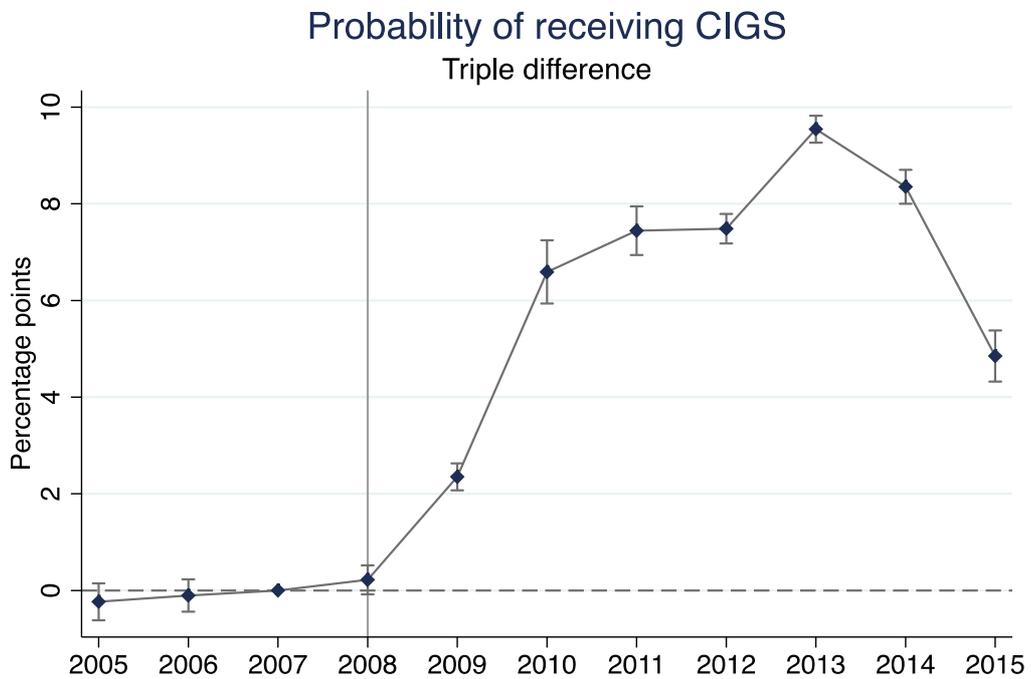
Source: INPS.

Figure 3



Source: INPS.

Figure 4



Source: INPS.

