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THE USE OF FIXED-TERM CONTRACTS AND THE (ADVERSE) SELECTION OF PUBLIC SECTOR WORKERS

by Lucia Rizzica*

Abstract

The paper seeks to investigate the relationship between job (in)security in the public sector and workers' self-selection between the private and public sector. Using data from the Italian Labour Force Survey for the years 2005-13, I show that a higher incidence of fixed-term contracts in the public sector has significant *adverse selection effects* in that it lowers the likelihood of workers of higher ability entering the public sector. Moreover, at least in some areas of the country, a lower relative probability of obtaining an open-ended position in the public sector decreases the likelihood that higher-ability, fixed-term workers remain in the public sector.

JEL Classification: J24, O15, M54, D82.
Keywords: public service delivery, incentives, selection, public sector personnel, occupational choices.

Contents

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1 Introduction[1]

Today among OECD countries the share of the workforce employed in the public sector averages about 21%, with peaks of almost 35% in some Scandinavian countries.[2] Understanding who are these people, how they are selected and what job features attract them is crucial to address issues on efficiency of public service delivery. Human capital is indeed a key resource of any enterprise and this holds also for the public administration. Producing public goods of high quality requires not only an efficient allocation of the given resources and a good organization of the work tasks (Bloom et al., 2014), but first, and most importantly, an effective selection of the workforce so as to count on high skill and motivated workers.

How individuals sort into jobs according to their preferences, skills, job own attributes and outside options has long been studied in economics (Roy, 1951). The choice between public and private sector jobs has traditionally been analysed in terms of responses to wage differences between the two sectors (Krueger, 1988; Borjas, 2002; Propper and Van Reenen, 2010; Dal Bo' et al., 2013). Since public workers seem to systematically enjoy a positive wage premium relative to their statistically comparable counterpart in the private sector in almost every country, if wages were the only determinant of individual choices, we should expect to observe all the most talented individuals to be working in the public sector. Yet, studies have showed that other aspects of the public profession attract workers, in particular, they may be intrinsically motivated towards the specific job, or have pro-social preferences that lead towards mission driven compared to profit driven organizations (Akerlof and Kranton, 2005; Besley and Ghatak, 2005; Ashraf et al., 2014), or seek higher job stability (Rothstein, 2015).

In this paper I investigate the latter aspect and try to shed light on the effects that lowering job stability in the public relative to the private sector may have on the workers' sorting between the two sectors. Indeed, differential changes in job security between the public and the private sector can reasonably be expected to alter the behaviour of economic agents with different characteristics. Specifically, the analysis relies on two assumptions: (i) that job insecurity lowers the expected utility derived from a job for all workers (Pissarides, 2000), and (ii) that employers always hire the most talented workers among the pool of applicants. Under these assumptions if, for instance, job stability decreases in the public relative to the private sector,

[1] *The views expressed in the article are those of the author only and do not involve the responsibility of the Bank of Italy.* I am grateful to all participants at the XX AIEL National Conference of Labour Economics and to Francesca Carta, Marta de Philippis, Francesco Manaresi, Giuliana Palumbo, Emilio Reyneri, Paolo Sestito, Pietro Tommasino and Marco Tonello for useful comments and discussions.

[2] OECD (2015).

we should expect high ability workers to progressively sort in the private sector as they update their expectations about the likelihood of getting a permanent position in either sector.

To inspect empirically the existence of such dynamics, I use data from the Italian Labour Force Survey for the years 2005-2013[3] and estimate how the probability that an individual sorts into the public sector changes in response to changes in the *relative* expectation of getting a fixed-term contract in the public rather than in the private sector. Secondly, I study whether exit choices are affected as well. Selecting a sample of individuals who moved from the public to the private sector from one period to the other, I manage to test if a decrease in the expected probability of being turned into an open-ended position increases the probability of leaving the public sector differentially for high and low ability workers.

My results show that the use of fixed-term contracts has *adverse* effects on the (self)selection of workers into the public sector: increasing their incidence as *entry* mode significantly decreases the probability that high skill workers sort into the public sector. Moreover, at least in some areas of the country, decreasing the probability that a fixed-term worker is stabilised in the public sector, i.e. that his contract is turned into an open-ended one, induces higher ability workers to *exit* the public sector and move to the private one.

These effects on the *dynamics* of selection of the public workforce are likely to have major consequences in the long run as they may progressively deteriorate the quality of the pool of the public sector workers and consequently that of the public goods and services provided. Moreover, as a very large share of public workers are employed in the education and health sectors,[4] the adverse selection effects of the workforce documented in this paper are further likely to generate losses in terms of human capital accumulation in the very long run.

The remainder of the paper is structured as follows: section 2 discusses the conceptual framework and presents a brief overview of the related literature; section 3 introduces the institutional setting; section 4 provides some descriptive evidence; section 5 presents the empirical strategy; section 6 discusses the results; section 7 provides some specification checks and section 8 concludes.

[3] Unfortunately data before 2005 are not comparable to later waves.

[4] According to RGS administrative data, in 2013, 56% of the total number of public sector workers were employed in the sectors of education (including universities) and health. Among all fixed-term workers about 58% were employed in these sectors.

2 Conceptual framework and related literature

That rational agents make optimizing decisions about what labour markets to participate in, i.e. that they *self-select* into certain jobs, markets, locations etc., is a well known fact in economics that finds its first systematic treatment in the seminal work of Roy (1951). The author there discusses the optimizing choices of 'workers' selecting between fishing and hunting on the basis of their skills and their expected wages in the two sectors. A more formal approach to the problem has then been introduced over thirty years later by Borjas (1987), who similarly models the decision of agents to self-select into migration.

The application of these models to the choice of workers to sort into the public rather than the private sector has first been proposed by Krueger (1988). Using aggregate US data, he shows that when the labour market becomes loose from an employee's perspective, i.e. the ratio of federal to private sector wages increases, the number of applications to federal job openings raises substantially so that a higher wage premium for federal workers increases *more* the propensity to apply of high ability individuals. Therefore earnings differentials may directly and significantly affect the *composition* of the pool of applicants for federal jobs and thus the quality of public sector workers.

