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Abstract

This paper investigates the costs for firms of employing women full-time *versus* part-time, in terms of differential hourly wages. To this end, we use administrative matched employer-employee data on the universe of female workers in Italy over a period of 33 years and rely on regression models that control for worker, firm, and job match fixed effects, in addition to several worker-, job-, and firm-level time-varying factors. We find that, when a worker switches from a full-time to a part-time contract within the same firm, she benefits from an increase in the hourly wage. Over the last three decades, these wage premiums have significantly reduced, although they remained positive and significant up to 2015. We also find that the part-time premium is pervasive and stable across many different labor market segments and independent of the workers' intrinsic productivity levels. These and other findings appear to be compatible with developments in wage bargaining institutions, whereby more generous conditions can be granted to part-time workers. Coupled with the detrimental effect of part-time work on firm productivity documented by Devicienti et al. (2018), our results contribute to explaining why firms are often unwilling to concede part-time positions to those employees who request such arrangements.

Keywords: Part-time/full-time wage differentials, wage bargaining institutions, multiple fixed effects regressions, administrative matched employer-employee longitudinal data.
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1. Introduction

Many experts have stressed that part-time work is a valuable work-life balance instrument, since it allows people to better conciliate their work with the needs of their private lives (Eurofound and ILO, 2019; Eurostat, 2009; OECD, 2017). However, both anecdotal and the available statistical evidence suggest that workers who wish to switch to a part-time work schedule often encounter resistance, if not outright opposition, from their employers. A quick search on the Internet confirms this: there is a multitude of online forums where workers complain that their employers have not allowed them to work a reduced number of hours. It is not unusual for workers, particularly females, to be forced to leave their jobs following a denied request to switch to a part-time work arrangement. Accordingly, Gasparini et al. (2012) reported that only about 30% of full-time employees in EU-15 feel that their employer would favorably consider their request to reduce their working hours.

There may be several reasons why firms are generally unwilling to satisfy the requests of their workers to switch to a part-time contract. The communication and start-up costs associated with part-time work and the difficulties of optimally staffing part-time employees might lead to efficiency losses in a firm's organizational structure. In a recent study, we have found, after accounting for a large number of worker and firm-level characteristics, that part-time work is, in fact, linked to significantly lower firm productivity, and that this result holds for different categories of firms (Devicienti et al., 2018). If firms can compensate for this productivity gap by offering lower wages to part-time workers, they should be indifferent between employing the workers according to a full-time or a part-time schedule. However, this is usually unfeasible in most industrialized economies, where the law dictates that part-time workers should have the same monetary (and non-monetary) benefits as comparable full-time workers. In some countries, such as Italy, the law even allows for a more favorable treatment of part-time workers. The emergence of a zero or positive part-time/full-time wage differential, coupled with the lower productivity associated with part-time arrangements, could help to understand the reluctance of firms to satisfy the requests of workers to switch to part-time schedules. This paper, which tackles the analysis from a firm's viewpoint, is aimed at investigating whether this happens or not.

In order to estimate whether part-time schedules have a different cost from full-time arrangements, we use a very large data set, which covers the universe of private-sector employees in Italy over a period of more than 30 years. This data set is based on administrative data from the Italian Social Security System (INPS) and links each employee to the firm he/she works in, thereby allowing a large amount of longitudinal worker-, firm-, and job-level information to be exploited. This multiple-level information is crucial to assess the presence of any wage differentials associated with part-time arrangements, since a multitude of factors can simultaneously determine wages and the part-time work status. We concentrate on the impact of a change in the working time arrangement of the same worker within the same firm. This allows any confounding effects, due to the presence of unobserved fixed worker, firm, and job match heterogeneity, to be removed. At the same time, we control for an ample set of time-varying observable factors that might also confound the effect. Particular attention is devoted to controlling for the employee's work history, with specific reference to accumulated experience in the labor market, in part-time and full-time work. We also pay attention to any possible contemporaneous endogeneity stemming from maternity and from the employer undergoing periods of economic crisis, which are likely to simultaneously influence a change in the working schedule and wages.

In this study, we focus on females. This decision was taken for several reasons. First, females constitute the vast majority of part-time workers. Second, they represent the most relevant segment for the aims and policy implications of this paper. Females are those that are more likely to ask for (temporary) transitions to part-time work, often to conciliate work with family commitments. A denied request to switch to a part-time arrangement may entail withdrawal from work, with well-known long-lasting consequences in terms of earnings and the possibility of successfully re-entering the labor market. Third, part-time work for males is a very heterogeneous phenomenon and, unlike what happens for women, it is mostly involuntary (i.e., most men working part-time would prefer a full-time position). Fourth, we concentrate on females for comparative reasons, since most studies that have examined part-time/full-time wage differentials have focused on women.

Several papers have analyzed part-time/full-time wage differentials, but most of them have investigated the issue from the workers' viewpoint. These studies were mainly interested in assessing the determinants of part-time/full-time wage differentials, and how the part-time status influences the future earnings and career trajectories of workers. Particular attention has been devoted to gender issues, either by concentrating the analysis on women or by juxtaposing part-time earning differentials with gender wage gaps (Manning and Petrongolo, 2009; Matteazzi et al., 2018; Mumford and Smith, 2009; Pacelli et al., 2013); to the impact of switching to a part-time contract on the future earnings and career prospects of the workers (Connolly and Gregory, 2009; Fernández-Kranz and Rodríguez-Planas, 2011; Paul, 2016); and to the presence of a possible heterogeneity of part-time wage differentials along the wage distribution (Gallego Granados, 2019; Nightingale, 2019; Simon et al., 2017).

This paper contributes to the existing part-time literature in several ways. It is one of the few studies that explore the wage effect of switching to a part-time contract while remaining with the same employer. Moreover, the use of administrative data on the universe of workers and firms over a period of more than three decades allows us to explore the long-run dynamics of the part-time/full-time wage differential, and to run separate analyses on many different categories of workers and firms, based on, for instance, age, migration status, parenthood, job duration, occupation, and the firm's size, industry, and location. The dimension of our data entails that, for each of these analyses, we can remove any confounding factors related to worker, firm, and match-specific unobserved heterogeneity. Furthermore, in order to explore the mechanisms at play, we investigate whether the effects vary between short and long part-time work (as in Paul, 2016) and between switches from full-time to part-time work and switches from part-time to full-time arrangements (as in Booth and Wood, 2008, and Day and Rodgers, 2015). We also explore the relevance of the mechanisms related to workers' commuting to work and differential rent-sharing by part-time status within the firm.

Fernández-Kranz and Rodríguez-Planas (2011), who used longitudinal matched employer-employee data to estimate part-time/full-time wage differentials in Spain are, to the best of our knowledge, the only scholars who have controlled for both unobserved individual- and firm-level fixed heterogeneity, as we do in this paper.[1] They reported significant part-time wage penalties for female workers, which remained after controlling for individual and firm fixed heterogeneity, and which were particularly pronounced for temporary workers. On the contrary, our estimates point to the existence of pervasive wage premiums associated with part-time work schedules, which are transversal to many different segments of the labor market. These results, together with other additional results presented in this paper, are compatible with part-time premiums that stem from the relatively higher protection accorded to (female) part-time workers by unions and sectoral collective agreements.

The rest of the paper is structured as follows. Section 2 briefly discusses the mechanisms that can lead to a wage differential between part-time and full-time work schedules. Section 3 reviews the existing empirical literature on the part-time/full-time wage differential along two main dimensions: estimation methods and cross-country evidence. Section 4 outlines our empirical model, the type of effect that we identify, and its relationship with previous empirical works. Section 5 describes the data, Section 6 shows and discusses our results and, finally, Section 7 outlines the implications of our findings and draws conclusions.

[1]However, while we have used data on the universe of Italian employees over a period of 33 years, they used a 4% non-stratified random sample of the population registered with the Spanish Social Security Administration in 2006, which amounts to a sample of about 76,000 individuals observed over the years 1996-2006.

2. Conceptual framework

There are several theoretical explanations as to why firms may pay full-time workers different hourly wages from part-time workers.

One mechanism is related to productivity differentials between the above two categories of workers, which - wage rigidity being absent - should be reflected in wage differentials. Part-time workers may be less productive than full-time workers, due to the daily start-up costs, whereby the individual labor productivity is lower during the first hours of work and only picks up slowly during the day (Barzel, 1973). Part-time work may also impose firm-wide communication and coordination costs that may be detrimental to the firm's overall efficiency (Owen, 1978). However, part-time workers may also be more productive than full-time workers if the stress reductions from working fewer hours offset the above-mentioned adverse effects (Moffitt, 1984; Tummers and Woittiez, 1991). Overall, the existing evidence for Italy points to significant productivity losses associated with part-time work arrangements (Devicienti et al., 2018).

The second set of mechanisms is related to the concept of compensating wage differentials. Individuals who request a shift to a part-time arrangement (e.g., due to childcare duties) may be willing to accept lower hourly wages in exchange for the possibility of working reduced hours. If firms find it costly to arrange part-time schedules, part-time wage penalties arise in equilibrium. Apart from the possible lower productivity associated with part-time work, firms generally face fixed labor costs (e.g., hiring and training costs). These costs increase proportionally with the number of employees rather than with the number of worked hours, thus making part-time work schedules relatively more expensive (Montgomery, 1988; Oi, 1962).

Alternatively, workers may request an increase in hourly wages to compensate for the reduction in total labor earnings (and possibly consumption) associated with the reduction in hours of work. Compensation for part-time schedules may also be required when workers have to bear commuting costs, both in terms of time spent reaching the job location or because they have to pay a fixed cost, such as a train/bus season-ticket or parking ticket.[2] Compensation for part-time arrangements may also be granted if part-time workers are less likely to obtain non-wage benefits or other amenities at the workplace than full-time workers (as pointed out by Paul, 2016, and Bardasi and Gornick, 2008). As the aim of this work is to understand the resistance of firms to conceding part-time positions to their employees,

[2] Mulalic et al. (2014) analyzed the effect of the commuting distance on workers' wages. Using the event of firm relocations in Denmark as a quasi-natural experiment, they found that employers accord a wage increase to their workers as compensation for higher commuting costs.

compensating wage effects that follow switches from a full-time contract to a part-time one within the same firm are of particular interest.