Figure 5

Probability of receiving any CIG

Triple difference

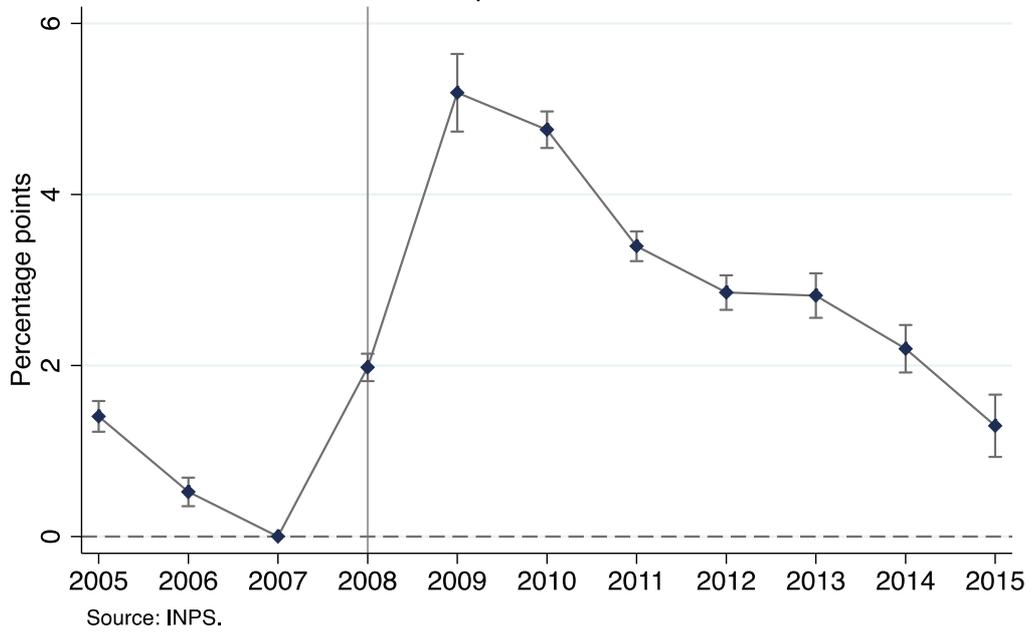


Figure 6

Annual labor earnings

Triple difference

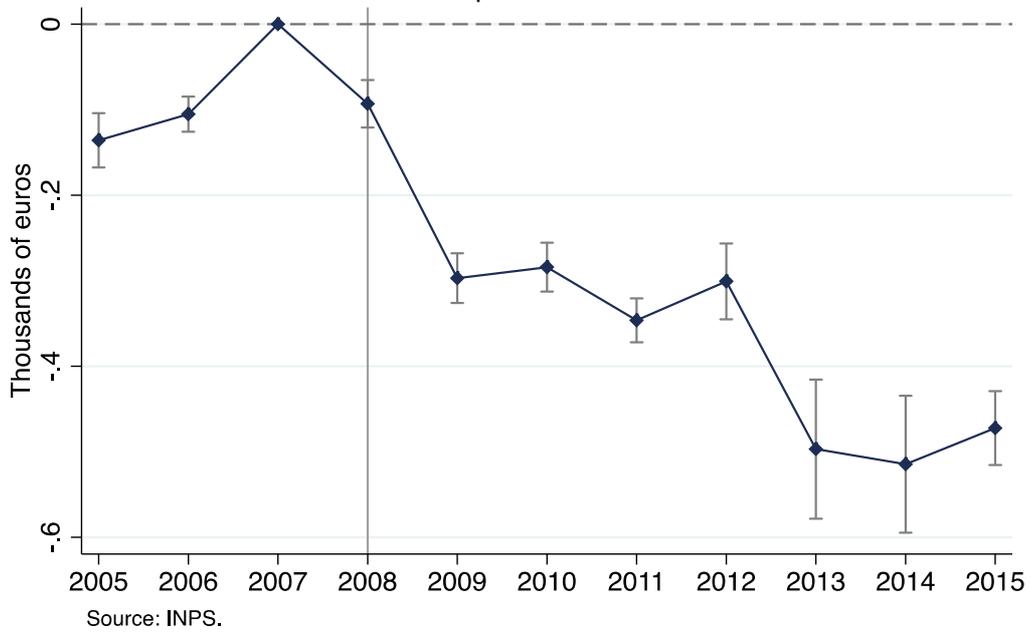


Figure 7

Annual weeks worked
Triple difference

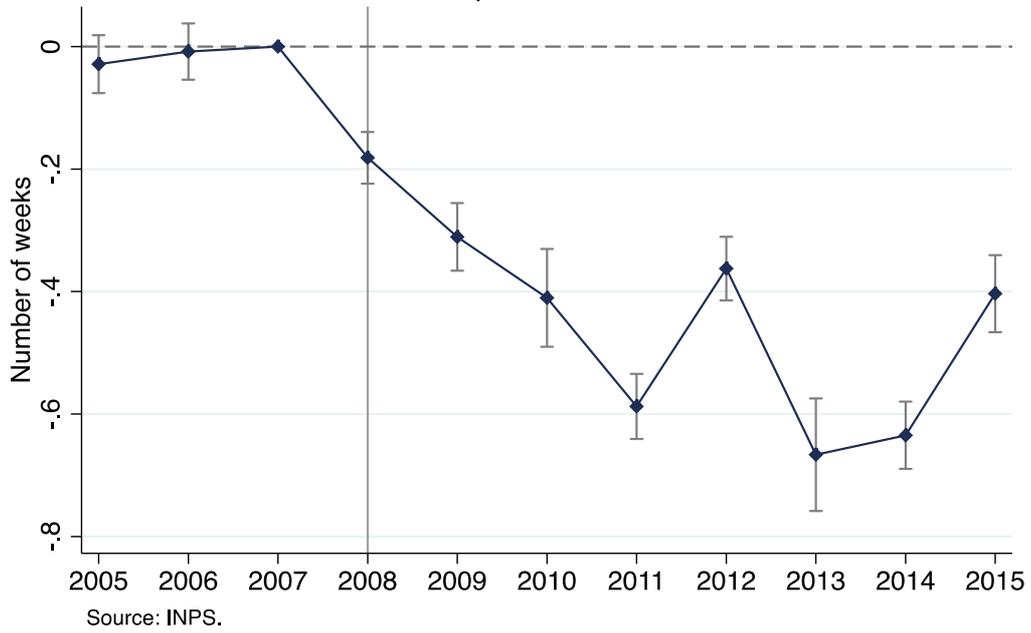


Figure 8

Probability of firm being active in t+1
Triple difference

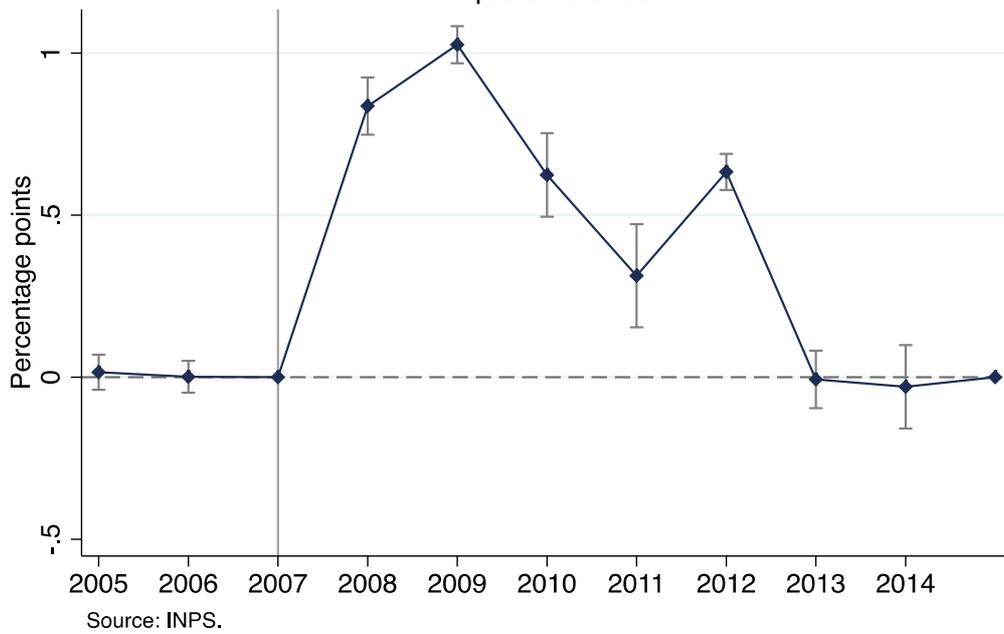
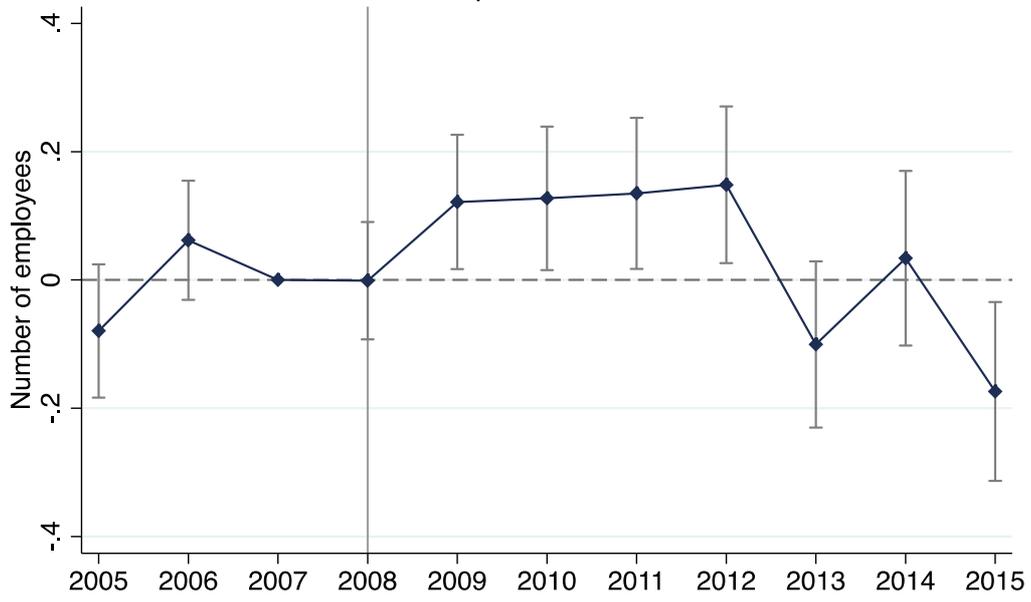