The link between wage differentials and the quality of workers who sort into the public sector has been highlighted by several other authors in more recent years. Borjas (2002), for example, takes a long term perspective to argue that it is not just the levels of wages that matter but also their dispersion. He argues that because relative wages across and within skill groups changed at different rates in the public and in the private sectors during the 1980s and 1990s, the economic incentives that induce particular types of workers to enter or leave a particular sector also changed over time. Thus, analysing flows into and out of the public sector, he estimates that lower wage dispersion in the public sector relative to the private one increases the skill gap between the two sectors because it induces higher ability individuals to sort into the private sector, which most rewards their skills, and the lower ability ones into the public sector, which penalizes them less. Finally, in a paper that attracted a lot of attention by the media, Propper and Van Reenen (2010) investigated the relationship between pay regulation and the quality of service in UK hospitals. They show that when the competitive outside wage, i.e. that paid in the private sector, for nurses is higher than the regulated NHS wage, the quality of the workers who remain in the public sector falls significantly with large negative effects on

hospitals performance.

The most recent literature has then highlighted how the decision to sort into the public sector is influenced by several aspects other than wages. Notably, Dal Bo' et al. (2013) and Ashraf et al. (2014) investigate the interaction between career incentives and intrinsic motivation and pro-social preferences in attracting high ability workers. For Italy, Reyneri and Centorrino (2007) show that among college graduates those who work in the public sector are on average more satisfied than those who work in the private sector, the difference being mainly explained in terms of relevance of their studies for the specific job, prestige of the position, possibility to improve professional skills, cultural interest for the job, autonomy and flexibility of working hours and perceived social utility of the job.

All these aspects interact with another key feature which is job stability. Rothstein (2015), for instance, develops and simulates a dynamic discrete choice model of teacher labour market in which workers continuously self-select into and out of teaching and learn about their (unobservable) ability. In this setting he simulates different types of contracts and concludes that bonus policies based on the teacher's performance are little effective in creating incentives for high ability workers to self select into teaching. On the other hand, a policy that reduces tenure rates, i.e. job stability, on the basis of workers' performance, may be more effective in generating virtuous dynamic selection effects, but this would need to be coupled with substantial salary increases to make up for the loss of utility generated by the lower job security. Rothstein's work contributes to a roaring debate in the US about optimal recruitment and retention policies for teachers. Previous works had indeed pushed for higher optimal firing rates because they ignored teachers' and potential teachers' behavioural responses to increases in tenure denial rates (Staiger and Rockoff, 2010; Boyd et al., 2011; Winters and Cowen, 2013a; Chetty et al., 2014). Yet, as noted by Winters and Cowen (2013b), when evaluating teachers' deselection policies "understanding the role of self-selected exits, and the underlying variation in teacher quality is essential for determining policy effects".

The present paper moves in this direction and aims at contributing to the literature on the determinants of the choice of working in the public or in the private sector, by focusing on the role of job security. Indeed, I investigate workers' responses to increases in the expected probability of being laid off in terms of public sector entry and exit, thus providing evidence on the long term effects of public workers' recruitment and retention policies. What I want to test is whether differences in expected job stability between the public and the private sector

affect the choice of workers to sort into either of the two sectors. The answer to this question is not trivial as on the one hand job instability lowers the expected utility of a job and thus should crowd out the most talented individuals, who can more easily find a different job; but on the other hand, to the extent that fixed-term workers get tenured on the basis of their ability and effort, lower job security should deter low ability workers from applying. Moreover, because public sector workers gain utility from many other aspects of their profession, it may be that even the most talented ones will be willing to trade off job stability for other characteristics of public sector work which they enjoy so that an increase in job instability would have no effect on the *quality* of applicants.

3 Institutional setting

In Italy fixed-term contracts were banned from the public sector until the early 2000s. In 2001, then, the government established that the same types of fixed-term contracts that were in use in the private sector could be further applied to the public sector, but only to face "temporary and exceptional needs". Despite these formal limits, the introduction of these new and more flexible contracts in the public administration quickly translated into an escalation of their use: the number of temporary workers in the public sector passed from about 443,000 in 2002 to over 490,000 in 2006 (+10.8%)[5]. The main reason why the new forms of flexible work were so succesful was that from the early 2000s the need to contain public spending, imposed by the EU Stability and Growth Pact requirements, called for an abrupt arrest of hirings in the public administration. The possibility of using temporary contracts thus became a way to circumvent these limits and feed the public sector with new workers. Indeed, while the number of fixed-term workers increased constantly from 2001 to 2006, that of permanent workers decreased from 3.22 millions in 2001 to 3.14 millions in 2006 (-2.5%) .

From 2007 then, with the burst of the economic crisis, the need to reduce public spending imposed a significant reduction in hirings in the public sector, even through fixed-term contracts. Hence, while the number of permanent contracts further decreased to 3.03 millions in 2013 (-3.4% from 2006), the number of temporary workers shrank more dramatically to just above 307,000 full time equivalent workers (-37.4% from 2006).

Today, nevertheless, the number of temporary workers in the public sector remains substantial and raises particular concerns in some specific sectors: of the about 300,000 public temporary

[5]Figures in this section are taken from RGS administrative records.

workers, almost half (140,000) are employed in schools, about 22% in local governments, 13% in the armed forces and 11% in the health sector. While the percentage of fixed-term workers employed in other public offices is negligible in absolute terms compared to that of these sectors, it should be underlined that there are several sectors which appear to overwhelmingly rely on fixed-term workers. This is, for instance, the case of public universities and armed forces, where the share of fixed-term workers in 2012 approximated respectively 27% and 20%.[6]

The most debated point about the use of fixed-term contracts in the public sector is the length of these employment relationships: the law currently establishes in three years their maximum length,[7] but the existing evidence suggests that a large share of temporary workers in the public sector have held their positions for consistently longer periods (section 4). This anomaly led the legislator to adopt a number of extraordinary measures of stabilisation of fixed-term workers over the past years, so that between 2007 and 2012, more than 70,000 fixed-term contracts were turned into permanent ones through special laws.

This setting appears well suited to analyse the choices of workers to sort between the public and the private sector: indeed, the two sectors experienced quite different evolutions over the past 15 years in terms of job stability so that we can reasonably expect observe changes in the composition of the two sectors in terms of workers' ability.

4 Data and descriptive evidence

The study relies on data derived from the Italian Labour Force Survey (LFS), which is a quarterly rolling panel dataset collected by the Italian Statistical Office (Istat). The dataset contains about 250,000 households, 600,000 individuals per wave, for whom detailed information about labour market status, but also family structure and other socio-economic characteristics is collected.