The third reason for differential hourly wages for part-time/full-time workers is that part-time workers may suffer from (statistical) discrimination, although this is usually prohibited by law. In Italy, as well as in many other advanced industrialized countries, the legislation concerning part-time work imposes strict rules against discrimination. In particular, it dictates that part-time workers must enjoy the same monetary conditions (e.g., wages, monetary bonuses) and non-monetary conditions (e.g., paid sick leave, parental leave) as comparable full-time workers according to a *pro rata temporis* principle.

Finally, collective bargaining may affect the ability of wages to reflect workers' productivity. In many countries, including Italy, the law leaves sectoral collective agreements free to dictate a more favorable treatment for part-time workers. Individual- and firm-level bargaining are often too weak to undo (and may even strengthen) the dispositions set by unions at the industry level. For their part, unions might disproportionately defend the weaker segments of the labor force, which typically include (female) part-time workers. If so, de-unionization and wage decentralization - which have recently been observed, and often advocated by policy commentators in many EU countries - may be associated with a deterioration of any wage privileges previously associated with part-time workers.

3. Previous empirical literature

The existing evidence on the presence of part-time/full-time wage differentials is mixed and depends on the type of data and estimation methods that were used. Many studies have focused on cross-sectional surveys of workers, and have generally found wage penalties associated with part-time work, which often remain after controlling for a series of individual-, firm-, and job-level characteristics (Bardasi and Gornick, 2008; Elsayed et al., 2017; Hardoy and Schøne, 2006; Jepsen et al., 2005; Manning and Petrongolo, 2009; Matteazzi et al., 2014; Mumford and Smith, 2009). A typical result of these studies is that the part-time pay penalty reduces significantly after taking into account occupational categories, thereby pointing to a crucial role of occupational segregation in explaining the observed part-time wage gaps. Other researchers have instead used individual longitudinal survey data (Booth and Wood, 2008; Connolly and Gregory, 2009; Day and Rodgers, 2015; Hirsh, 2005; Paul, 2016) and found that part-time penalties significantly reduce, often disappear, and sometimes even transform into part-time premiums once worker fixed effects are included in the regressions. Therefore, unobserved individual heterogeneity (e.g., differences in abilities and preferences between workers who typically hold part-time *versus* full-time contracts) also plays an essential part in explaining the observed part-time pay penalties (Paul, 2016).

Some studies have assessed part-time/full-time wage differentials by distinguishing between different types of part-time work, such as working part-time for just a few hours as opposed to more extensive part-time work (Paul, 2016) or holding a fixed-term *versus* a permanent job position (Fernández-Kranz and Rodríguez-Planas, 2011). Some scholars have looked at what happens when the change in the working time arrangement is not accompanied by a simultaneous change of the employer (Day and Rodgers, 2015; Fernández-Kranz and Rodríguez-Planas, 2011; Manning and Petrongolo, 2009), and this is more relevant for the present paper. For instance, Manning and Petrongolo (2009) found that the hourly earnings of women who changed from a full-time contract to a part-time one in the same firm remained virtually unchanged in a sample of 90,000 British women observed over the 2001-2003 period. On the other hand, the raw part-time wage gap was as high as 25% and reduced to 12.5% when individual-level characteristics were controlled for and to 2.5% when occupation categories were also taken into account. Part-time status and wages may thus also be related to firm and job match specificities which, if uncontrolled, can confound the estimated earning differentials between part-time and full-time working time arrangements.

Paul (2016) used survey data for German female workers over the 1984-2011 period. The study found evidence of a wage penalty for short part-time workers (i.e., total weekly working hours between 5 and 15 hours) and a wage premium for long part-timers (i.e., weekly working hours in the range of 15-35 hours), after controlling for individual-, firm-, and job-level observable characteristics, individual-level fixed heterogeneity, and non-random switches to part-time positions. Using Australian survey data for the 2001-2004 period, Booth and Wood (2008) found that the wage differentials of (both male and female) part-time workers shifted from negative to positive after controlling for individual-, firm-, and job-level observable characteristics and unobserved individual fixed heterogeneity. Day and Rodgers (2015) have recently updated the study by Booth and Wood (2008) using a 12-year panel survey, and confirmed the presence of a premium for full-time workers that switch to part-time work, but only if the switch is within the same firm.[3]

Some papers have departed from estimating average effects and tested whether part-time/full-time wage differentials vary across the wage distribution. Simon et al. (2017) performed quantile regressions, using survey data for Spain, and found that part-time work tends to penalize low-qualified men located in the lower part of the wage distribution and high-qualified women located in the upper part of the distribution. Gallego Granados (2019) instead found the opposite result from survey data on German women, whereby a part-time

[3]Neither Paul (2016) nor Booth and Wood (2008) distinguished between changes in the working time arrangements that occur within the same firm from switches that involve a simultaneous change of the employer.

wage penalty emerges at the lower end of the wage distribution and a premium at the top of the distribution, while they found no discernible difference between part-time and full-time pay for workers that earn median wages.

There are also a few cross-country studies that have reported part-time premiums for some countries and penalties for others (Bardasi and Gornick, 2008; Matteazzi et al., 2014; O'Dorchai et al., 2007; Pissarides et al., 2005).[4] Like most of the single-country studies surveyed above, these cross-country studies typically controlled for an ample set of covariates at the individual-, firm-, and job-level (e.g., occupational segregation), as well as for non-random sorting into part-time status using fully-specified parametric models with distributional assumptions.

To the best of our knowledge, the only estimates on part-time earning differentials that exist for Italy come from these cross-country studies, and the results are somewhat mixed. In fact, Matteazzi et al. (2014) and Pissarides et al. (2005) both pointed toward the presence of a wage premium, while Bardasi and Gornick (2008) and O'Dorchai et al. (2007) showed evidence of pay penalties associated with part-time work.

Matteazzi et al. (2014) used survey data from the European Union Statistics on Income and Living Conditions for the year 2009 and conducted the analysis for Italy on a sample of around 8,000 women aged 25-59. They found a significant (albeit small) part-time premium. Pissarides et al. (2005) used the European Community Household Panel Survey for six annual waves (1994-1999 period) and performed their analysis for Italy on a sample of around 7,000 men and women aged 16-64. They found significant and substantial wage premiums for both male and female part-time workers. Bardasi and Gornick (2008) resorted to Luxembourg Income Study data and used a sample for Italy of around 5,000 women aged 25-59 observed in 1995. They instead found significant wage penalties associated with part-time work. O'Dorchai et al. (2007) resorted to the European Structure of Earnings Survey for the year 1995 and conducted the analysis for Italy on a sample of around 67,000 men employed in private-sector firms with at least 10 workers. They found significant wage penalties associated with part-time work for men. It should be noted that none of these studies on Italy use fixed effects methods to control for unobserved time-invariant worker and/or firm heterogeneity. Fixed effects methods are able to flexibly control for non-random selection into part-time status, without resorting to distributional assumptions, and are therefore useful to complement existing research based on fully-specified models.

Finally, using INPS-WHIP administrative matched employer-employee panel data on

[4]For women, a part-time pay premium has been observed in Sweden by Bardasi and Gornick (2008), and in Austria and Italy by Matteazzi et al. (2014). For men, it has been observed in Denmark by O'Dorchai et al. (2007), and in Italy, Austria, and Greece by Pissarides et al. (2005).

working careers, Pacelli et al. (2013) investigated the presence of a "motherhood wage penalty" among Italian women over the 1989-2003 period.[5] Interestingly, they found that a shift from a full-time to a part-time contract, after a woman became a mother, was not associated with a reduction in the hourly wage, while a wage gap was observed when women were still working as full-time workers after childbirth. They interpreted the results by arguing that the high protection accorded to part-time jobs in Italy prevented the emergence of any motherhood-related part-time wage gap.

4. Empirical model and identification issues

As discussed in the previous sections, the part-time/full-time wage differential may be the result of several intervening factors, and working a reduced number of hours *per se* is only one of them (Paul, 2016). In order to motivate our empirical model, clarify the nature of the estimated parameters, and discuss identification issues, it could be useful to quickly recap the numerous confounding factors at play that have emerged from previous empirical works.

A relevant fraction of the raw part-time wage penalty can be accounted for by considering the observable personal characteristics of the worker, such as her human capital (e.g., education and experience) or other individual characteristics (e.g., children). Although these factors have a substantial effect on wages, they are, at the same time, strong determinants of the decision to work part-time. For instance, part-time jobs are often associated with positions for low-educated or low-experienced individuals, which in turn are associated with lower wages. Similarly, mobility limitations and constrained schedules, due to family commitments, might oblige individuals to take on less favorable jobs, which might be part-time positions. However, once these observable personal characteristics of the worker are accounted for, part-time workers are still found to earn substantially less than full-time workers.

Other dimensions that contribute to explaining a substantial fraction of the part-time wage penalty are job characteristics, including occupation, and workplace characteristics. A significant job segregation is associated with part-time work: low-skilled positions and fixed-term contracts are significantly more likely to be associated with part-time contracts than high-skilled positions and permanent contracts. Female segregation at the workplace also contributes significantly to explaining the part-time wage penalty (Mumford and Smith, 2009).

[5] The WHIP data set is similar to our data set, but refers to a much shorter, earlier period; more importantly, it is a 1:12 random sample from the worker universe. This makes the estimation of models with both worker and firm fixed effects virtually unfeasible.

As mentioned earlier on, one strand of the literature has estimated part-time/full-time wage differentials by controlling for as many observable differences as possible, including individual, job, and workplace characteristics (Bardasi and Gornick, 2008; Ermisch and Wright, 1993; Matteazzi et al., 2014; Manning and Petrongolo, 2009; Mumford and Smith, 2009; Wolf, 2002). These studies estimate a "pure" effect of part-time work, insofar as they hold constant the observable aspects that differ between part-time and full-time work. However, they are not necessarily able to identify the causal effect of having a part-time contract. Other factors, which are not attributable to working a reduced number of hours *per se*, can determine the wage differential.

Some scholars have stressed the role of differences in the work history of part-time and full-time workers (Connolly and Gregory, 2009; Fernández-Kranz et al., 2015). Being employed part-time in the previous years might lead to accumulating substantially less experience and (firm-specific) human capital than having worked full-time, thereby implying lower wages of part-time workers who have had part-time contracts for a long time.

Another set of studies have acknowledged that part-time workers might be different from full-time workers with respect to time-invariant unobservable individual characteristics, such as ability, commitment to work, and energy. This unobserved fixed heterogeneity explains a relevant part of the part-time penalty, which often disappears (or even transforms into a premium) once it is controlled for (Booth and Wood, 2008; Connolly and Gregory, 2009; Fernández-Kranz and Rodríguez-Planas, 2011; Hirsh, 2005). As highlighted by Paul (2016), although accounting for individual fixed effects appears essential to achieve an estimate of the causal effect of part-time work, it also entails that such an effect is estimated exclusively on those who switch from a full-time to a part-time position (or *vice versa*).