Figure 9

Firm size in March

Triple difference

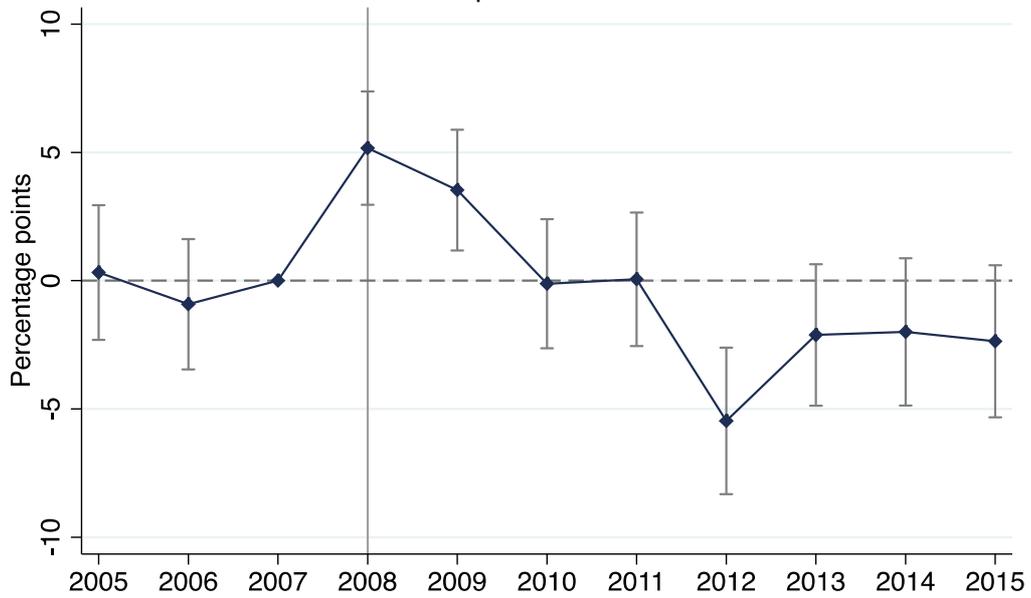


Source: INPS.

Figure 10

Hiring rate (annual)

Triple difference

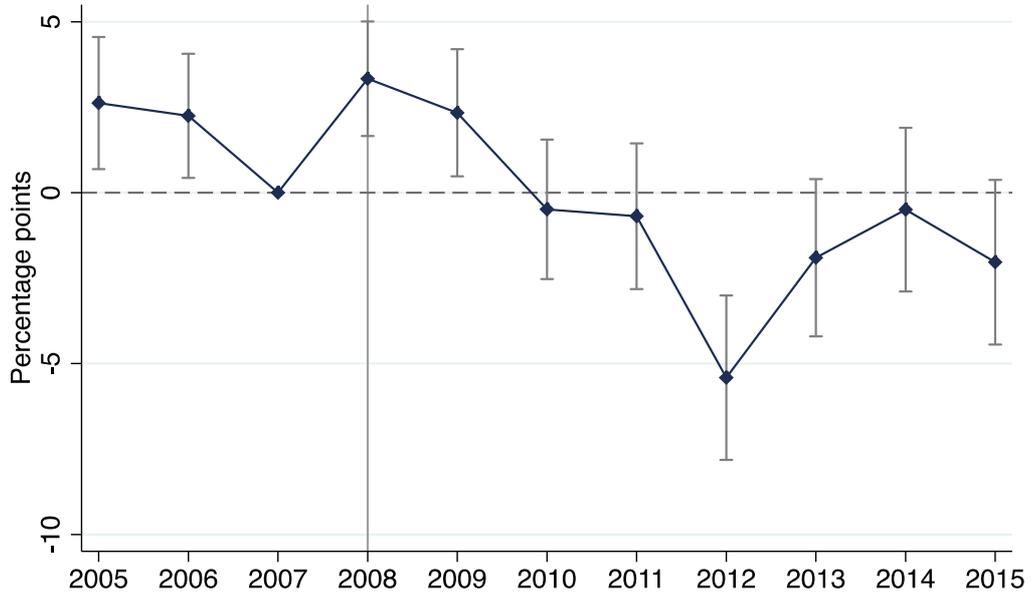


Source: INPS.

Figure 11

Separation rate (annual)

Triple difference

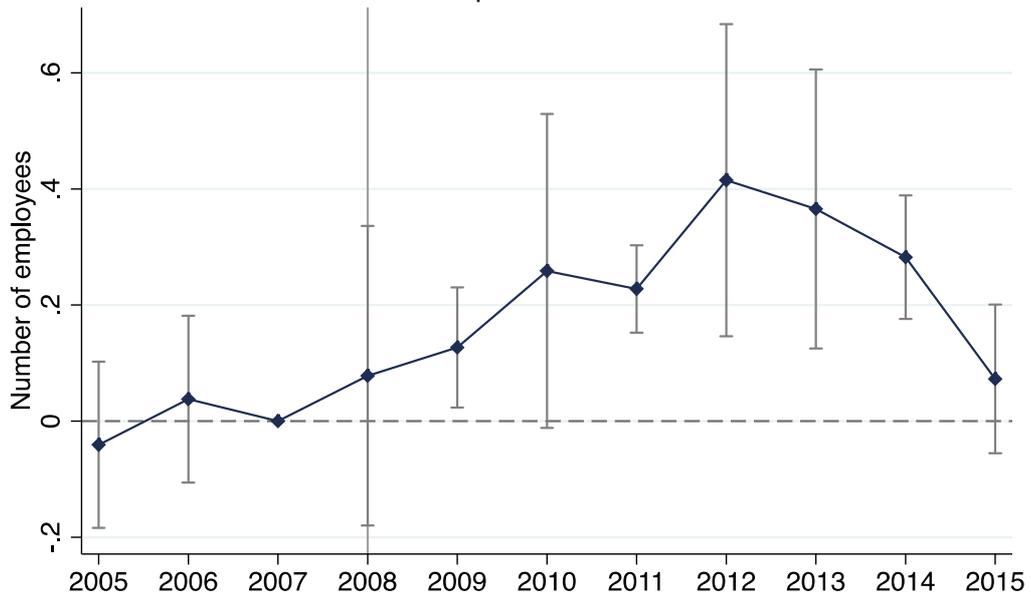


Source: INPS.