I build a quarterly dataset that spans from 2005 to 2013.[8] The sample is restricted to employees and autonomous workers with an employer-coordinated freelance work contract (on specific project or not) or an occasional work contract. For all workers I establish whether they work in the public or private sector. Because this information is not released to the public by

[6] Author's own calculations based on RGS data.

[7] This limit was initially applicable only to fixed-term contracts and not to the other contractual forms such as *Formazione-Lavoro, Somministrazione, LSU*, so that it was possible to exceed the three year limit by using a different type of contract. Only in 2008 (art 49, par.3, legislative Decree 112/2008) was it established that the three year limit was applied to all contractual forms. Still, some forms, such as the so called *co.co.co.* or school contracts, are still exempted form the three year limit and ruled under specific regimes.

[8] Throughout the paper estimates are weighted using panel weights constructed by Istat to replicate the structure of the Italian population.

Istat, I recover it on the basis of the sector of activity of the employer. Thus, public sector firms will be those operating in the sectors of: (i) public administration and defense, compulsory social security; (ii) education, health and social work activities; (iii) other services activities. While the first category unambiguously identifies public sector workers, the other two may well capture workers of the private sector. To correct, at least partly, this measurement error, I further impose that public sector workers have to work for an employer that has more than one local unit.

According to this classification of the Labour Force Survey data there are currently about 3 million public sector workers. These represent about 13.6% of the employed population and 5% of the total Italian population. Looking at the long term dynamics of these figures, it further appears that there has been a constant reduction in the number of public workers starting from 2008, and that this reduction has been more severe than in the private sector so that the number of public sector workers has decreased more than the total number of employed people (figure 1).

I define new hires as those workers who report having started their current job in the quarter of the interview. A look at the dynamics of hirings in the public sector (figure 2), confirms that the number of new hired in the public sector increased between 2005 and 2007, then decreased sharply with only a temporary increase in 2010 and 2011 and a deeper drop in the last two years.

Table 1 gives an idea of the magnitude of the numbers at stake: the number of fixed-term workers that are employed by the public sector is about one fifth of the total, and amounts today to about 400,000 individuals. This number is considerably lower than what was observed in 2006 and 2007 before the spending review norms restrained the spread of fixed-term contracts. Interestingly, the private sector witnessed an opposite trend as from 2009, after the crisis hit, the share of fixed-term workers increased from 14.4% to 16.3% in 2012. Only in 2013 the share of fixed-term workers in the private sector started to shrink again.

If we look at new hires only (table 2), the data confirm that fixed-term contracts have become the main entry way into the public sector: the share of new contracts that were fixed-term rose from 80.5% in 2005 to 86.4% un 2013; a larger increase is documented for the private sector (from 60.7% to 73.6%), yet in the latter case the figures remained considerably lower. Table 2 further provides interesting evidence about the most debated issue of the length of fixed-term employment relationships in the public sector. This shows that permanency in the fixed-term

status is quite long and goes beyond the three years stated by law for 29% of public workers. Taking all fixed-term workers over the analysed ten years, it turns out that the average duration of permanency under a fixed-term contract is over seven and half years in the public sector, and less than two in the private. Over the years, moreover, the length of fixed-term employment relationships has increased in the private sector, especially from 2008 onwards, while in the public sector it has remained quite constant. Yet, it is clear that the speed of stabilisation in the private sector is much higher than in the public.

Finally table 3 offers a snapshot of the characteristics of the most recent new hires. It reveals that fixed-term workers are generally younger than those hired with an open-ended contract, both in the public and in the private sector. In the public sector there further is a lower incidence of women among fixed-term new hired. This seems consistent with the fact that women tend to be more risk averse than men and thus traditionally prefer the public sector for its stability. Interestingly, it appears that among new hires in the public sector the largest share of those hired through a permanent contract lives in the North, while in the South is the largest share of those hired under a fixed-term contract. These geographical patterns are not observable in the private sector. In terms of education, fixed-term new hires are more educated than permanent new hires in the private but not in the public sector. Yet, in the public sector they appear to have higher ability, as measured by the time to obtain the degree (see section 5.5 for details). In spite of having higher ability, fixed-term workers of the public sector suffer a wage penalty relative to their permanent peers which is much wider than in the private sector. Relevant differences further appear with respect to job finding methods: in the public sector we observe a sharp difference between fixed-term and permanent workers in that the latter are considerably less likely to have found their job through informal channels and much more likely to have found it through a public competition. In particular the share of public permanent workers who entered through a public competition is above 60% and less than one third for fixed-term workers.

5 Empirical Strategy

I want to estimate whether and to what extent workers sort into the private or public sector depending on their expectation of getting a permanent position in either of the two sectors and how these expectations interact with individual ability. The empirical exercise will thus consist in the estimation of two different models: one for *entry* in the public sector and one for *exit*

from the public sector. The former will be estimated among all those who start a job at time t, whether this is private or public. The latter, because a permanent position is by definition an absorbing state, will be estimated only among fixed-term workers. The implicit underlying assumption is that employers always hire the candidate with highest ability, so that the observed employer-employee relationship is the result of a labour supply choice.

5.1 Sorting into the public sector

The first empirical model considers new hires i at time t and estimates how the likelihood that they choose the public sector varies depending on the expected labour conditions in each of the two sectors. The estimating equation will be of the following type:

$$Pr(Pub_{it} = 1|NH_{it} = 1) = \alpha + \beta_1 q_{it} + \beta_2 p_{it} + \beta_3 \theta_i + \beta_4(\theta_i \times p_{it}) + \beta_5 \Delta w_{i,r,T-1} + \gamma_r + \delta_T + u_{it} \quad (1)$$

In this specification the outcome variable is a binary variable for whether individual i works in the public sector rather than in the private sector at quarter t. This is conditional on having started a job in the current quarter, i.e. of being a new hire ($NH_{it} = 1$).

On the right hand side is a term q_{it}, that represents the expected relative probability of finding a job in the public rather than in the private sector. No matter how attractive each sector is for the characteristics of the positions offered, one needs to control for the relative probability of finding a job there. As described in the previous section, job finding rates in the public and private sectors have evolved following different dynamics: in the first case it have mainly been fiscal policy restrictions that have set the rhythm of hirings, in the latter case instead, hirings have fallen with the burst of the economic crisis.

The second explanatory variable is another expected relative probability, that of getting a fixed-term position instead of a permanent one in the public relative to the private. Both these variables are not only time, but also cross-sectionally varying because I will build these counterfactual probabilities on the basis of individual characteristics such as the reference labour market and educational attainment (section 5.5).