It is also crucial to account for unobserved fixed firm heterogeneity, including corporate culture, the degree of firm-level collective bargaining, or corporate social responsibility, which may affect the wages offered by a firm and its use of part-time contracts (Fernández-Kranz and Rodríguez-Planas, 2011). Accounting for unobserved fixed firm characteristics - besides worker fixed effects - implies estimating the wage differential on those workers who switch from full-time to part-time work (or *vice versa*) while employed by the same firm, but ensures that the impact of part-time work abstracts from any confounding effects due to a contemporaneous change of employer.

However, after having controlled for both individual and firm fixed effects, some time-varying factors can still intervene in the decision (either by the employee or the employer) to change the working time arrangement and, at the same time, be correlated with earning changes (i.e., contemporaneous endogeneity; see also Aaronson and French, 2004, and Paul, 2016).

First, it is essential to control for any possible changes in the job contract that might occur contemporaneously with the change in the working time arrangement. These changes may include changes in the type of occupation (i.e., occupational up- or down-grading)[6] and duration of the work contract (i.e., passing from a fixed-term to a permanent contract). Having a child is another typical and relevant event (Connolly and Gregory, 2009; Paul, 2016).[7] Similarly, a firm's decision to transform some of the workers' contracts from full-time to part-time may also be non-random and time-varying. A typical situation in which contemporaneous endogeneity might emerge is when a firm experiences a period of crisis, during which it might convert selected groups of employees to part-time work schedules and contextually reduce their wages.

Given the above discussion, we estimate the following wage regression:

$$ln(w_{ijt}) = \alpha_i + \phi_j + \mu_{ij} + \beta PT_{ijt} + \gamma X_{ijt} + \epsilon_{ijt}. \tag{1}$$

The dependent variable, w_{ijt}, is the hourly wage of worker i working in firm j in year t. The term α_i is a worker fixed effect that captures the time-invariant worker heterogeneity. The term ϕ_j is a firm fixed effect that captures the time-invariant firm heterogeneity. The term μ_{ij} is a firm-worker match fixed effect that captures time-invariant match heterogeneity (see below). Our regressor of interest is PT_{ijt}. This is a dummy variable for the part-time contract, which is 0 if the worker has a full-time contract and 1 if the worker holds a part-time contract. As highlighted by the subscripts of PT_{ijt}, we can observe the part-time status of a given worker across years and firms. This means that we know whether a worker switches from a full-time to a part-time contract (or *vice versa*) with the same employer, or after changing employer. The vector X_{ijt} collects a variety of worker- and firm-level characteristics that are included as controls. Depending on the specifications, they can comprise the worker's migration status, age, occupation, contract duration (i.e., permanent *versus* temporary), tenure in the firm, total work experience, total experience in part-time work, the firm's size, sector of economic activity, and region, and year fixed effects.[8] Depending on the specifications, the X_{ijt} vector also includes controls for maternity

[6]Formal occupational downgrading within the same firm is illegal in Italy. In practice, the switch to a part-time arrangement might be associated with a professional deskilling, which cannot be observed from administrative data.

[7]It often happens that women ask for a reduction of working hours after having a child, which might have other wage effects than those related to the switch to a part-time contract.

[8]We cannot explicitly account for the workers' education as this information cannot be obtained from our data. However, this should not represent an issue, as education is mostly time-invariant for those who are employed and, therefore, largely accounted for by worker fixed effects (see also Connolly and Gregory, 2009).

events and demand shocks at the firm-level, or at the local labor market level, to account for the potential problems of contemporaneous endogeneity outlined above. Finally, ϵ_{ijt} is the residual of the regression. Our parameter of interest is β, which measures the percentage wage differential between part-time workers and full-time workers that emerges net of the controls listed above.

We estimate Equation (1) by ordinary least squares (OLS) regressions using within-spell variation.[9] Apart from entailing the removal of worker and firm fixed effects, this also implies that we are controlling for any fixed unobserved heterogeneity related to the job match (i.e., the employer-employee match). Match-specific fixed heterogeneity (embedded in μ_{ij}) may include the skills and knowledge of the worker that are particularly relevant to the firm, and which likely influence both the wages and part-time status of the match. Moreover, removing worker, firm, and match fixed effects means that we estimate the part-time/full-time wage differential using the wage variation that arises from switches from full-time to part-time contracts (or *vice versa*) of the *same* worker in the *same* firm.

In short, we obtain an estimate of the part-time/full-time wage differential that is driven neither by selection into specific jobs and due to particular worker and firm observable characteristics (including the work history), nor by unobserved individual, firm, and job match fixed heterogeneity. Since we also control for contemporaneous endogeneity due to adverse conditions experienced by the firm and entry into motherhood, the estimated β identifies the causal effect of part-time work if one assumes that no other time-varying factors intervene in the decision (either by the firm or by the employee) to switch from a full-time to a part-time contract or *vice versa*.

5. Data

We use administrative data from the Italian Social Security System (INPS), which collect labor market histories for the 1983-2015 period of each employee working for at least one day in any private-sector firm in Italy. INPS assigns unique identifiers to the workers and firms, which allow us to track them longitudinally. It is also possible to know in which firm a given worker is employed at each point in time. Hence, we have a longitudinal matched employer-employee data set on the universe of Italian private-sector employees over more than 30 years.

The worker information includes basic demographic characteristics: the worker's gender, age, and place of birth. We can also recover information related to maternity periods by exploiting INPS information on maternity leave. As far as the information on the worker's

[9] We refer to worker-firm combinations as "spells".

job is concerned, we have data on the yearly gross wages, number of days worked over the calendar year, type of occupation, contract duration (fixed-term *versus* open-ended contract), and whether the worker has a part-time or full-time contract.

Unlike most of the papers reviewed in Section 3, which based their distinction between employees working full-time and part-time on how workers described their employment situation or by establishing *ex ante* a specific hours threshold, in our data set, the contract itself neatly identifies the part-time status. Therefore, we are able to precisely separate part-time workers from full-time workers without resorting to arbitrary hours cutoffs. Thanks to the panel dimension of the data set, we are also able to compute the workers' experience in the labor market, as well as their experience in part-time work. Similarly, we are able to reconstruct the workers' tenure in the firm.

As for firms, we have information on their general characteristics, such as their location and type of industry. We are also able to construct variables related to the firms' workforce, such as their use of part-time work. Finally, it is possible to match the INPS information on incorporated businesses with the financial information contained in the AIDA data set (Bureau Van Dijk) for the same firms. The matching procedure was carried out by the INPS data warehouse by using the unique tax identifiers of the firms. This allowed us to retrieve firm-level financial information (e.g., revenues or value-added) from the yearly balance sheets that firms are obliged to maintain and deposit with the Chambers of Commerce (see Section 6 below).[10]

Although we do not observe the working hours directly, we are able to precisely measure a worker's *contractual* hourly wage at each point in time. The hours of work stipulated in a full-time contract contain sector-, firm-, and occupation-specific components. We have controls for each of these components in Equation (1). We then need information on the number of hours stipulated in each part-time contract. The INPS data provide us with this information. We know the exact proportion of hours of work stipulated in each part-time contract, compared with the corresponding full-time position contract, that is, a full-time position held in the same sector, firm, and occupation.[11] Hence, our regression analyses allow us to estimate how the contractual hourly wage of a worker changes when moving from a part-time to a full-time position or *vice versa*.

We conduct a basic cleaning of the data. First, we focus on individuals aged 15-64 (i.e.,

[10]The AIDA data set includes balance-sheet information on the universe of non-financial incorporated businesses. Since non-incorporated firms are not required to file detailed balance sheets, they are not present in the AIDA data set. Hence, the analyses in which we exploited balance-sheet information relied on part-time/full-time switches that occurred within firms included in the INPS-AIDA matched data.

[11]This information was obtained from the INPS variable called "settimane utili".

the typical working years). Second, we drop jobs with less than 16 paid weeks in a year in order to capture workers with a minimum of labor-market attachment.[12] Third, in order to minimize the measurement error in wages, we drop the top and bottom 1% in each yearly wage distribution, as well as any job reporting a number of paid days over the theoretical maximum in a year (equal to 312 days). Finally, for those workers that have multiple jobs in the calendar year, we select the one with the highest wage.[13]

In our empirical analysis, we focus on the more recent, post-crisis period, that is, 2009-2015. The total number of observations in that period is 33,088,421. As shown in the bottom part of Table 1, there are over 1,5 million of women who switch from full-time to part-time contracts or *vice versa* within this period. As many as 792,079 of these switches occur within the same firm. These 792,079 observations are those on which we identify our effect of interest, that is, when we remove both worker and firm (and, consequently, match) fixed effects. As can be seen from Table A.1 in Appendix A, many of these switches are from full-time to part-time contracts (501,787), whereas switches from part-time to full-time arrangements are relatively less frequent (290,292 occurrences).

Worldwide, part-time jobs are generally held by women, and Italy is no exception. According to our data, about 42% of female employees were working part-time in the 2009-2015 period. As Table 2 shows, the proportion of part-timers among females steadily increased during the considered 33-year period. The share of part-time workers among males was instead much lower: on average, only about 11% in the 2009-2015 period. However, as for females, it steadily increased throughout our observation window (see Table E.1 in Appendix E).[14]

Finally, Table C.1 in Appendix C reports the number of workers' transitions to part-time or full-time work, differentiating among a variety of labor market segments, and Table A.2 in Appendix A reports summary statistics on the observable worker-, job-, and firm-level char-

[12] Note that this restriction only applies to yearly observations. Therefore, if an individual works less than 16 weeks in a given year, we do not remove the entire block of panel observations corresponding to that individual. For robustness, we carried out several estimations for the case in which we did not apply this restriction and observed very similar results.

[13] As an alternative, we randomly selected one job in the case of multiple job holdings in the year, but this did not produce any significant change in our results.