Figure 12

Employees on open-ended contracts

Triple difference



Source: INPS.

Figure 13

Employees on fixed-term contracts Triple difference

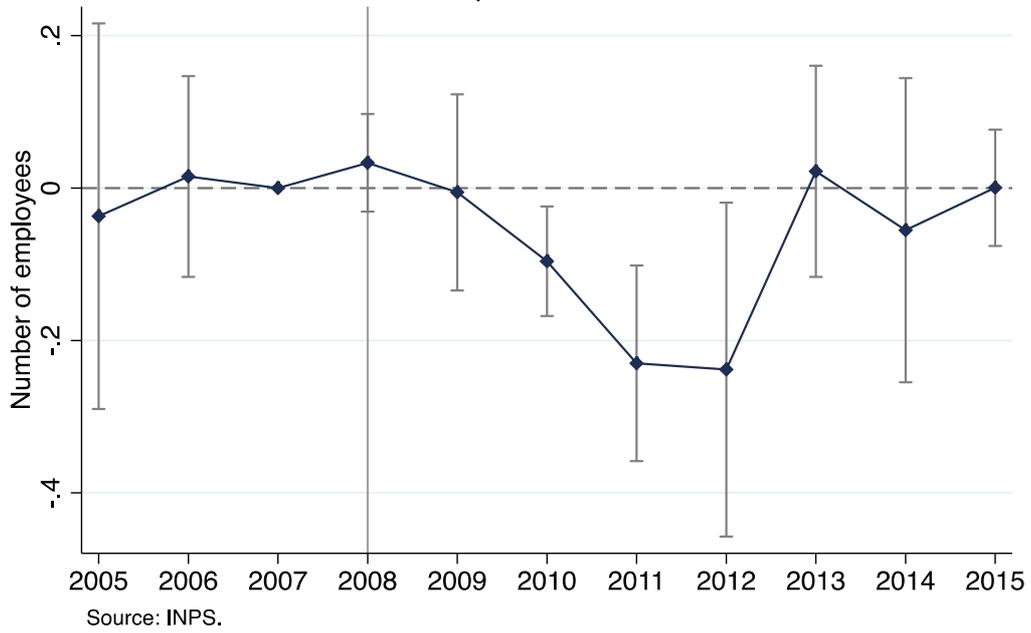
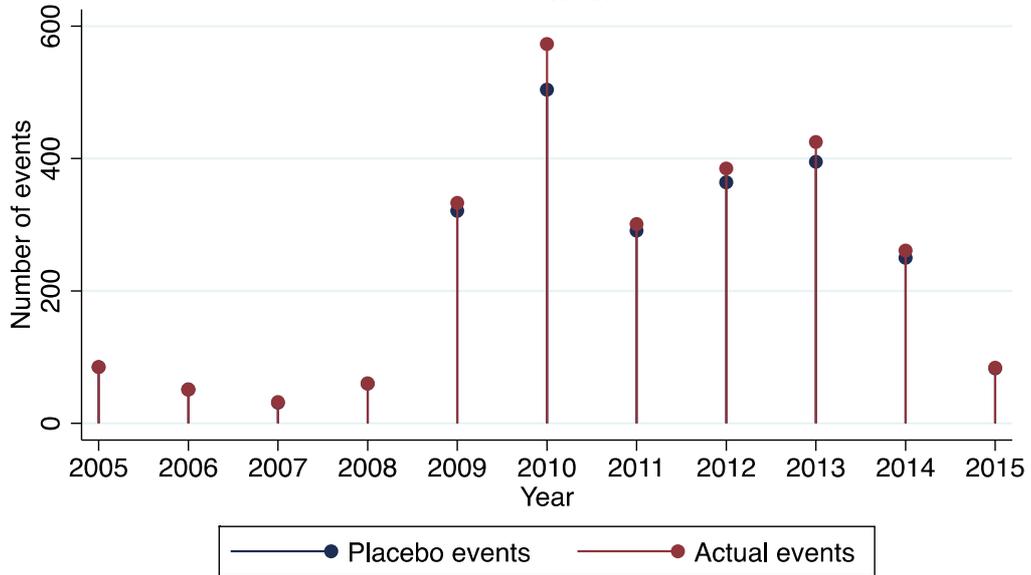


Figure 14

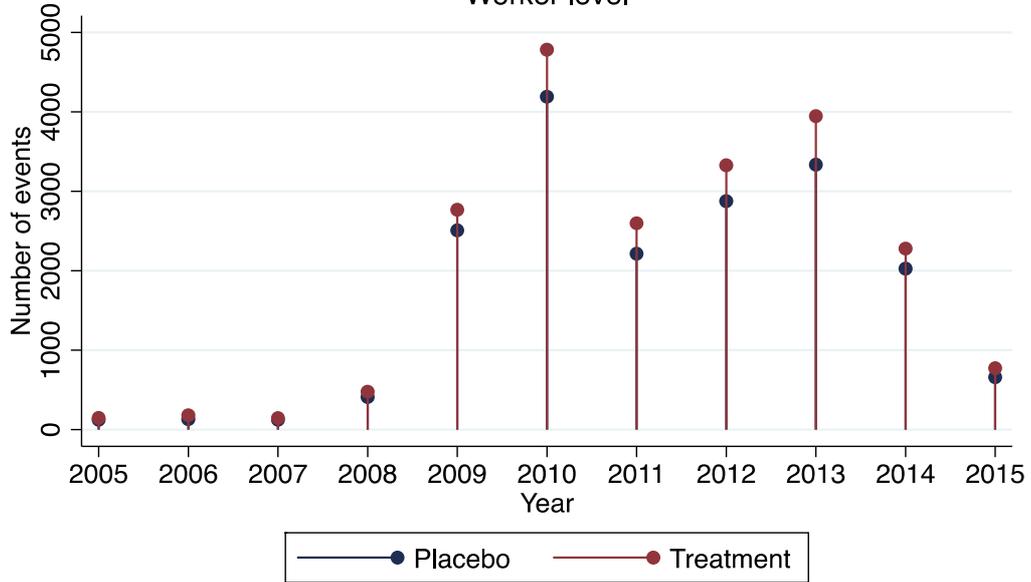
Distribution of events by year Firm level



Note: Treated = 2505, Controls = 2350.
Source: INPS.