The term θ_i is a measure of individual ability. This measure is time invariant because it aims to capture previously accumulated, ideally innate, skills (see section 5.5 for its definition). The ability measure is further interacted with the expected relative probability of getting a fixed-term position p_{it}. The coefficient β_4 will thus be our main parameter of interest, the one

that will tell us whether higher ability workers "like" job instability or not. In particular, the term $\hat{\beta}_4$ will be positive if lower job security pushes away low ability individuals. This may happen if stabilisations are determined on the basis of effort and ability. If instead fixed-term contracts have equally undesirable features for all types of workers, then higher ability ones, to the extent that they are more desirable by both public and private employers, will simply choose the sector which features a higher probability of getting a permanent position and so in this case the term $\hat{\beta}_4$ will be negative.

The empirical model also contains a variable that proxies for the wage differentials between the public and the private sector $\Delta w_{i,r,T-1}$. This measure is built from EUSILC 2005-2012 data[9] and varies at the level of gender (i), NUTS2 region (r) and year (T). Specifically, in each year individuals will expect the wage gap to be the one observed in the previous year ($T-1$).

Finally equation 1 contains a set of region (γ_r) and year (δ_T) fixed effects to control for time invariant geographical differences and common time trends.

5.2 Sorting out of the public sector

The second transition of interest is that from the public to the private sector. We want to understand whether and how the prospect of obtaining a permanent position affects the choices of fixed-term workers to stay in the public sector. The population we will look at is thus limited to workers who were employed in the public sector under a fixed-term contract at $t-1$. These workers will be discouraged by the uncertainty of their employment position and thus may prefer to move to the private sector attracted by the prospect of higher chances of passing from a fixed-term to a permanent position. The estimating equation will now be of the following type:

$$\begin{aligned} &Pr(Pub_{it}=0|Pub_{it-1}=1, FT_{it-1}=1) = \\ &\alpha+\beta_1 q_{it}+\beta_2\pi_{it}+\beta_3\theta_i+\beta_4(\theta_i\times\pi_{it})+\beta_5\Delta w_{i,r,T-1}+\gamma_r+\delta_T+u_{it} \end{aligned} \tag{2}$$

The outcome variable is, as before, an indicator for whether in quarter t, worker i is employed in the public or in the private sector. This time we are interested in the likelihood that he is working in the private sector ($Pub_{it}=0$). To identify *switchers* we condition on i having been employed in the public sector in the previous quarter ($Pub_{it-1}=1$) and on having been under a fixed-term contract ($FT_{it-1}=1$). I impose that the two quarters have to be subsequent to

[9] The LFS contains data on wages only from 2009 onwards.

exclude those workers who are laid off from the public sector, and only for this reason find another job in the private sector. Ideally, indeed, I want to restrict my sample to "voluntary transitions" so as to get rid of labour demand effects and maintain a labour supply approach.

The set of explanatory variables is the same as in equation 1, but the expected relative probability of interest is now the term π_{it}. This term is the expected relative probability of continuing to work under a fixed-term contract in the public rather than in the private sector. To the extent that fixed-term contracts duration is generally longer in the public than in the private sector, we expect this term to be generally larger than one. As before we control for the relative probability of finding a job q_{it}, and for wage differentials $\Delta w_{i,r,T-1}$, as well as a set of socio-demographic control variables and region and year fixed effects.

5.3 Effects of fixed-term duration

The two empirical models just described are further investigated in relation to the expected duration of the fixed-term employment relationship, i.e. on how long an individual works under a fixed-term contract before this is turned into a permanent one. Indeed, a system in which fixed-term contracts are used as a short term instrument to allow employers to screen their workers, should not discourage prospective high ability employees from seeking a job in a certain sector. If, on the other hand, the expected duration of fixed-term contracts is very long, workers will perceive this as a factor of instability and prefer to look for another job. Similarly, for exit, workers who expect not to be stabilised in the short term, may prefer to sort out of the public sector.

To investigate if expected fixed-term duration amplifies the effects of fixed-term contracts on workers' sorting, I augment the previously described empirical models by introducing a term that will proxy for the expected relative duration of the fixed-term contract, and I then interact it with ability and with the probability of being hired under a fixed-term contract. The two models thus become:[10]

$$\begin{aligned} &Pr(Pub_{it} = 1 | NH_{it} = 1) = \\ &\alpha + \beta_1 q_{it} + \beta_2 p_{it} + \beta_3 \theta_i + \beta_4(\theta_i \times p_{it}) + \beta_5 d_{it} + \beta_6(p_{it} \times d_{it}) + \beta_7(\theta_i \times p_{it} \times d_{it}) + \\ &+ \beta_8 \Delta w_{i,r,T-1} + \gamma_r + \delta_T + u_{it} \end{aligned} \tag{3}$$

[10] From equations 3 and 4 is excluded the interaction term $(\theta_{it} \times d_{it})$ because duration only matters if a worker is hired under fixed-term, so its effect will be captured by the triple interaction only.

$$Pr(Pub_{it} = 0|Pub_{it-1} = 1, FT_{it-1} = 1) =$$
$$\alpha + \beta_1 q_{it} + \beta_2 \pi_{it} + \beta_3 \theta_i + \beta_4(\theta_i \times \pi_{it}) + \beta_5 d_{it} + \beta_6(\pi_{it} \times d_{it}) + \beta_7(\theta_i \times \pi_{it} \times d_{it}) + \quad (4)$$
$$+ \beta_8 \Delta w_{i,r,T-1} + \gamma_r + \delta_T + u_{it}$$

where the two coefficients β_7 are meant to reveal whether part of the effect of the incidence of fixed-term contracts is due to the expected relative duration.

5.4 Sample selection

The two econometric models of equation 1 and 2 are restricted to, respectively, newly hired employees and public sector fixed-term workers. This implies that my estimated effects will only be valid within these groups and hardly generalizable outside. A similar reasoning applies to most of the works referred to in section 2, for example that of Borjas (2002).

Specifically, when estimating the likelihood of sorting into the public sector, I am implicitly leaving out all those who do not find a first or a new job, as well as those who do not participate in the labour market and those who are instead self-employed. In table 4 I compare the sample on which the estimation of equation 1 is based with the most relevant excluded groups. The main special feature of my sample is that it is composed of significantly younger individuals than all other groups. This means that the results obtained are particularly relevant for individuals at the beginning of their careers, who will presumably be more willing to accept less favorable work conditions. A similar mechanism should in principle bias downward my estimates of the discouragement effect of job instability. On the other hand, because the sample excludes the population of those who do not find a job at all, who are supposed to have lower ability than those who do find one, we may expect the estimates to be upward biased because the unemployed may be less demanding when deciding to accept a job offer. Yet, the fact that in table 4 we observe no evidence of a difference in average ability between new hires and unemployed, would suggest that such upward bias, if any, should not be large.