[14] We compared these statistics with data from the Labor Force Survey for Italy. Although roughly comparable, the shares of part-time workers are systematically higher in the INPS data than in the LFS data. Such a discrepancy is likely linked to the different population coverages of the two data sources. Moreover, LFS also includes public-sector employees, where part-time work is substantially less widespread than in the private sector. For instance, according to the Italian State General Accounting Department, the share of part-time workers among females was only around 7% in the public sector in 2006. Moreover, LFS is based on self-reported information, and, as a result, workers might misreport information on their work contract.

acteristics of the different subsets of switchers. These two tables give additional information on the switchers. Switches within the same firm appear to be more likely to result in "good jobs" or "better matches". They are more preponderant among workers in prime-age or older-age categories, among natives, permanent workers, white-collar workers or managers, and workers in firms located in more prosperous areas (North-East and North-West), as well as those employed in medium-sized and large companies. The average experience and tenure are higher among those who change their working time arrangements within the same firm. Finally, the proportion of women experiencing a maternity-leave event in the year is higher among those who switch from full-time to part-time work within the same firm, coherently with the fact that having a child is a crucial determinant of the workers' request to switch to a part-time contract.

6. Results

6.1. Main results

Table 1 shows the main results derived from the estimation of Equation (1). Here, we concentrate on the 2009-2015 period. Following the discussion in Section 4, we present different versions of the estimated part-time/full-time wage differentials, in which controls are gradually inserted. All the estimations report robust standard errors clustered at the worker and firm (i.e., at the job match) level.

The first row in the table shows a raw part-time/full-time wage differential of -0.233. This is consistent with the other studies in the part-time literature, whereby substantial raw part-time pay gaps are reported for many industrialized countries. In Model 2, we control for a number of worker-, firm-, and job-level observable characteristics, as well as for year fixed effects. As for the worker- and job-level controls, we include a cubic polynomial for the worker's age, a dummy for foreign-born workers, dummies for contract duration (i.e., permanent *versus* temporary), and dummies for occupation (divided into three classes: blue-collar worker, white-collar worker, and manager). As far as the firm-level controls are concerned, we include dummies for firm size (6 classes), industry (2-digit ATECO-2007 classification), and region (20 dummies). The wage penalty associated with part-time arrangements reduces to about 10%. Accounting for observed worker-, job-, and firm-level characteristics is essential to net out any effect due to selection into specific jobs and of particular categories of workers and firms into part-time work.

Since unobserved fixed firm heterogeneity is likely to confound the effect, we add firm fixed effects to Model 3. The estimated part-time penalty is further reduced to 4%, thus pointing to the importance of netting out any wage effect due to unobserved firm specificities (e.g., differences in firm wage policies, firm-level bargaining, or corporate culture). Models with firm fixed effects compare workers who share the same working environment; however, they fail to adequately recognize that co-workers with part-time contracts instead of full-time ones may be inherently different. We instead control for worker - and not firm - unobserved fixed heterogeneity in Model 4. The part-time penalty transforms into a statistically significant premium, equal to 1.9%. It is therefore crucial to control for any unobserved differences between workers who typically have part-time positions as opposed to full-time positions. Taken together, the results of Models 3 and 4 tell us that firm and worker unobserved heterogeneities are both critical confounding factors. In Model 5, we estimate a version of Equation 1, which, in addition to the time-varying controls of Model 2, removes both firm and worker fixed effects. The estimate shows that part-time contracts are associated with 4.6% higher hourly wages than full-time contracts.

Workers' labor market histories might also contribute to confounding the estimated part-time/full-time wage differential. In Model 6, apart from worker and firm fixed effects and observable characteristics, we add controls for the worker's tenure and tenure squared. In Model 7, we also add controls for the total labor market experience and its square.[15] Both models confirm a part-time premium of just under 5%. We also insert a control in Model 8 to explicitly account for experience in part-time work, measured as the number of years with a part-time contract from the first observation in the INPS data set. Again, the estimated part-time/full-time differential is stable (4.8%).

In Section 4, we pointed out that contemporaneous endogeneity can hinder the identification of the effect of interest. In particular, two factors may be considered as particularly relevant: maternity and firm-level shocks. In Model 9, we include a dummy variable to indicate whether the worker has been on maternity leave in the current year, which captures as neatly as possible the event of childbirth. The estimated part-time/full-time differential is still positive and significant, at 3.9%. In Model 10, we control for firm-level shocks by resorting to information on the firms' yearly balance sheets obtained from the AIDA data set. Productivity shocks are proxied by the firm-level value added per employee.[16] The estimated part-time differential in the INPS-AIDA sample of incorporated businesses and their workers is still positive and significant, at 3.0%.

After removing any confounding effects related to the selection of part-time contracts into specific occupations and due to particular worker, job, and firm characteristics (including the work history of employees), and after controlling for worker, firm, and match unobserved fixed heterogeneity and contemporaneous endogeneity stemming from maternity and firm-

[15] Tenure is measured as the number of years the employee works in a given firm, whereas total experience in the labor market is measured as the number of years from the first job (as observed in the INPS data).

[16] As an alternative, we considered revenues per worker, with only slight changes in the results.

level shocks, it emerges that part-time contracts are associated with a higher hourly wage than full-time contracts. This differential is in the 3 to 5% range and is always statistically significant. Furthermore, the evolution of the estimated wage differential as a result of additional controls - from a raw part-time penalty of 23.3% to a significant part-time premium - indicates that the wage effect of part-time contracts *per se* is, in fact, mixed up with a large variety of confounding effects, which are crucial to net out.

Table 2 shows the evolution of the part-time/full-time wage differential over the considered 33-year span. From now on, we present estimates with the same set of controls as those included in Model 8 in Table 1, that is, with worker, firm, and match fixed effects, together with time-varying worker-, firm-, and job-level controls, including the full set of variables related to the employee's work history.[17] Female part-timers experienced wage premiums throughout the entire observation window. The differential was high in the early periods and constantly decreased over time, passing from as much as 32.7% in the 1983-1987 period - when only 3.2% of female workers held part-time contracts - to 4.8% for the more recent 2009-2015 period.[18]

6.2. Robustness I: contractual versus *actual hours*

A remarkable feature of our data is the possibility of controlling for a large set of observable and unobservable worker-, firm-, and match-specific wage determinants. However, a potential limitation is that we do not observe the actual hours of work. Only a few matched employer-employee data sets include information on the actual hours worked at the individual level, but this information is usually more contaminated by measurement errors than earnings data drawn from social security sources. In the following, we take various steps to provide an assessment of how any unobserved variations in the actual worked hours could have an impact on the estimated part-time wage premium.

Although our data allow us to account for variations in the number of hours formally stipulated (*ex-ante*) in part-time contracts, they cannot account for (*ex-post*) variations in the actual number of hours worked by both full-time workers and part-time workers, for instance, due to contingent local- or firm-level economic conditions. As any overtime payments are included in the numerator of our earnings measure, a potential issue arises as to whether unobserved overtime or any other "extra" hours are differentially affected for

[17]For these and the following additional estimates, we also experimented with specifications in Models 9 and 10 in Table 1 and obtained the same results.

[18]Even though this paper has focused on women, we have reported some general estimates for males. As can be seen in Table E.1 in Appendix E, the picture is somewhat different from what emerges for women. Although men experienced significant, yet decreasing, part-time premiums up to the early 2000s, the wage differential has disappeared in recent years.

part-time workers and full-time workers by business-cycle conditions or firm-level shocks.[19]

Another issue arises concerning involuntary part-time work. Involuntary part-time workers are more prevalent on a slack labor market, where a high level of unemployment is common. A person who may have to involuntarily switch to a part-time job, as a coping strategy to avoid losing her job, is likely to suffer from a lower hourly wage because of his/her reduced bargaining power. Alternatively, the same switch may entail an increase in the unit wage, if compensating wage differential considerations prevail.

The concerns related to unobserved variations in the worked hours should arguably be more relevant when the local economy, the sector, or the firm is affected by demand shocks. To investigate the practical relevance of such concerns, we follow three strategies. First, we interact the part-time status dummy with the local unemployment rate. Second, we consider the dynamics in revenues at a fine sectoral level to identify the subset of firms that faced adverse demand shocks and for which variations in the worked hours and switches to involuntary part-time work may have been more likely to occur. Third, we try to identify the subset of firms that raised their use of part-time labor more intensively from one year to the next. When an unusual share of a firm's workforce switches from a full-time to a part-time position in any given year, this could indicate that the firm faces a negative demand shock, and the switch to part-time work is demand-driven, that is, it is involuntary for the workers.[20]

The results of these analyses are presented in Tables 3 and 4.

It can be observed, in Table 3, that the part-time premium is reduced in the presence of high regional unemployment, as shown by the negative interaction term.[21] When a re-

[19] Fernández-Kranz and Rodríguez-Planas (2011) used an external time-use survey to impute the actual worked hours in their main (administrative) data, based on observable worker characteristics and contractual hours, which were available in their two data sources. While no external survey would allow us to proceed with a similar imputation, we noted that a disadvantage of this procedure is that workers with the same contractual hours and observable characteristics are imputed the same actual worked hours, thereby disregarding the possibility of idiosyncrasies in the firm's demand shocks, which are a crucial reason why discrepancies might emerge between the actual and contractual worked hours among part-time workers.

[20] Fernández-Kranz and Rodríguez-Planas (2011) reported that the practice of under-reporting working hours for part-timers is widespread in Spain. We attempted to directly assess whether this was the case for Italy. We checked several surveys on Italian workers, including the Labor Force Survey (LFS), the Time Use Survey (TUS), and the European Working Condition Survey (EWCS). Unfortunately, no variables are available that allow us to directly observe whether part-time workers systematically work more hours than the hours stipulated in their contracts. However, some indirect evidence suggests that the practice of differential under-reporting of the working hours by part-time status might not be a significant issue in Italy. The ratio of the actual hours worked by part-time workers and full-time workers computed in the LFS is virtually the same as the share of contractual hours worked by part-time workers and full-time workers computed in the INPS data.

[21] In this case, we focused on the 2005-2015 period rather than the 2009-2015 period to exploit any variations in regional unemployment rates in *pre*- and *post*-Great Recession years.

gion undergoes a favorable business cycle and unemployment is low, the hours of work and overtime payments are generally higher. The estimated part-time premium may partially be related to a greater variation of worked hours among part-time workers in regions with a high labor demand. However, the magnitude of this effect is negligible: the estimates imply that the part-time premium is 0.0399 for an unemployment rate of 3.7% (10th percentile in the distribution of unemployment) and falls to 0.0397 when unemployment is at 13.7% (90th percentile).