Figure 15

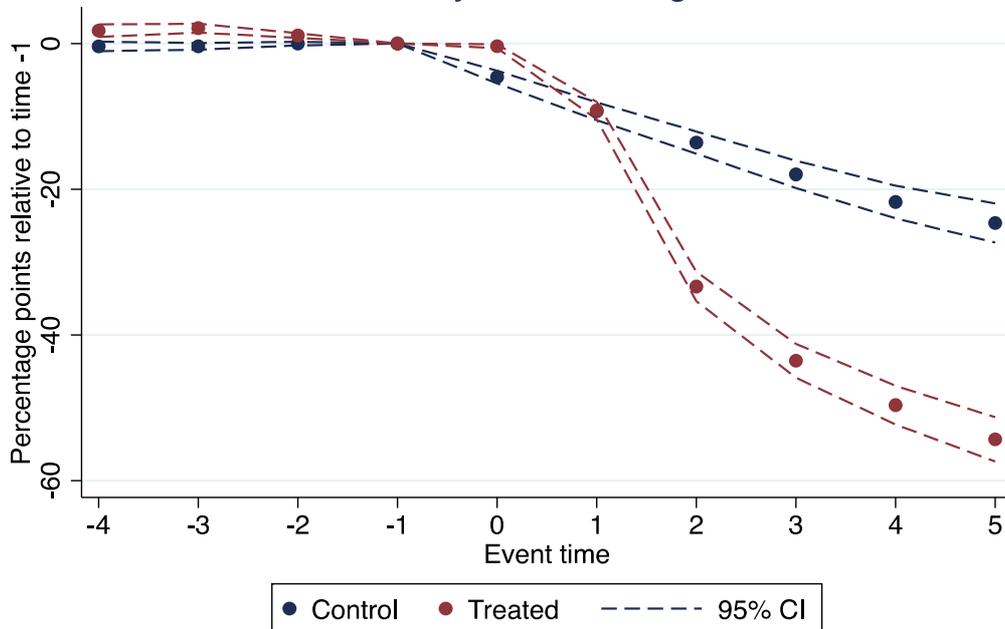
Distribution of events by year Worker level



Note: Treated = 21273, Controls = 18472.
Source: INPS.

Figure 16

Probability of firm being active



Source: INPS.