The sample of those who were fixed-term public workers at $t-1$ (equation 2) is also quite special and hardly representative of the whole Italian adult population. Table 4 shows that these individuals are, for example, predominantly women. Yet, it remains of interest to predict what happens to the current stock of public sector temporary workers.

5.5 Variables construction

The most challenging part of the empirical exercise consists in building reasonable measures of the individuals' expectations about employment conditions. I shall thus assume that these expectations are history based, i.e. that workers project in the future what they observed in the past.

Job finding probability q_{it}. In each quarter τ the job finding rate is computed as the the ratio between the number of people who started a job in sector S in the current quarter and the sum of those who were unemployed[11] or found a job in either sector $S = \{Pub, Priv\}$.[12]

$$\begin{aligned} q_{i,\tau,Pub} &\equiv Pr(NH_{i\tau} = 1, Pub_{i\tau} = 1) \\ q_{i,\tau,Priv} &\equiv Pr(NH_{i\tau} = 1, Pub_{i\tau} = 0) \end{aligned}$$

Because individuals have history based expectations, I assume they take the average probability of the *previous four quarters* as expectation for their own job finding probability in quarter t. The choice of averaging over a full year allows me to control for seasonal effects. Therefore:

$$\begin{aligned} q_{i,t,Pub} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} q_{i,\tau,Pub} \\ q_{i,t,Priv} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} q_{i,\tau,Priv} \end{aligned}$$

In figure 3, on the left panel, the solid lines represent the evolution of these two probabilities over time, while the dashed grey lines are the instantaneous measures $q_{i,\tau,S}$. Clearly, the probability of finding a job in the private sector is much higher than that of finding one in the public sector, although this sensibly lowered from 2008 onwards.

The relative job finding probability is eventually defined as:

$$q_{it} \equiv \frac{q_{i,t,Pub}}{q_{i,t,Priv}} \tag{5}$$

The subscript i indicates that this measure also varies depending on individual specific characteristics.

[11] I restrict these to having been unemployed for more than three months to avoid counting workers who became unemployed later.

[12] These rates are computed with cross-sectional sampling weights to reproduce the contemporaneous structure of the population.

In particular, I will assume that this changes with the region of residence and the level of educational attainment.

Fixed-term incidence p_{it}. This indicator is built in the same fashion as the previous one but measures the likelihood of being hired under a fixed-term contract in each sector S at any quarter τ. It is thus built as the share of workers hired under fixed-term contracts over the total number of workers hired in that same sector and quarter.

$$\begin{aligned} p_{i,\tau,Pub} &\equiv Pr(FT_{i\tau} = 1 | NH_{i\tau} = 1, Pub_{i\tau} = 1) \\ p_{i,\tau,Priv} &\equiv Pr(FT_{i\tau} = 1 | NH_{i\tau} = 1, Pub_{i\tau} = 0) \end{aligned}$$

As for the job finding rate, individual i's expected probability of getting a fixed-term position in sector S, conditional on finding a job, is a moving average of the probabilities observed in the previous four quarters.

$$\begin{aligned} p_{i,t,Pub} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} p_{i,\tau,Pub} \\ p_{i,t,Priv} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} p_{i,\tau,Priv} \end{aligned}$$

The right panel of figure 3 shows the evolution of these two probabilities over the years (solid lines), together with that of the quarterly measures $p_{i,\tau,S}$ (dashed grey lines). With respect to the instantaneous job finding rates $q_{i,\tau,S}$, these measures are much more volatile because they are less precisely measured. Yet, looking at the moving averages, it is clear that the incidence of fixed-term as entry contract is considerably larger in the public than in the private sector, although the latter increased more sensibly in the most recent years.

Finally, the relative incidence of fixed-term contracts will be:

$$p_{it} \equiv \frac{p_{i,t,Pub}}{p_{i,t,Priv}} \tag{6}$$

Again individual variability will be identified at regional and educational level.

Ability θ_i. Measuring ability is not an easy task, ideally one would like to have some indicator of test scores at early age, to make sure not to capture something that may be influenced

by work experience. No similar measure is available in my data, so I will rely on a proxy given by the inverse of the number of extra years to obtain a degree. The idea is that individuals who graduate from college in 10 years time are of lower ability than those who graduate in 4 years. I thus define ability as:

$$\theta_i \equiv [1 + t_{icd} - \min(t_{cd})]^{-1} \tag{7}$$

where t_{icd} is the number of years it took individual i, belonging to cohort c, to obtain the degree d and $\min(t_{cd})$ is the minimum number of years employed to get that same degree among individuals from the same cohort.[13] Figure 4, on the left panel, shows the distribution of my measure of ability for public and private workers. The *ability gap* of public sector workers is quite clear. On the right panel of the figure, then, the same distributions are plotted after controlling for the individual level of educational attainment. Taking into account the educational composition of the two sectors, the *public sector ability gap* becomes much larger.

Fixed-term continuation rate π_{it}. To build this measure I need to exploit the longitudinal dimension of the LFS data. I will say that a worker is stabilised if he moves from a fixed-term to a permanent contract within the same sector S. On the other hand, a worker continues to be fixed-term if he is observed to be working in sector S under a fixed-term contract at time $\tau - 1$ and also at τ. Thus, for every quarter τ, the fixed-term continuation rate will be:

$$\begin{aligned}
\pi_{i,\tau,Pub} &\equiv Pr\left(FT_{i\tau} = 1 \mid FT_{i\tau-1} = 1, Pub_{i\tau-1} = 1, Pub_{i\tau} = 1\right) \\
\pi_{i,\tau,Priv} &\equiv Pr\left(FT_{i\tau} = 1 \mid FT_{i\tau-1} = 1, Pub_{i\tau-1} = 0, Pub_{i\tau} = 0\right)
\end{aligned}$$

As for the other counterfactual probabilities, individuals will make expectations based on the observation of past realizations, so that:

$$\begin{aligned}
\pi_{i,t,Pub} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} \pi_{i,\tau,Pub} \\
\pi_{i,t,Priv} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} \pi_{i,\tau,Priv}
\end{aligned}$$

Figure 5 (left panel) shows the trend in the rates of stabilisation $(1 - \pi_{tS})$ in the public and in the private sector. The solid lines are the moving averages, i.e. individuals' expected probabilities of being stabilised, while the dashed lines are the quarterly observed rates $(1 - \pi_{\tau S})$.