In the first panel in Table 4, we split the sample according to whether the job is in a firm experiencing a large - as opposed to a small - change in the sectoral product demand.[22] A large (small) shock is defined as being above (below) the median yearly change in the real (log) revenues at the sectoral level, defined using the 5-digit ATECO-2007 industry classification. The estimated part-time premium is not sensitive to the size of the industry product demand shocks, again suggesting that variations in the unobserved hours of work do not drive our results.

In the second panel in Table 4, we proxy a firm's demand situation by relying on firm-level variations in its use of part-time labor. We compute, for each firm, indicators that capture variations in the intensity of part-time work among the firm's workforce (i.e., any switch in the number of hours contractually defined by the workers' labor contracts).[23] We then separately estimate the part-time/full-time wage differentials on the sub-sample of firms where the one-year lagged change in the firm-level use of part-time work is above the 50th percentile change in the sample (Column 1) or, alternatively, above the 90th percentile change (Column 2).[24] We do not find any sizable difference in the estimated part-time premiums in either case.

As a further robustness test, we explore part-time/full-time wage differentials in very specific subgroups of workers where fraudulent practices of under-reporting the working hours of part-time workers are unlikely. The results, presented and discussed in Appendix B, point to a significantly positive part-time premium, close to the average value, even for these cases.

Overall, the bulk of the evidence reported in this section weighs against the concern that

[22] As demand shocks are here defined as industry-specific, we were able to rely on the entire INPS data set, which contains both incorporated and non-incorporated businesses, rather than on the smaller INPS-AIDA data set that we had to use when examining the relevance of firm-level demand shocks.

[23] We do so by computing the firm-level change in the ratio between two INPS variables: the number of equivalent weeks ("settimane utili") and the number of paid weeks.

[24] We relied on the lagged firm-level change to prevent this measure from mechanically picking up the current switch in the part-time status of worker i, that is, PT_{ijt} in Equation (1). Moreover, in order to make the firm-level change in part-time intensity more meaningful, we limited this analysis to firms with at least 15 employees.

variations in unobserved actual hours of work may play a significant role in our estimates.

6.3. Robustness II: selection and heterogeneity

Although controlling for worker, firm, and match fixed effects is crucial to obtain a robust estimate of the actual part-time/full-time wage differential, it also entails the wage effect of part-time contracts being identified on the specific sample of workers who change their working time arrangement within the same firm, thereby causing possible selection bias. As highlighted in Section 5, those workers who switch their working time arrangements within the same firm may be associated with "good jobs" (e.g., prime-age, native-born, white-collar, permanent workers). Changes in the working time arrangements within the same employer might thus be more likely granted to workers who are "important" for the firm, for instance, those with good employer-employee matches. Similarly, women often ask for a switch to a part-time contract following maternity, and those who see their requests fulfilled may be those who are more productive and closely attached to the labor market. The observed part-time premiums may thus be driven, at least in part, by these selection issues.

In the following, we pursue a variety of robustness checks to explore the relevance of these selection concerns.

First, we estimate part-time/full-time wage differentials in several different subgroups of workers on the basis of the available observable worker-, job-, and firm-level characteristics, which include workers' age and migration status, contract duration, job position, as well as the firms' size, sector, and location. We present and discuss the results for these robustness tests in detail in Appendix C. Notably, a positive part-time wage premium is found in all of the 22 considered partitions and it is always statistically significant (see Table C.1 in Appendix C). What is more important is that the estimated part-time premium does not vary to any great extent across the groups, although many of them might be regarded as structurally different in terms of preferences, endowments, and constraints.

We then explore the part-time wage effect for workers with different degrees of tenure in a firm and experience in the labor market, which - albeit not precisely - reflect the "importance" of a worker for the employer. We re-estimate Model 8 in Table 1 for split samples by degree of tenure, experience, and experience in part-time work, and the results are shown in Table 5. We split the sample between high-tenure and low-tenure workers, that is, those above and below the median workers' tenure. Similarly, we divide high-experienced and low-experienced workers as those above and below the median workers' experience. Finally, we divide the sample between workers with no experience in part-time work and those with some experience in part-time work. In these cases, a significantly positive part-time/full-time wage differential again emerges. Moreover, the estimated premium is again very stable and in line with the average effect, thus reflecting that the part-time premium is essentially invariant to the work history of an employee and possible selection concerns due to switches granted to "more important" workers.

Resorting to INPS information on maternity leave, we further investigated the part-time/full-time differentials by maternity status (Table 6). We split the sample between women who had never been on maternity leave during the 2005-2015 period and women who had at least one maternity leave during the same period. Although indirectly, this captures the presence of young children in the household. The results show two things. First, a significantly positive part-time premium emerges for both categories of women. Notably, it is 3.2% - slightly lower than the average estimate - for the women who have not experienced maternity in recent years, thus indicating that the selection concerns related to maternity highlighted above do not play a major role in our results. Second, a substantially higher part-time premium, equal to 8.1%, is found for those women who experienced maternity. Although this might be linked to more productive women asking for and being granted a switch to part-time arrangements following maternity, it is also consistent with more generous legal provisions being accorded to part-time mothers.

Finally, we tackle the issue of selection due to unobservable worker ability more directly by partitioning workers according to proxies of these abilities, obtained beforehand through AKM-style estimates of worker fixed effects (Abowd et al., 1999) from the workers' histories before 2009. This is a more direct way of checking whether the observed part-time premium could be driven by "better workers" being more likely to ask for (and be granted) switches to part-time contracts. Using the method presented in Abowd et al. (1999), we first estimated the worker effects from AKM regressions over the 2005-2009 period, whereby wage regressions with worker and firm fixed effects are used to estimate the workers' earning potentials depurated of firm-specific wage components (e.g., specificities pertaining to firm wage policies). This worker effect is commonly used as a proxy for the underlying individual productivity of a worker. We merged the estimated AKM effects on the 2009-2015 portion of the sample. We then estimated the part-time/full-time wage differential on the merged data for low- and high-productivity workers, that is, those corresponding to the bottom and top 25th percentiles of the AKM worker effects distribution, respectively. Table 7 reports the results for this robustness test. As one can see from the table, a significant part-time premium - in line with the average effect - again emerges in both cases, in the opposite direction to what selection issues would entail. A slightly higher part-time premium is, in fact, found for less productive workers (5.2% *versus* 3.4%). This more direct check suggests that the selection related to workers' (unobservable) productivity does not drive our results.

Additional evidence that selection issues regarding the quality of the switchers do not drive the results is provided in Table D.1 in Appendix D. Table D.1 reports the results for the probability of changing the working time arrangement within the same firm (first panel) and switching from a full-time to a part-time contract within the same firm (second panel) by AKM worker effects deciles, which makes it possible to assess whether the switchers are systematically higher-quality workers. As can be seen from the table, there is no evidence that high-productivity workers have higher switching probabilities. Although the coefficients are sometimes significant, they are also very small in magnitude (they range between +0.0007 and -0.0069). Therefore, this further test suggests that changes in working time arrangements within the same firm (i.e., those on which we identify the part-time/full-time wage differential) are essentially independent of the workers' intrinsic productivity levels.

In short, the separate analyses by many population subgroups point to a substantial uniformity of the estimated part-time premium across all the subgroups. The estimated part-time premium is very similar, even for employees with different observed work histories (tenure, experience, and part-time work experience). A part-time premium emerges, regardless of the maternity status and individual productivity levels. Overall, this points to the fact that selection issues do not play any major role in explaining the observed part-time premium.[25]

6.4. Mechanisms

In this subsection, we explore the possible mechanisms behind the observed part-time premium. The numerous robustness checks presented earlier point to a part-time premium that is not driven by any variations in the unobserved actual hours of work or by selection issues. What emerges instead is a pervasive premium across all the segments of the labor market. Such pervasiveness of part-time premiums must, therefore, be rooted in something that affects the worker population *across the board*.

The protective nature of legal provisions associated with part-time contracts - whereby sectoral- and firm-level collective agreements are allowed to grant more generous economic conditions to part-time workers-, the functioning of the Italian labor market, and, above all, its industrial relation practices seem the key factors. The Italian labor market features a relatively large amount of wage rigidities, mostly as a result of the prevalent role of sector- and firm-level collective bargaining (e.g., Devicienti et al., 2019). A form of rigidity that is particularly relevant to the present context is the presence of wage components (e.g.,

[25]We did not detect any part-time penalties in any of these subgroups, even among the most disadvantaged segments of the labor market. Moreover, a part-time premium - even higher than the average - also emerged for foreign-born and temporary workers (see Appendix C). This finding is in sharp contrast with the one reported for Spain by Fernández-Kranz and Rodríguez-Planas (2011), whereby a part-time penalty was found for temporary workers once individual and firm fixed effects had been removed.

bonuses and other monetary benefits) that are not proportional to the number of worked hours. This is partly due to the egalitarian wage policies frequently pursued by unions and to their efforts to protect the weaker segments of the labor market. Some wage components bargained at the individual level, or unilaterally granted by employers, may also not be exactly proportional to the number of worked hours. Even small bonuses paid in absolute (i.e., quasi-fixed) amounts would end up favoring those workers who switch to part-time contracts.

We pursue three types of analyses that corroborate the empirical relevance of such mechanisms. First, higher benefits associated with part-time contracts due to legal provisions should be reversible, that is, they should be closely linked to the work contract. Therefore, it could be expected that a switch from a full-time to a part-time contract should have a roughly similar, albeit opposite in sign, effect to the reverse switch from a part-time to a full-time arrangement. Second, if these more generous conditions associated with part-time contracts materialize in absolute amounts, switches to a short part-time schedule should result in a higher premium than switches to a long part-time schedule. Third, rent-sharing within the firm should also favor part-time workers. This can also be expected if at least some of the productivity-related bonuses are distributed to the firm's workforce in a non-proportional manner to the worked hours. Tables 8, 9, and 10 provide some preliminary evidence that these mechanisms are, in fact, at play.