Figure 17

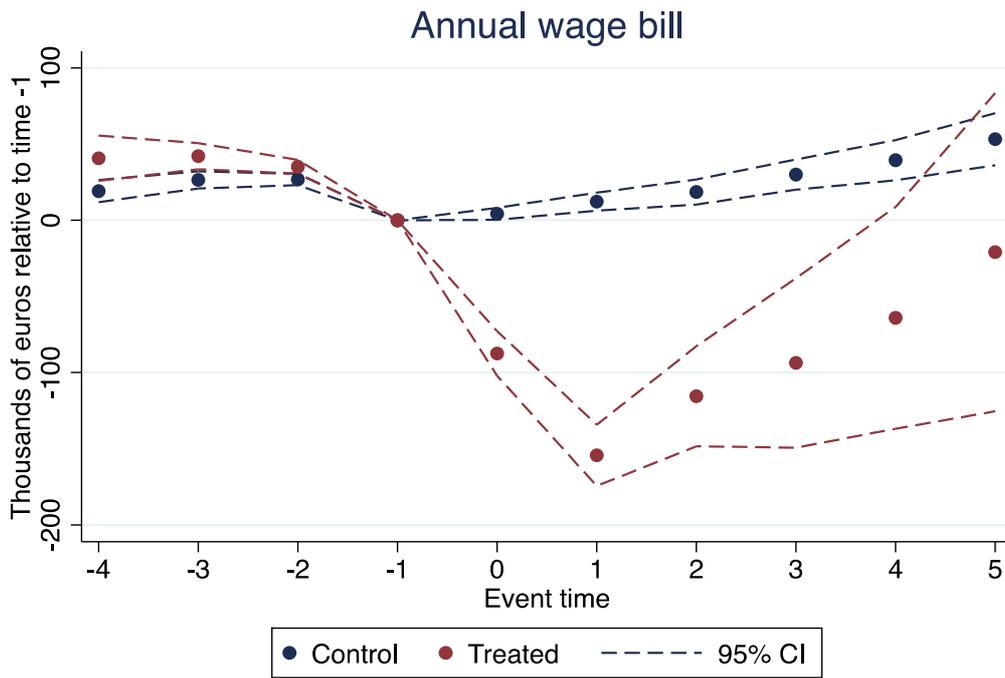


Figure 18

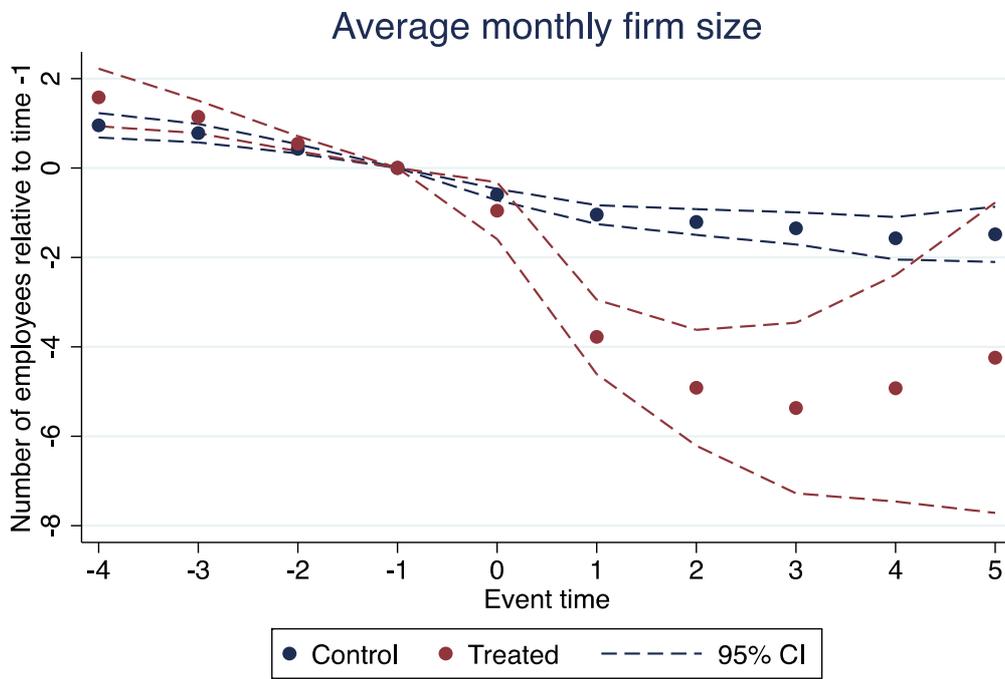


Figure 19

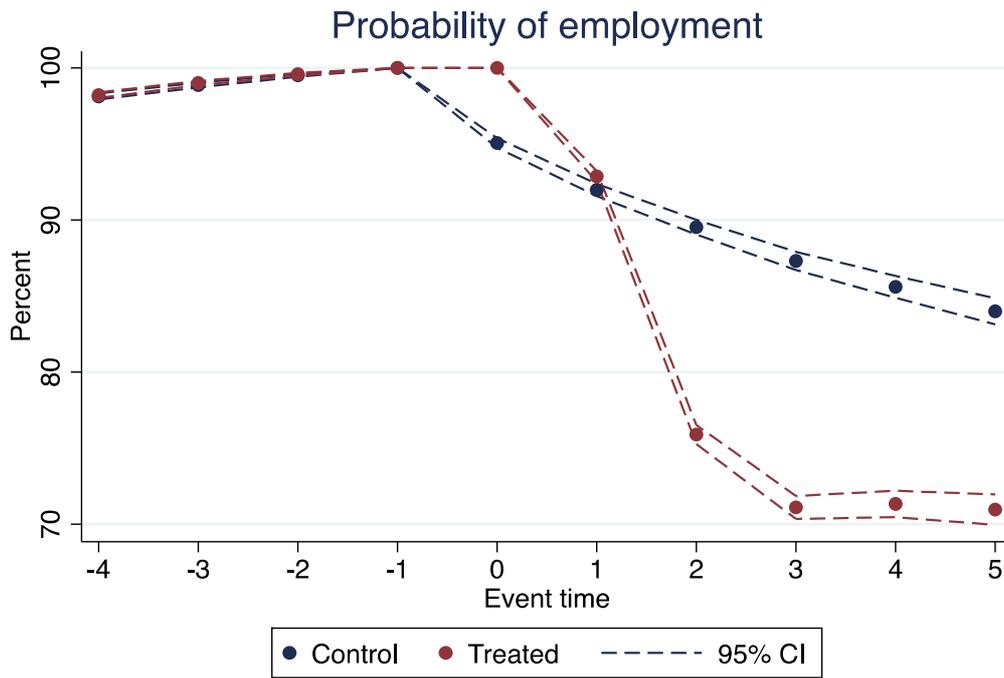


Figure 20