[13] These values are computed in terms of age: age at which the degree is obtained minus minimum age at which individuals in the sample have obtained that same degree. The degrees are classified in 12 different categories.

Again, it is clear that the probability of being turned into a permanent position from a fixed-term one has traditionally been considerably lower in the public that in the private sector, but the difference has shrank in the most recent years, when also private employers have more rarely stabilised their fixed-term workers.

Finally, I define a relative expected fixed-term continuation rate as:

$$\pi_{it} \equiv \frac{\pi_{i,t,Pub}}{\pi_{i,t,Priv}} \tag{8}$$

Fixed-term duration d_{it}. I finally introduce a measure of fixed-term duration. This is given by the number of years between the moment in which a worker started working for a given employer under a fixed-term contract and the moment in which his contract was turned into a open ended one. For every quarter τ, the fixed-term duration will be:

$$\begin{aligned} d_{i,\tau,Pub} &\equiv (T - T_{i,start} | FT_{i\tau} = 0, FT_{i\tau-1} = 1, Pub_{i\tau-1} = 1, Pub_{i\tau} = 1) \\ d_{i,\tau,Priv} &\equiv (T - T_{i,start} | FT_{i\tau} = 0, FT_{i\tau-1} = 1, Pub_{i\tau-1} = 0, Pub_{i\tau} = 0) \end{aligned}$$

where T is the current year and $T_{i,start}$ is the year in which the individual started working for his current employer.[14] Because individuals make their expectations about how long they will have to stay under a fixed-term contract based on the experience of previous workers, the expected duration will be a moving average of the observed values:

$$\begin{aligned} d_{i,t,Pub} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} d_{i,\tau,Pub} \\ d_{i,t,Priv} &= \frac{1}{4} \sum_{\tau=t-1}^{t-4} d_{i,\tau,Priv} \end{aligned}$$

Figure 5 (right panel) shows the trend of the fixed-term durations over time and highlights the fact that in the private sector these have constantly remained slightly below the legal limit of three years, whereas in the public sector they have been constantly above four years, with a sharp increase in the last two years.

The term to include in the regressions will be the ratio of the expected fixed time duration in the public and in the private sector, which varies by quarter, region of residence and educational

[14] Unfortunately the data do not allow me to retrieve the month in which the individual started working for his current employer, so the two variables contain measurement error.

attainment:

$$d_{it} \equiv \frac{d_{i,t,Pub}}{d_{i,t,Priv}} \tag{9}$$

6 Results

6.1 Sorting into the public sector

Equation 1 is estimated through probit on a sample of about 22,000 individuals over nine years. Results are presented in table 5. The first row gives the effect of increasing the job finding probability in the public relative to the private sector (q_{it}) on the likelihood that an individual sorts into the public. We expect this coefficient to be positive so that the more the public sector hires, the more individual i is likely to start working there. In table 5 an increase in the relative probability of finding a job in the public sector of 10 percentage points over the mean determines an increase in the likelihood of sorting into the public sector of 0.6 to 3 percentage points. The second row is the relative incidence of fixed-term contracts for new hires (p_{it}). The associated coefficient is slightly negative but hardly statistically different from zero. This presumably indicates excess of labour supply, so that for any type of contract offered employers manage to find workers willing to accept that job offer. The third term, refers to ability θ_i. To simplify the interpretation of the coefficients I created a binary variable that takes value one if the level of individual ability is above median and zero otherwise.[15] The associated estimated coefficient is significantly negative, thus indicating that public new hires are on average of lower ability than their private sector peers. The magnitude of the coefficient tells us that individuals of ability above median are 3.2 percentage points less likely to sort into the public sector. The fourth row gives us the estimate for our coefficient of interest, i.e. the interaction between ability and the relative incidence of fixed-term contracts. The coefficient is consistently negative, statistically significant and stable across specifications, thus indicating that the public sector ability gap is indeed influenced by the incidence of fixed-term contracts, i.e that high ability individuals sort into the private sector in response to increases in the expected probability of getting a fixed-term, rather than a permanent, contract in the public sector. Finally, with respect to the wage gap, the associated positive and significant coefficient suggests that individual choices are highly sensitive to relative wages, so that higher wages significantly attract more individuals. As control variables I included education dummies, gender and age. All these variables are

[15] Results that use the continuous ability measure are reported in section 7.

significant and have the expected signs: more educated or older individuals and women are more likely to sort into the public sector.

As a second exercise I split the sample according to the economic activity sector of the public employer. I thus have a first group of individuals who report working for the public administration and defense or compulsory social security, the second group of public sector new hires will be those working in education, health and social work activities, finally, the third group will be of those who report working for other services. Results are reported in table 6. Counterfactual probabilities are accordingly computed using only past public sector workers in the relative sub-group.

Several interesting findings emerge: first, the raw ability gap is highest in the health and education sector, still sizeable in the other services activities and null in the public administration, defense and social security group (column (3) of table 6). High ability individuals are 3.9 percentage points less likely to work in the public sector among health and education workers, and 2.1 percentage points less likely among other services activities workers. Second, and most importantly, it turns out that a large portion of the ability gap is determined by the expected relative incidence of fixed-term contracts. In the first group (panel A), if all contracts were open ended, high ability workers would be more likely to sort into the public sector by about 16 percentage points; the higher incidence of fixed-term workers decreases this likelihood significantly so that the final ability gap is almost null. Among health and education workers (panel B), the large observed ability gap would again be reversed (though becoming not significantly different from zero) if all contracts were permanent, and increasing the odds ratio of getting a fixed-term contract by 10 percentage points decreases the likelihood of high ability workers to sort into the public sector by about 0.6 to 0.7 percentage points. In the third group (panel C), on the other hand, the significant ability gap, seems not to be explained by the expected type of contract.