Table 8 shows the wage effect of the two possible directions of switches: from full-time to part-time work and from part-time to full-time work. The estimated wage impact of a switch to part-time work is significantly positive (3.0%), whereas the reverse switch from part-time to full-time contracts is negative and significant at any conventional level (-1.4%). Table 9 shows the results of having differentiated between short (defined as below 15 hours per week) and long part-time work (more than 15 hours per week). We then adopted a finer categorization and differentiated between short (again defined as below 15 hours per week), medium (between 15 and 28 hours), and long part-time work (above 28 hours). The results show that a significant part-time premium emerges for all these cases. However, the highest premium is associated with short part-time work (13.4%), which decreases to 6.1% for medium part-time work, and 2.3% for long part-time contracts.[26]

Finally, Table 10 shows the results concerning the within-firm rent-sharing effects. We leverage on the empirical literature on rent-sharing (e.g., Card et al., 2014) and run regressions to investigate how firms distribute firm-level productivity shocks over their full-time

[26]Note that the results in Tables 8 and 9 are not based on split samples (i.e., we exploited the full sample and inserted additional regressors on the basis of the direction of the switch and the type of part-time contract, respectively). The same applies to Tables 3 and 10.

and part-time workers. Here, we use the INPS-AIDA matched data set, where information on each firm's yearly balance sheet is available. Specifically, we estimate a version of Equation (1) which, apart from controlling for firm-level productivity, defined as the firm's yearly value added per worker, also includes its interaction with the part-time dummy.[27] The significant and positive interaction term, albeit small, suggests that firm-level productivity shocks are partly distributed to workers in quasi-fixed amounts, thus favoring part-time workers. The estimated coefficients imply that the wage elasticity to value-added per worker is 2.2% for full-time employees and slightly larger, that is, 2.5%, for part-time workers. Workers also receive bonuses and other wage components that are linked more directly to measures of a firm's performance different from its productivity (e.g., client satisfaction, reduction in absenteeism). We cannot observe these other measures in our data. However, even qualitative measures of a firm's performance should ultimately be positively related to its productivity, as defined by the value added per worker. Hence, it is possible to argue that the results in Table 10 provide some preliminary evidence that these other wage components and bonuses might also be distributed to workers non-proportionally to the worked hours, thus contributing to the observed part-time wage premium.

As previously discussed, a possible explanation of the observed part-time premiums may be related to compensating-differential mechanisms. A typical example are those mechanisms related to commuting costs, whereby a part-time premium emerges to compensate for the higher weight of commuting costs in reduced working time schedules. We verified such a mechanism by exploring part-time/full-time differentials on the basis of the workers' commuting status, and the results are shown in Table 11. We identified workers as commuters (non-commuters) if their municipality of residence is different from (equal to) the municipality where the job is located. As can be seen in the table, there are no discernible differences in the part-time premium by commuting status.[28]

A more general compensating differential mechanism may also be at play, whereby workers obtain a higher hourly wage to compensate for the reduction in annual earnings and consumption associated with their part-time positions. Although it cannot be excluded, widespread cultural egalitarianism (i.e., also by the employers) would be required for the

[27] We also experimented with measures of a firm's quasi-rent per worker as in Card et al. (2014), defined as the value added per worker net of the opportunity cost of labor and capital. The opportunity cost of labor is defined as the average wage in the industry and local labor market where the worker is employed. The cost of capital was obtained after applying an estimate of the user's cost of capital to the stock of fixed assets, reconstructed with the perpetual inventory methods (see Card et al., 2014, for the details). The results were qualitatively similar to those presented in Table 10.

[28] We also experimented with the exclusion of the major Italian cities for this exercise, with only slight changes in the results.

emergence of the kind of uniform part-time premium that we detected. Alternatively, the ubiquitous premium might arise if firms express a high demand for part-time jobs. This seems unlikely, as firms in Italy can already rely on the flexibility offered by various forms of temporary contracts to deal with demand uncertainty or technological shocks, and part-time positions are generally found to be detrimental to a firm's productivity (e.g., Devicienti et al., 2018). Although more nuanced forms of compensating differentials are also possible, they may be expected to be differently relevant to the various worker population subgroups. However, we found little evidence of the wage premium being heterogeneous across subgroups.

7. Conclusions

In this paper, we have used matched employer-employee data on the universe of female Italian private-sector employees over a period of 33 years and analyzed the costs for employers, in terms of wage differentials, of transforming a work contract from full-time to part-time. Our research aim was motivated by the fact that employers are often reluctant to concede switches to part-time arrangements, as reported in official statistics and anecdotal evidence. Assessing the reasons for such a reluctance required estimating a part-time/full-time wage differential that would be as close as possible to the effect of working reduced hours *per se* and as depurated as possible from potential confounding effects.

We thus estimated part-time/full-time wage differentials by eliminating worker, firm, and match fixed effects while controlling for a large number of worker-, firm-, and job-level time-varying characteristics, including the employees' work history. We also controlled for non-random changes in working time arrangements due to maternity and local-, sectoral-, and firm-level demand/productivity shocks. We conducted a large number of robustness checks aimed at addressing two major concerns, namely, the fact that we did not observe any *ex post* variations in the actual hours of work and selection issues. Finally, we conducted several analyses to better gauge the mechanisms behind the observed results. By matching balance-sheet information from the AIDA data set, we were able to control for critical firm-side events, such as productivity/demand shocks, and to explore the presence of rent-sharing dynamics associated with part-time contracts, thus shedding new light on the potential mechanisms driving the observed part-time wage premium.

The results point to significant and pervasive part-time premiums for females, which, although declining, have persisted until recent years. The separate analyses conducted on several population subgroups point to a substantial uniformity of the estimated premium. The estimated part-time premium was very similar, even for workers with different observed work histories (in relation to tenure, experience, and experience in part-time work). The same happened when we partitioned workers according to proxies of their productivity levels.

Although a somewhat higher part-time premium was found in association with maternity, a significant part-time premium also emerged for women who had not experienced childbirth. The part-time premium is not irreversible, but symmetrically linked to the transition: there is a premium in the switch from full-time to part-time work and a penalty in the switch from part-time to full-time work. A significant part-time premium emerges, irrespective of the type of part-time work schedule. Notably, part-time work with short hours is associated with a substantially higher premium than part-time work with extended hours. Finally, it appears that rent-sharing dynamics favor part-time workers, who end up receiving a slightly higher share of the rents generated by their employers than full-time workers.

What could drive these results? The Italian labor market features a relatively large amount of wage rigidities, mostly because of the prevalent role of sector- and firm-level collective bargaining (Devicienti et al., 2019). In particular, although the Italian labor legislation dictates that part-time workers should receive the same monetary and non-monetary treatments as comparable full-time workers, it also explicitly allows sectoral- and firm-level agreements to provide more generous economic treatments to part-timers (Matteazzi et al., 2014). Reversible premiums, linked closely to the work contract, are coherent with the part-time premium stemming from institutional dynamics. The pervasiveness of part-time premiums in the economy provides further support to the view that the observed part-time wage premiums are likely rooted in the institutions and practices which, across the board, characterize the country's system of industrial relations and wage bargaining. Furthermore, the high part-time premium associated with maternity is in line with the Italian labor legislation, whereby legal provisions concerning part-time work are particularly generous with part-time mothers (Pacelli et al., 2013). Declining part-time premiums are coherent with developments in wage bargaining institutions. Starting from the mid-1990s, the Italian labor market has undergone a constant (albeit slow) trend toward a general liberalization and modernization, aimed at removing labor market rigidities, and improving the connection of wages to the underlying workers' productivity and the overall allocative role of wages. Over time, sectoral collective bargaining may have gradually incorporated these tendencies, even in the case of part-time work. However, unions still try to protect those who are seen as weak segments of the labor force. The fact that these groups generally include part-time women workers (especially mothers) is in line with our findings that a part-time wage premium is still observed for females, especially after childbirth.

A common form of labor market rigidity, whereby part-time premiums emerge, is the presence of wage components, such as bonuses and other monetary gratifications, which are distributed in fixed amounts, that is, not proportionally to the number of worked hours. Some wage components bargained at the firm-level, or unilaterally granted by employers, may also be not entirely proportional to the number of worked hours, thereby favoring workers who switch to part-time contracts. Higher premiums associated with short part-time contracts as well as rent-sharing dynamics that favor part-timers are indications that these mechanisms are at play.

Our paper does not claim that these are the only or even the primary channels of the observed part-time premium. Our limited objective was to show that these specific channels play a role and contribute to the detected wage premium of part-time workers. We have also explored the existence of compensating-differential mechanisms related to work commuting, but these do not appear to have any detectable bearing on the observed part-time premium. Other channels, possibly related to structural changes in the demand and supply of part-time jobs, may also have been at play. It is not possible to exclude that - apart from the "institutional explanation" - the interplay between demand and supply could have influenced the evolution of part-time/full-time wage differentials in past and recent years, although we have not tested these aspects directly.

The higher wage costs associated with part-time work, coupled with its detrimental effect on firm productivity that we documented elsewhere (Devicienti et al., 2018), contribute to explaining the reluctance of firms to concede part-time positions to employees who ask for them.

Some important policy implications can be drawn from these findings. Tax reliefs may be useful to overcome a firm's double disincentive (productivity losses and higher labor costs) to offer part-time positions. These rebates could be targeted to people in real need (e.g., involved in childcare or educational commitments), namely people who would voluntarily switch to a part-time position, were they given the option. Moreover, institutional reforms that align wages more to workers' productivity may contribute to raising the number of people who succeed in obtaining part-time positions when they ask for them - a hitherto unnoticed benefit of such reforms.

The mechanisms that we have highlighted may also matter for the part-time/full-time differentials in other countries, an aspect that should be further investigated, possibly by relying on data sets rich in information on both workers and firms. On the one hand, consensus has not yet been reached on whether a premium or a penalty prevails in certain countries and under certain institutional circumstances. On the other hand, many EU countries have similar collective bargaining institutions and industrial relations to those of Italy.