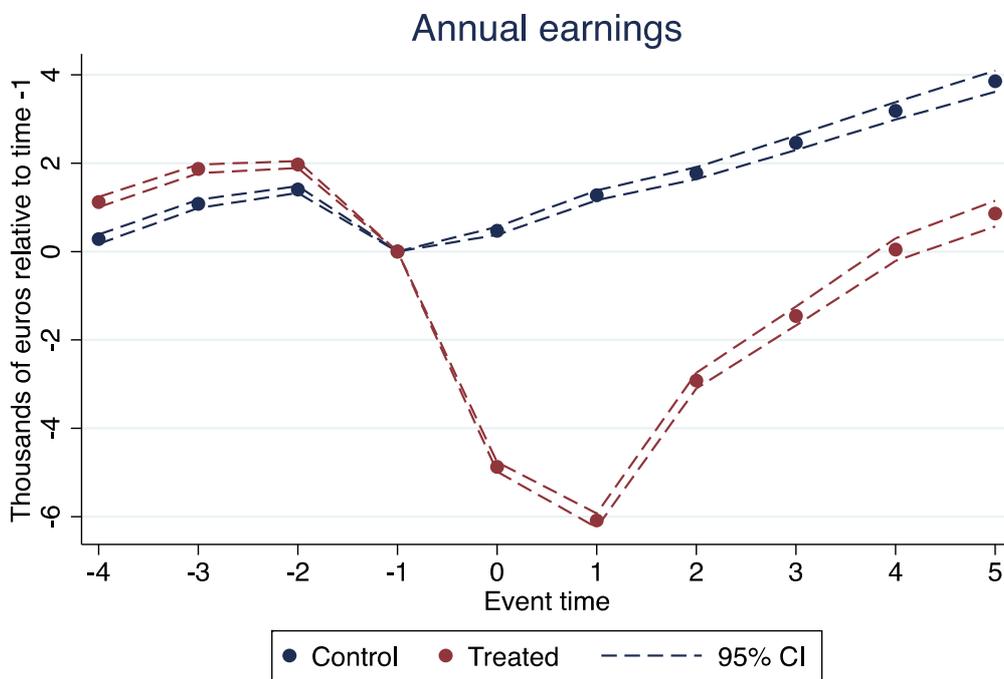
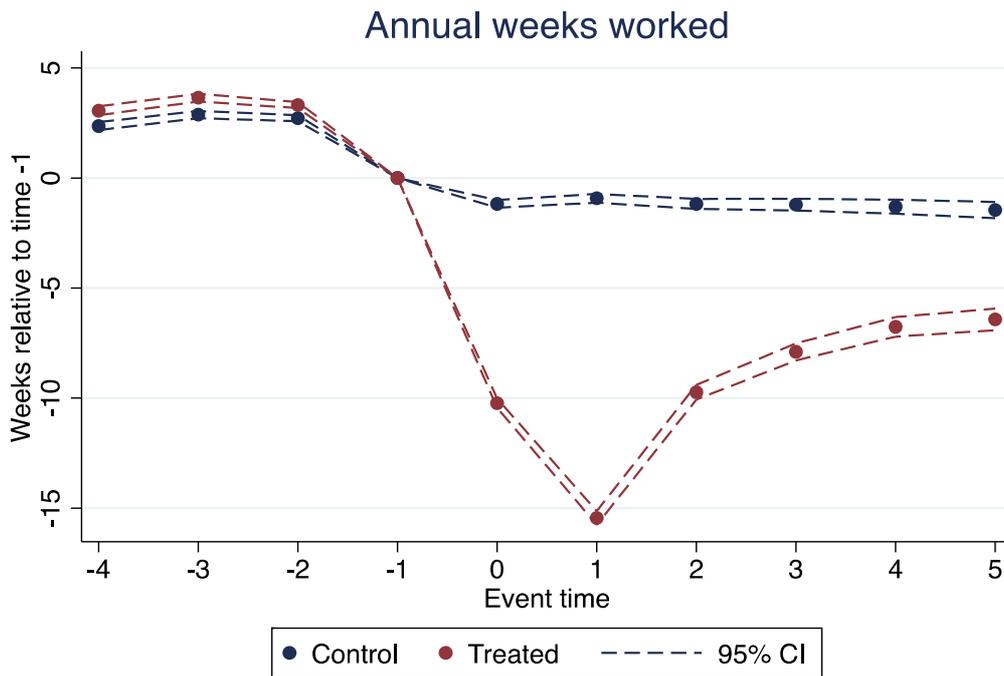
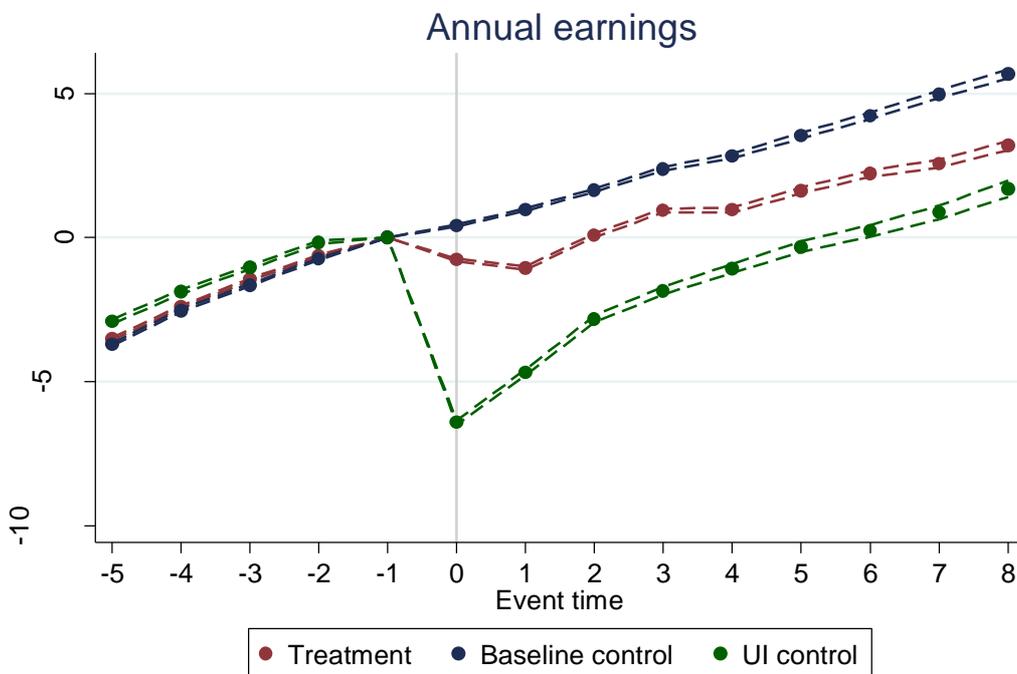


Figure 21



Source: INPS.

Figure 22



Source: fRDB.