Secondly, I explore the existence of possible geographical heterogeneity in the results. Table 7 reports the results of equation 1 split between North, Center and South of Italy. While the raw ability gap is very similar in the three areas, significant differences appear when I add the interaction with the probability of getting a fixed-term contract: in the North, a higher expected probability of getting a fixed-term contract decreases the likelihood that a high ability worker sorts into the public sector, while the coefficient of the ability term alone becomes positive. Despite not significant, these effects are in line with those of the main specification of table

5: if all contracts were to be open ended public sector workers would be more likely to be the high ability types. In the Center (panel B) this effect is amplified: an increase in the relative likelihood of getting a fixed-term contract by 10 percentage points determines an increase in the probability that a high ability worker sorts into the private instead of the public sector by almost 1.5 percentage points. Finally, in the South, it appears that the observed public sector ability gap is not driven by increases in the incidence of fixed-term contracts in the public sector. This may suggest that the elasticity of substitution between the public and the private sector in the South is very low, so that, no matter the terms of contract, high ability workers still prefer the public to the private sector.

Finally, figure 6 shows how the results change depending on the worker's age. The left panel shows the estimated raw ability gap, i.e. the estimated coefficient for θ_i in column (3), while the right panel the coefficient for the interaction term $(\theta_i \times p_{it})$ of column (7). It appears that the raw ability gap is most severe among young adults and disappears for workers above age 45. With respect to the crowding out effect of fixed-term expectations, instead, the effect seems to be concentrated among individuals below 35, being largest for those aged 25-34.

6.2 Sorting out of the public sector

The second relevant transition to examine in order to understand the impact of contractual terms on the composition of public employment, is that of moves out of the public sector. Is it the case that public sector fixed-term workers who have low expectations of being turned into permanent contracts decide to leave for the private sector? And is it the case that this happens more for higher ability workers? The results of the estimation of equation 2 are reported in table 8.

Now the raw ability gap between fixed-term public sector workers who leave and those who stay in their job is slightly positive but not statistically different from zero (column (3)). Its sign, though, seems to indicate that high ability fixed-term workers are more likely to sort out of the public sector than low ability ones. The addition of the interaction with the fixed-term continuation rate π_{it} would instead suggest that the effect is not driven by the expectations about the probability of being stabilised in that, if this was the case, the sign of the coefficient would be positive, i.e. higher ability workers would be more likely to move to the private sector when the probability of being stabilised decreases (the fixed-term continuation rate increases). Still, as none of these coefficients is statistically different from zero, it becomes crucial to explore

several dimensions of heterogeneity in the effects.

All the other coefficients in the regression have the expected signs. The higher the wage premium for public workers relative to private ones, the less likely that individual i will leave the public sector. More highly educated individuals are more likely to stay in the public, presumably reflecting the mechanisms identified by Reyneri and Centorrino (2007) by which Italian college graduates report higher job satisfaction in the public sector than in the private, because the former provides job opportunities that are more closely related to their course of studies or are of higher social prestige and cultural interest. Interestingly, women are significantly more likely to leave the public sector, this may be due to the fact that they are more keen on finding a stable job (they dislike fixed-term contracts more than men). Finally, with respect to age, we observe that older individuals are less likely to leave the public sector, probably because they have more difficulties in finding a different job.

Table 9 shows the results of estimating the same empirical model in the three different economic activity subsamples. This exercise does not allow to provide conclusive evidence in that the sample size shrinks significantly when I compute sector specific counterfactual probabilities. Still, it would seem that in the public administration, defense and social security group (panel A), the sorting mechanism goes in the direction of adverse selection, i.e. when the expected fixed-term continuation rate increases high ability workers are more likely to sort out of the public sector and get a job in the private. This happens most significantly in the other services activities group (panel C) where there appears to be a significant positive ability gap between public sector leavers and stayers, so that high ability public sector fixed-term workers are 6 percentage points more likely to sort out of the public sector than low ability ones. Moreover the coefficient of the interaction term, despite not being significant under conventional statistical terms, is much larger. On the other hand, among education and health workers (panel B) the mechanism seems reversed: those who leave are the low ability ones and the prospect of continuing to work under a fixed-term contract discourages more the low ability ones than the high ability ones. This difference in the mechanisms may be due to the fact that health and education workers are much less employable in the private sector and that for them the public option is generally more prestigious than most alternatives in the private sector.

As a final exercise, I explore the existence of differences in the effects depending on the geographical area of residence of workers (table 10). The results reveal the existence of completely opposite dynamics between the North and the South: in northern regions there is no clear ability

gap between public fixed-term workers who leave and those who stay and, most importantly, a decrease in the probability of being stabilised crowds out lower ability workers. In the South instead, there is a significant difference in the likelihood of sorting out of the public sector between high and low ability fixed-term workers, so that the former are about 3 percentage points more likely to leave, and it appears to be the prospect of not being stabilised that pushes high ability workers out of the public and into the private sector. The interpretation of these results would suggest that in the North, fixed-term contracts act more as a screening device among workers, so that those with low ability perceive a lower likelihood of being stabilised and find another job. In the South, instead, it is those with high ability who decide to find another job, presumably because they do not feel more likely to be stabilised than low ability ones. Indeed comparing the ability of stabilised and non stabilised workers it turns out that in the North stabilised workers have a significantly higher level of ability than non stabilised ones, while in the South no such difference appears (figure 7).

6.3 Effects of fixed-term duration

The last two sets of results investigate the existence of a reinforcing effect of the sorting mechanisms uncovered above depending on the expected duration of fixed-term work relationships. As pictured in figure 5, the average duration of a fixed-term relationship in the public sector is sensibly longer than in the private sector. To understand if variations in this difference affect the occupational choices of workers, I augment the main empirical specifications so as to include interaction with the relative expected duration of fixed-term contracts. Table 11 shows the results of the estimation of equation 3 and table 12 the results of the estimation of equation 4.

The results reveal that prospective high ability entrants are influenced in their choices by variations in the expected duration of the fixed-term employment relationship (the coefficient of the triple interaction term in table 11). The discouraging effect of expecting to be hired under a fixed-term contract is reinforced by the expectation that this contract will last longer than in the private sector. The magnitude of this reinforcing effect, still, is quite small. On the other hand, exit choices do not appear to be influenced by the expected duration of the fixed-term employment relationship, the coefficient of the triple interaction term being very small and not statistically different form zero.

7 Robustness Checks

In this section I provide some simple specification checks to corroborate the validity of the main results. Tables 13 and 14 report the results of these checks respectively for equation 1 and equation 2. In both tables the first column reports the baseline results of tables 5 and 10, column(7), i.e. the probit specification with all the controls and year fixed effects.