Table 1: **Estimated part-time/full-time wage differential, diffusion of part-time work, and transitions. Female workers. Period: 2009-2015.**

Estimation model	**Part-time/full-time wage differential (β)**	**Observations**
1. Raw part-time/full-time wage differential	−0.233***	33,088,421
	(0.0001)	
2. Pooled OLS [worker-, firm-, and job-level controls]	−0.102***	33,088,421
	(0.0001)	
3. Firm fixed effects [+ controls of Model 2]	−0.040***	33,088,421
	(0.0001)	[1,627,285]
4. Worker fixed effects [+ controls of Model 2]	+0.019***	33,088,421
	(0.0001)	(7,059,849)
5. Worker, firm, and match fixed effects [+ controls of Model 2]	+0.046***	33,088,421
	(0.0001)	"10,094,475"
6. Worker, firm, and match fixed effects + Tenure and tenure squared [+ controls of Model 2]	+0.046***	33,088,421
	(0.0001)	"10,094,475"
7. Worker, firm, and match fixed effects + Experience and experience squared [+ controls of Model 6]	+0.047***	33,088,421
	(0.0001)	"10,094,475"
8. Worker, firm, and match fixed effects + Experience in part-time work [+ controls of Model 7]	+0.048***	33,088,421
	(0.0001)	'10,094,475"
9. Worker, firm, and match fixed effects + Maternity [+ controls of Model 8]	+0.039***	32,837,759
	(0.0001)	"10,085,046"
10. Worker, firm, and match fixed effects + (log) Value added per worker in the firm [+ controls of Model 8]*	+0.030***	18,728,046
	(0.0002)	"4,479,456"
Diffusion of part-time work and transitions		
Share of part-time workers: 42.2%		
Switches FT/PT or PT/FT: 1,500,855		
Switches FT/PT or PT/FT within the same firm: 792,079		

Source: INPS data; years: 2009-2015
**Source: INPS-AIDA data; years: 2009-2015*
All the estimations report robust standard errors clustered at the worker and firm (i.e., at the job match) level. In the last column, in (), we report the number of workers; in [], the number of firms; in "", the number of spells. *** denotes significance at the 1% level. Controls at the worker-, firm-, and job-level in Model 2 (and subsequent models) include: a cubic polynomial for the worker's age, dummies for foreign-born workers, job contract duration (i.e., temporary *versus* permanent contract), job occupation (i.e., blue-collar worker, white-collar worker, and manager), and dummies for the firm's size (6 classes), industry (2-digit ATECO-2007 classification), and region (20 dummies). Tenure is measured as the number of years in the firm. Experience is measured as the number of years since the first job. Experience in part-time work is measured as the number of years with a part-time contract since the first job. Maternity is a dummy variable indicating whether the employee has been on maternity leave in the current year. "FT" and "PT" stand for part-time work and full-time work, respectively.

Table 2: **Evolution of estimated part-time/full-time wage differential, diffusion of part-time work, and transitions. Female workers. Period: 1983-2015.**

Sub-period	**Part-time/full-time wage differential (β)**	**Share of part-time workers**	**Switches FT/PT or PT/FT**	**Switches FT/PT or PT/FT within the same firm**	**Observations**
1983-1987	+0.327*** (0.0004)	3.2%	223,631	175,231	11,805,926
1985-1989	+0.251*** (0.0003)	6.9%	339,787	245,692	12,398,066
1988-1993	+0.169*** (0.0003)	12.3%	557,106	349,200	16,668,687
1992-1997	+0.103*** (0.0002)	18.2%	629,054	366,827	17,397,177
1996-2001	+0.079*** (0.0002)	23.4%	818,677	429,296	19,438,706
2000-2005	+0.059*** (0.0002)	28.6%	1,008,217	502,795	22,766,611
2004-2009	+0.048*** (0.0002)	35.9%	1,187,037	581,168	25,342,748
2009-2015	+0.048*** (0.0001)	42.2%	1,500,855	792,079	33,088,421

Source: INPS data; years: 1983-2015

All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. For all the rest, see the footnote of Table 1.

Table 3: **Estimated part-time/full-time wage differential and potential variation in hours worked related to local labor market conditions. Female workers. Period: 2005-2015**

Part-time work	+0.040***
	(0.0002)
Regional unemployment rate	−0.002***
	(0.0000)
Part-time work ∗ regional unemployment rate	−0.0001***
	(0.0000)
	Observations: 49,419,633

Source: INPS data; years: 2005-2015

This regression includes the same controls of Model 8, Table 1. For all the rest, see the footnote of Table 1.

Table 4: **Estimated part-time/full-time wage differential and potential variation in hours worked related to sectoral and firm-level demand shocks. Female workers. Period: 2009-2015.**

Firms below/above median change in log revenues at 5-digit sectoral level		
	Firms below median change	Firms above median change
Part-time work	+0.044*** (0.0002) [16,022,953]	+0.048*** (0.0002) [16,036,935]

Firms with high or very high lagged increase in firm-level intensity of part-time work		
	Firms above 50th percentile change	Firms above 90th percentile change
Part-time work	+0.046*** (0.0004) [8,407,245]	+0.038*** (0.0012) [1,174,132]

Source: INPS data; years: 2009-2015

All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. In square brackets, the number of observations. For all the rest, see the footnote of Table 1.

Table 5: **Tenure, experience, experience in part-time work. Female workers. Period: 2009-2015**

Status	**Part-time/full-time wage differential (β)**	**Observations**
High-tenure	+0.044*** (0.0002)	16,605,422
Low-tenure	+0.049*** (0.0002)	16,482,999
High-experience	+0.045*** (0.0002)	16,622,534
Low-experience	+0.051*** (0.0002)	16,465,887
No experience in part-time work	+0.059*** (0.0002)	13,973,040
Some experience in part-time work	+0.039*** (0.0002)	19,115,381

Source: INPS data; years: 2009-2015
All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. High- and low-tenure workers are defined as those above and below median workers' tenure, respectively. High- and low-experienced workers are defined as those above and below median workers' experience. "No experience in part-time work" and "some experience in part-time work" are computed using the amount of experience in part-time work accumulated by 2005 (or by the first panel observation after that year). For all the rest, see the footnote of Table 1.

Table 6: **Maternity. Female workers. Period: 2009-2015**

Status	**Part-time/full-time wage differential (β)**	**Observations**
Never on maternity leave	+0.032*** (0.0001)	24,595,481
At least once on maternity leave	+0.081*** (0.0003)	8,242,278

Source: INPS data; years: 2009-2015
All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. "Never on maternity leave" and "at least once on maternity leave" refer to period 2005-2015. Therefore, the first status implies that the worker has never been on maternity leave between 2005 and 2015, whereas the second status means that the worker has been at least once on maternity leave in that time period. For all the rest, see the footnote of Table 1.

Table 7: **AKM worker effects. Female workers. Period: 2009-2015**

Status	**Part-time/full-time wage differential (β)**	**Observations**
Bottom 25th percentile AKM worker effects	+0.052*** (0.0003)	6,402,957
Top 25th percentile AKM worker effects	+0.034*** (0.0003)	6,440,373

Source: INPS data; years: 2009-2015
All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. AKM worker effects are derived from AKM regressions with two-way fixed effects computed over the period 2005-2009. For all the rest, see the footnote of Table 1.

Table 8: **Switches from full-time to part-time work *versus* switches from part-time to full-time work. Female workers. Period: 2009-2015**

Direction of switch	**Part-time/full-time wage differential (β)**
Switch from full-time to part-time work	+0.030*** (0.0002)
Switch from part-time to full-time work	−0.014*** (0.0002)
	Observations: 33,088,421

Source: INPS data; years: 2009-2015
The regression includes the same controls of Model 8, Table 1. For all the rest, see the footnote of Table 1.

Table 9: **Short *versus* long part-time work. Female workers. Period: 2009-2015**

Type of part-time work	**Part-time/full-time wage differential (β)**
Model 1	
Short part-time work (less than 15 hours per week)	+0.121*** (0.0003)
Long part-time work (more than 15 hours per week)	+0.043*** (0.0001)
Model 2	
Short part-time work (less than 15 hours per week)	+0.134*** (0.0003)
Medium part-time work (between 15 and 28 hours per week)	+0.061*** (0.0002)
Long part-time work (more than 28 hours per week)	+0.023*** (0.0002)
	Observations: 33,088,421

Source: INPS data; years: 2009-2015
All regressions include the same controls of Model 8, Table 1. For all the rest, see the footnote of Table 1.

Table 10: **Rent-sharing. Female workers. Period: 2009-2015**

Part-time work	+0.010*** (0.0018)
(log) Value added per worker in the firm	+0.022*** (0.0001)
Part-time work ∗ (log) value added per worker in the firm	+0.003*** (0.0002)
	Observations: 18,728,046

Source: INPS-AIDA data; years: 2009-2015
The regression includes the same controls of Model 8, Table 1. For all the rest, see the footnote of Table 1.

Table 11: **Commuting. Female workers. Period: 2009-2015**

Status	**Part-time/full-time wage differential (β)**	**Observations**
Not commuter (city of residence is the same as city where the job is located)	+0.048*** (0.0002)	13,963,314
Commuter (city of residence is not the same as city where the job is located)	+0.045*** (0.0001)	19,125,107

Source: INPS data; years: 2009-2015

All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. For all the rest, see the footnote of Table 1.

Appendices

A. Identifying observations: numbers and characteristics

Table A.1: **Observations used to identify part-time/full-time wage differential by estimation model. Female workers. Period: 2009-2015.**

Estimation model	**All workers**	**Part-time workers**	**Full-time workers**	**All workers, % lost**	**Part-time workers, % lost**	**Full-time workers, % lost**
Pooled OLS	33,088,421	13,966,248	19,122,173	-	-	-
Worker fixed effects (all switches)	1,500,855	900,866*	599,989**	95.5%	93.5%	96.9%
Worker, firm, and match fixed effects (switches within the same firm)	792,079	501,787*	290,292**	47.2%	44.3%	51.6%

Source: INPS data; years: 2009-2015

* Workers who switch from full-time to part-time work.