Figure 23

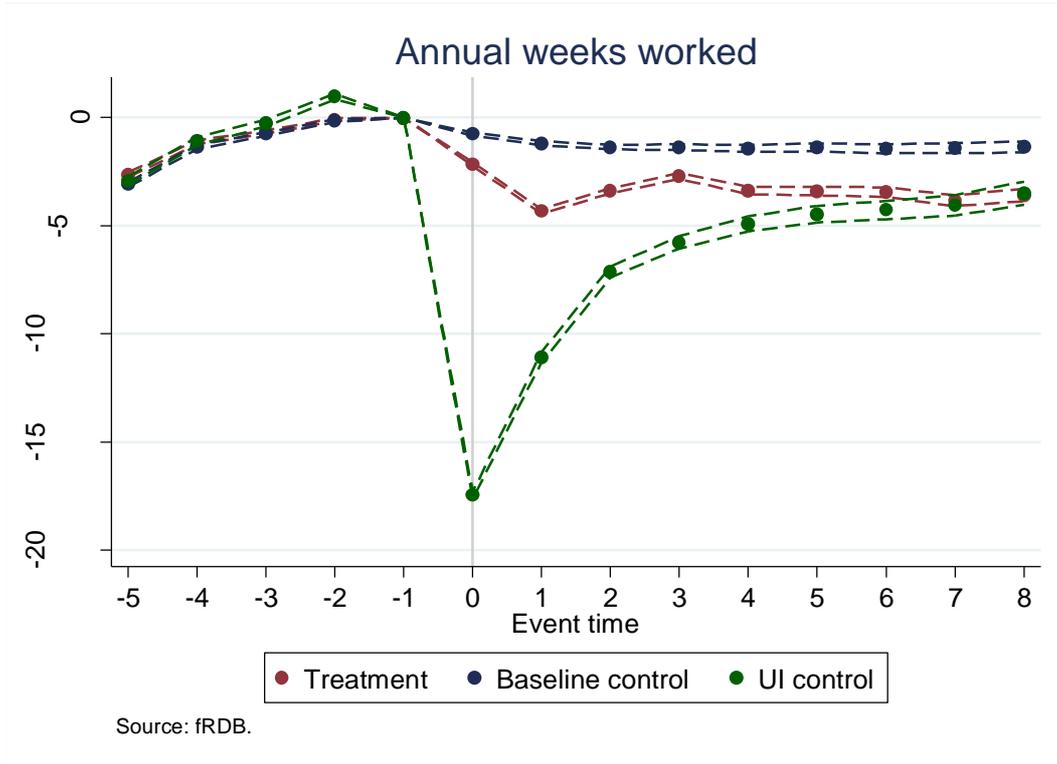


Figure 24

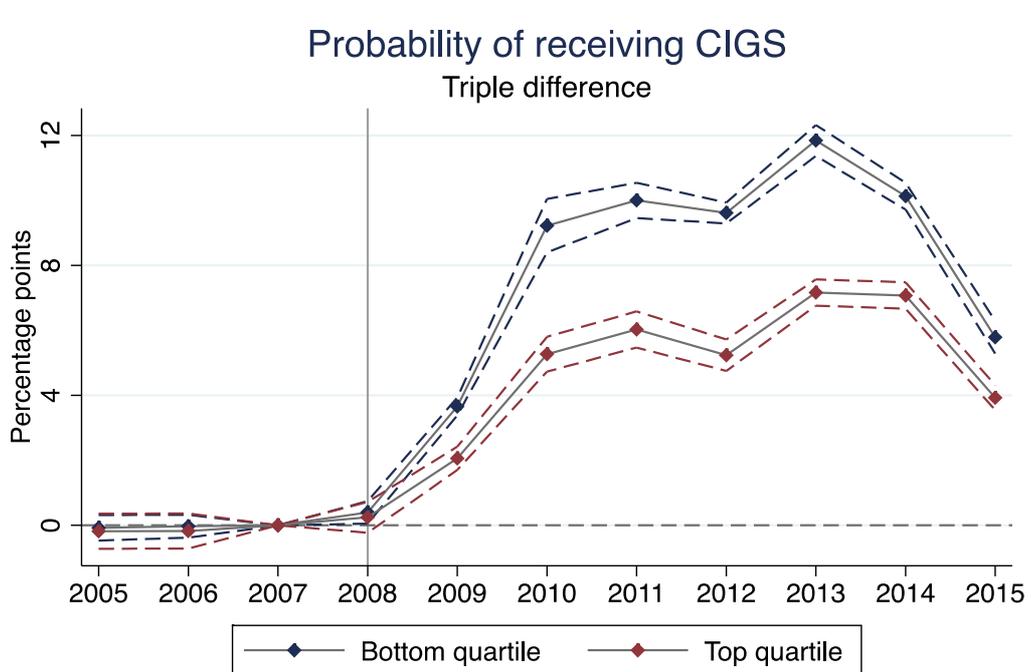
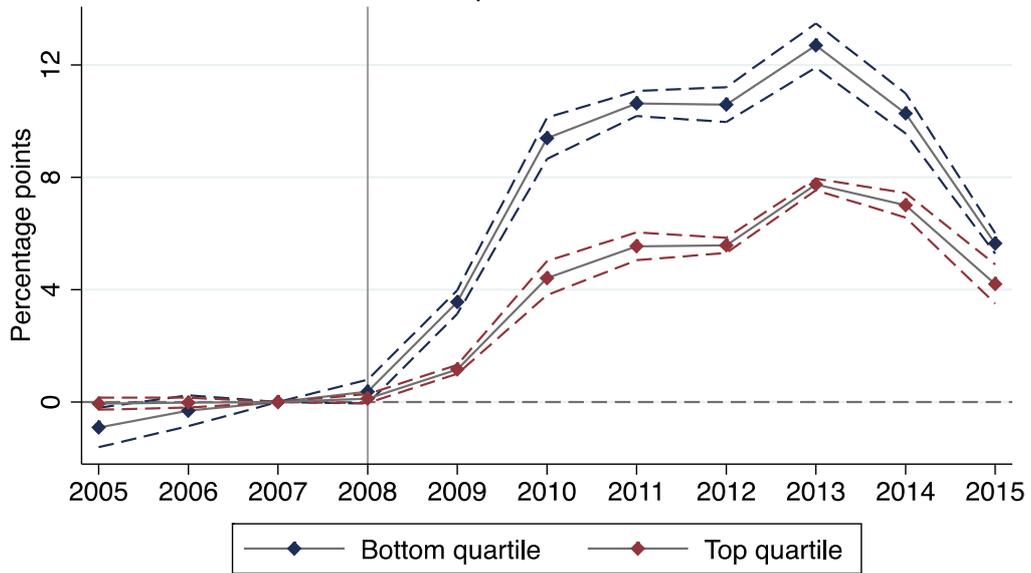


Figure 25

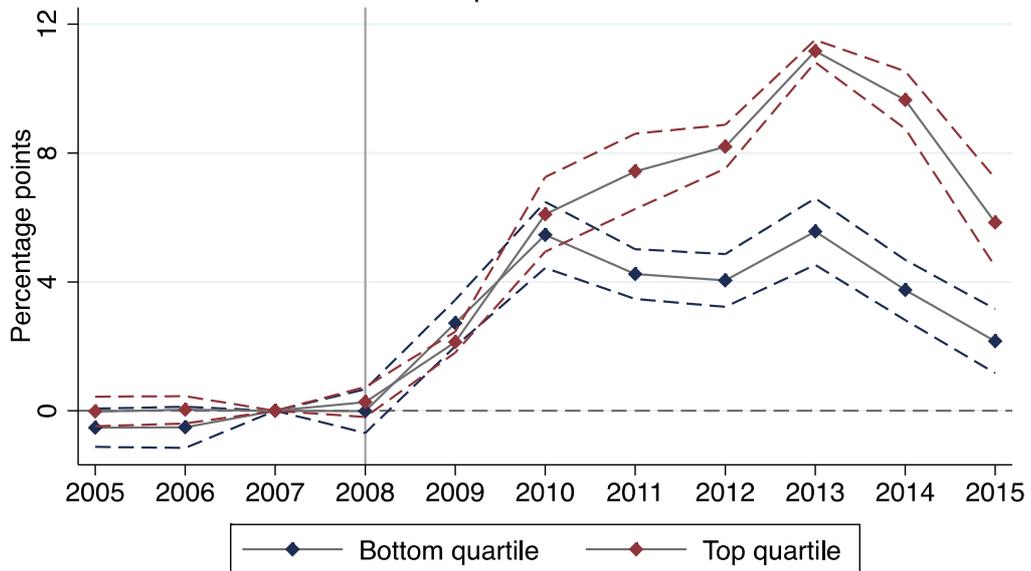
Probability of receiving CIGS
Triple difference



Note: Dimension of heterogeneity: labor productivity.
Source: INPS.

Figure 26

Probability of receiving CIGS
Triple difference



Note: Dimension of heterogeneity: Whited-Wu index (no dividends), increasing in financial health.
Source: INPS.