** Workers who switch from part-time to full-time work.

Table A.2: **Summary statistics by observations used to identify part-time/full-time wage differential in different estimation models. Female workers. Period: 2009-2015.**

	Pooled OLS		**Worker FE**			**Worker, firm, and match FE**		
	All part-time workers	**All full-time workers**	**Switchers FT/PT or PT/FT**	**Switchers FT/PT**	**Switchers PT/FT**	**Switchers FT/PT or PT/FT within the same firm**	**Switchers FT/PT within the same firm**	**Switchers PT/FT within the same firm**
Age - years	39.925	39.494	36.503	36.737	36.151	37.879	37.859	37.915
Native-born - %	88.9%	91.4%	87.8%	88.7%	86.5%	91.1%	92.0%	89.4%
Foreign-born - %	11.1%	8.6%	12.2%	11.3%	13.5%	8.9%	8.0%	10.6%
Permanent contract - %	84.6%	87.2%	66.3%	68.4%	63.2%	87.4%	88.7%	85.1%
Temporary contract - %	15.4%	12.8%	33.7%	31.6%	36.8%	12.6%	11.3%	14.9%
Blue-collar worker - %	50.3%	35.9%	46.7%	46.8%	46.7%	37.9%	37.3%	38.9%
White-collar worker - %	49.7%	63.9%	53.3%	53.2%	53.3%	62.1%	62.7%	61.1%
Manager - %	0.01%	0.2%	0.02%	0.02%	0.02%	0.03%	0.04%	0.04%
Experience - years	11.235	12.963	9.483	9.858	8.921	11.265	11.546	10.780
Tenure - years	4.963	6.378	2.861	3.184	2.377	5.795	6.143	5.192
Experience working part-time - years	8.044	1.718	4.394	3.544	5.669	4.547	3.594	6.195
Maternity - %	5.8%	7.2%	7.5%	9.2%	5.0%	12.1%	14.5%	7.9%
Firm with $\leq$15 employees	49.1%	34.5%	51.8%	55.1%	47.0%	49.9%	52.8%	44.7%
Firm with (15-50] employees	11.6%	16.7%	13.8%	12.6%	15.4%	13.8%	13.6%	14.2%
Firm with (50-100] employees	5.6%	8.3%	5.9%	5.4%	6.6%	6.0%	5.8%	6.4%
Firm with (100-250] employees	7.0%	10.1%	6.8%	6.4%	7.5%	7.1%	6.8%	7.5%
Firm with >250 employees	26.7%	30.4%	21.7%	20.5%	23.5%	23.2%	21.0%	27.2%
Manufacturing firm - %	12.4%	26.0%	14.8%	14.4%	15.4%	17.3%	17.4%	17.0%
Services firm - %	87.6%	74.0%	85.2%	85.6%	84.6%	82.7%	82.6%	83.0%
Firm in North-East - %	23.7%	26.3%	25.9%	25.7%	26.2%	26.2%	26.3%	25.9%
Firm in North-West - %	30.8%	36.9%	31.4%	31.0%	32.0%	31.3%	31.3%	31.3%
Firm in Center - %	22.4%	20.9%	22.2%	21.7%	22.9%	21.9%	21.3%	22.8%
Firm in South and Islands - %	23.1%	15.9%	20.5%	21.6%	18.9%	20.6%	21.1%	20.0%

Source: INPS data; years: 2009-2015
"FE" stands for fixed effects.

B. Contractual *versus* actual hours

In Table B.1, we report our reference estimate of part-time/full-time wage differentials in two specific sub-samples where the practice of differential under-reporting of working hours by part-time status is unlikely.[B.1] In particular, we have enough within-firm switchers to run our preferred econometric specification even in the narrowly-defined cells made of workers who are prime-age (we further isolate workers aged 35-45 and 45-50), native, blue-collar, with a permanent contract, working in large firms, in the manufacturing sector, and the North-West of Italy. These are arguably the typical contexts where the combination of strong unions' presence, managerial practices, and the more prevalent civic and pro-law cultural traits (e.g., compared to the South of the country) make the monitoring and enforcement of labor contracts more likely and, conversely, misreporting or other informal practices less widespread. Even in these specific cells, estimates point to a significantly positive part-time premium, which is near to the average value.

Table B.1: **Estimated part-time/full-time wage differential in contexts with likely low discrepancy between part-time contractual and actual hours. Female workers. Period: 2009-2015**

Context	**Part-time/full-time wage differential (β)**
Workers aged (35-45], native-born, with a permanent contract, blue-collar, in firms with >250 employees, located in North-West, operating in manufacturing sector	0.061*** (0.0052) [146,748]
Workers aged (45-50], native-born, with a permanent contract, blue-collar, in firms with >250 employees, located in North-West, operating in manufacturing sector	0.047*** (0.0079) [73,944]

Source: INPS data; years: 2009-2015
All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. In square brackets, the number of observations. For all the rest, see the footnote of Table 1.

[B.1] It should be noticed that, while off-the-book payments are not uncommon in Italy, they are typically not recorded in administrative data, as the latter cover regular wage payments in jobs for which the employer pays social security contributions. Hence, in principle our wage variable is not affected by this type of under-reporting practices.

C. Selection issues: robustness I

In Table C.1, we re-estimated Model 8 of Table 1 separately for 22 different categories of workers. We begin by splitting the sample by workers' age groups (Rows 1 to 4 of Table C.1). The motivations for undertaking part-time work might differ along the life cycle, particularly in consideration of family commitments and circumstances. We then look at whether the inclusion/exclusion of specific groups of workers, such as foreign-born or workers with temporary contracts, might have any detectable impact on our results, possibly on account of their lower bargaining power (Rows 5 to 8). Next, we split the sample according to three major occupation groups (blue-collar workers, white-collar workers, and managers), once again to document the existence of any differential part-time premium related to the specificities of these occupational profiles (Rows 9 to 11). We then proceed by considering the sub-sample of workers employed in firms of different sizes, which might differently use and reward part-time work (Rows 12 to 16). For similar reasons, we split the sample according to whether the job is held into a manufacturing or service firm (Rows 17 and 18). Finally, recognizing the large territorial disparities that characterize the country under consideration, we also look at the existence of any substantial differences in the wage differential by part-time status in different macro-areas (North-East, North-West, Center, and South of Italy, Rows 19 to 22). A positive, very stable, and largely statistically significant part-time wage premium is found in any of the considered partitions.

Table C.1: **Estimated part-time/full-time wage differential and transitions by different worker and firm subgroups. Female workers. Period: 2009-2015.**

Row	Subgroup	Part-time/full-time wage differential (β)	Switches FT/PT or PT/FT	Switches FT/PT or PT/FT within the same firm	Observations
1	Workers aged 15-25	+0.067*** (0.0006)	185,897	71,486	2,788,306
2	Workers aged 26-45	+0.054*** (0.0002)	1,036,016	549,220	20,206,365
3	Workers aged 46-55	+0.035*** (0.0003)	227,119	135,139	7,904,366
4	Workers aged 56-64	+0.043*** (0.0006)	51,823	36,234	2,189,384
5	Native-born workers	+0.046*** (0.0001)	1,276,065	704,308	29,919,198
6	Foreign-born workers	+0.054*** (0.0005)	224,790	87,771	3,169,223
7	Workers with permanent contract	+0.046*** (0.0002)	911,675	668,553	28,778,256
8	Workers with temporary contract	+0.053*** (0.0004)	589,180	123,526	4,310,165
9	Blue-collar workers	+0.061*** (0.0002)	703,675	301,194	13,986,943
10	White-collar workers	+0.041*** (0.0002)	796,782	490,569	19,058,728
11	Managers	+0.049*** (0.0082)	398	316	42,750
12	Workers in firms with $\leq$15 employees	+0.046*** (0.0002)	776,958	394,288	13,381,324
13	Workers in firms with (15-50] employees	+0.041*** (0.0004)	206,874	109,650	4,818,838
14	Workers in firms with (50-100] employees	+0.046*** (0.0006)	88,243	47,509	2,386,202
15	Workers in firms with (100-250] employees	+0.049*** (0.0006)	102,924	55,930	2,931,947
16	Workers in firms with >250 employees	+0.044*** (0.0003)	325,856	184,702	9,570,110
17	Workers in manufacturing firms	+0.049*** (0.0004)	236,825	147,599	7,288,611
18	Workers in services firms	+0.046*** (0.0002)	1,264,030	644,480	25,799,810
19	Workers in firms located in North-East	+0.055*** (0.0002)	388,000	206,987	8,328,072
20	Workers in firms located in North-West	+0.044*** (0.0003)	471,544	247,792	11,355,748
21	Workers in firms located in Center	+0.048*** (0.0003)	333,433	173,428	7,112,576
22	Workers in firms located in South and Islands	+0.037*** (0.0003)	307,878	163,872	6,292,025

Source: INPS data; years: 2009-2015

All regressions include the same controls of Model 8, Table 1. All regressions are run on split samples. For all the rest, see the footnote of Table 1.

D. Selection issues: robustness II

Table D.1: **Switching probability by AKM worker effects. Female workers. Period: 2009-2015**

Dependent variable: switcher FT/PT or PT/FT within the same firm		
AKM worker effects - 2nd decile	−0.0019***	(0.0002)
AKM worker effects - 3rd decile	−0.0014***	(0.0002)
AKM worker effects - 4th decile	−0.0003	(0.0002)
AKM worker effects - 5th decile	+0.0003	(0.0002)
AKM worker effects - 6th decile	+0.0007***	(0.0002)
AKM worker effects - 7th decile	+0.0003	(0.0002)
AKM worker effects - 8th decile	−0.0012***	(0.0002)
AKM worker effects - 9th decile	−0.0040***	(0.0002)
AKM worker effects - 10th decile	−0.0069***	(0.0002)
	Observations:	26,268,852
Dependent variable: switcher FT/PT within the same firm		
AKM worker effects - 2nd decile	−0.0018***	(0.0002)
AKM worker effects - 3rd decile	−0.0015***	(0.0002)
AKM worker effects - 4th decile	−0.0009***	(0.0002)
AKM worker effects - 5th decile	−0.0003**	(0.0002)
AKM worker effects - 6th decile	+0.0000	(0.0002)
AKM worker effects - 7th decile	+0.0001	(0.0002)
AKM worker effects - 8th decile	−0.0004**	(0.0002)
AKM worker effects - 9th decile	−0.0017***	(0.0002)
AKM worker effects - 10th decile	−0.0039***	(0.0002)
	Observations:	26,268,852

Source: INPS data; years: 2009-2015

All regressions include the same controls of Model 8, Table 1, except for worker and firm fixed effects, which are not included. Note that AKM worker effects are time-invariant. All regressions are run on split samples. AKM worker effects are derived from AKM regressions with two-way fixed effects computed over the period 2005-2009. For all the rest, see the footnote of Table 1.

E. Male workers

Table E.1: **Evolution of estimated part-time/full-time wage differential and share of part-time workers. Male workers. Period: 1983-2015.**

Sub-period	**Part-time/full-time wage differential (β)**	**Share of part-time workers**	**Observations**
1983-1987	+0.169*** (0.0002)	0.3%	25,047,046
1985-1989	+0.137*** (0.0006)	0.6%	25,578,351
1988-1993	+0.105*** (0.0004)	1.0%	32,904,218
1992-1997	+0.053*** (0.0003)	2.1%	32,080,120
1996-2001	+0.039*** (0.0003)	3.2%	34,433,755
2000-2005	+0.027*** (0.0002)	4.1%	38,267,854
2004-2009	−0.001*** (0.0002)	6.6%	40,115,889
2009-2015	−0.000 n.s. (0.0001)	11.0%	45,787,468

Source: INPS data; years: 1983-2015
All regressions include the same controls of Model 8, Table 1. “n.s.” denotes non-significance at the 10% level. For all the rest, see the footnote of Table 1.

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