First, in column (2) of tables 13 and 14, I investigate the sensitivity of the results to the definition of the ability measure. To this purpose, instead of using a binary variable for ability, I exploit the full variation of the original ability measure θ_i. The results in table 13 show again that ability in the public sector would be higher but that the increase in the use of fixed-term contracts generates an ability gap. Nevertheless in this specification the coefficients of interest lose statistical significance. As for equation 2, column (2) of table 14 shows the same pattern of results of the baseline results: in the North, a higher fixed-term continuation rate decreases the likelihood that individuals with higher ability leave the public sector, i.e. crowds out lower ability workers; on the other hand, in the South, higher job instability in the public sector pushes out the higher ability individuals; the regions of central Italy show the same pattern of the northern ones but the coefficients are not statistically significant.

Secondly, I re-estimate the two models using a less demanding measure of ability, i.e. rather than comparing all individuals to the "smartest" of their cohort and degree, I compare them to the median one. The new measure of ability will be the difference between the median number of years to obtain a specific degree in a given cohort and that employed by individual i:

$$\zeta_i \equiv [median(t_{cd}) - t_{icd}] \tag{10}$$

As in the main specification, the variable is transformed into a binary one that distinguishes individuals with ability above the median from those with ability below. The corresponding estimates are reported in columns (3) of tables 13 and 14. Again, using this measure, fixed-term expectations lower the likelihood that high ability individuals sort into the public sector. When looking at sorting out of the public sector, instead, the estimates confirm that in the North a lower probability of stabilisation pushes out the lower ability individuals, the effect being large and significant, while the opposite happens in the South, in which case, nevertheless, the estimated coefficients are now not statistically significant.

A further check consists in augmenting the model with an interaction term between q_{it} and

θ_i to account for the possibility that the interaction between p_{it} and θ_i may partially capture some interaction between q_{it} and θ_i (because p_{it} and q_{it} may be correlated). The results in columns (4) show that this was not the case, indeed the new interaction term is generally not different from zero and the estimates of the main coefficients remain unaffected.

The last set of robustness checks I provide focuses on the empirical model employed and proposes new estimates based on a linear probability model, but with a more prudential clustering strategy. Following Cameron and Miller (2015), I impose a double level clustering at region and year level. The results are reported in columns (5). In the first case the size of the estimated coefficient of the interaction term remains similar in magnitude to that of column (1) but loses statistical significance. In table 14, instead, the coefficients of interest remain highly statistically significant and of very similar magnitude to those of the main specification.

8 Concluding remarks

Understanding the mechanisms which underlie the choice of workers to get a public or a private job is of first order relevance not only because public employment represents a large and significant share of the current workforce, but most crucially, because it is on these workers' talent and effort that the quality of public services eventually depends.

In Italy, public employment has witnessed dramatic changes over the past 15 years: from being a lifetime secure job, it turned into a very unstable one, with fixed-term contracts being today the main hiring method and with their duration being often excessively long. This erosion of the public sector stability premium is likely to affect the composition of the public sector workforce. From a theoretical point of view, the prevalence of fixed-term contracts may attract more talented individuals to the extent that stabilisations happen on the basis of merit. On the other hand, as long as tenure is not or little related to merit, we shall expect higher ability workers to opt for better, more secure, options.

This paper investigated this question empirically, using data from the Italian Labour Force Survey 2005-2013. I constructed measures of individual expected probabilities of: (i) finding a job in the public relative to the private sector; (ii) finding a fixed-term rather than a permanent job in the public relative to the private sector; (iii) being turned into a permanent worker from a fixed-term position in the public relative to the private sector. Descriptive evidence confirmed that the likelihood of finding a job in the public sector is about one tenth that of finding one

in the private sector, and, conditional on that, the probability that the job is permanent is in the public half than in the private sector. Moreover it appears that for a fixed-term worker, the probability of being stabilised is lower in the public sector, and most importantly, this generally requires more time.

The empirical analysis showed how the likelihood of sorting into and out of the public sector is affected by changes in these relative probabilities and how these effects vary depending on the ability of the worker. I showed that the large observed *raw ability gap* between public and private new hires is at least partly explained by the higher incidence of fixed-term contracts, so that, if all new contracts were open-ended, higher ability individuals would sort more in the public than in the private sector. This is consistent with the evidence by which the public sector generally gives the worker higher job satisfaction with respect to non strictly financial job characteristics. As for transitions from the public to the private sector, I showed that, at least in the South, these increase among high ability fixed-term workers when the stabilisation rate in the public sector decreases relative to that of the private sector. In the North, on the other hand, we observe an opposite tendency: as the rate of stabilisation in the public decreases relative to the private, it is more likely that lower ability individuals leave the public for the private.

While conclusive evidence would require more accurate data, primarily on the workers' job search effort and on the employee's type of job, the results of this paper already suggest important policy implications. First, they show that an excessive use of fixed-term contracts in the public sector has not only a short term cost in terms of "fairness and efficiency" of public service provision, but also a long term cost given by the dynamic effects on workers self-selection into the public sector. As public employment becomes less attractive, more talented workers will progressively choose different work options. If one considers that a very large part of public employment is in the education and health sectors, and that these sectors also heavily rely on fixed-term contracts, it becomes clear that this effect may further have a negative impact on the accumulation of human capital in the very long run.

Secondly, the finding that part of the adverse selection effect, at least at entry, is explained by variations in the expected relative duration of the fixed-term employment relationship, suggests that a short term fixed-term contract at entry, which quickly turns into a permanent one or is terminated, may be less detrimental. In this spirit, the excessive length of fixed-term contracts should be tackled not only to avoid sanctions from the EU, but also, to attract and retain in

the public sector higher ability workers.

Finally, the finding that lower stabilisation rates push out of the public sector lower ability individuals in the North and higher ability individuals in the South, seems to indicate that job instability per se does not necessarily produce adverse selection effects at exit, but that under certain circumstances it may instead generate a virtuous selection mechanism.

To conclude, the paper has highlighted the existence of possible dynamic effects of *adverse self selection* of workers into the public sector generated by increased job instability. Yet, one should bear in mind that the use of fixed-term contracts may also allow employers to screen their workers more accurately so as to retain only those who turn out to be most talented or who put more effort in their work thus reducing the inefficiencies arising from *moral hazard* mechanisms. This aspect, which is beyond the scope of this paper, is of primary relevance from a policy perspective and should be further investigated in order to provide a comprehensive assessment of the impact of the use of fixed-term workers on the quality of public service provision.

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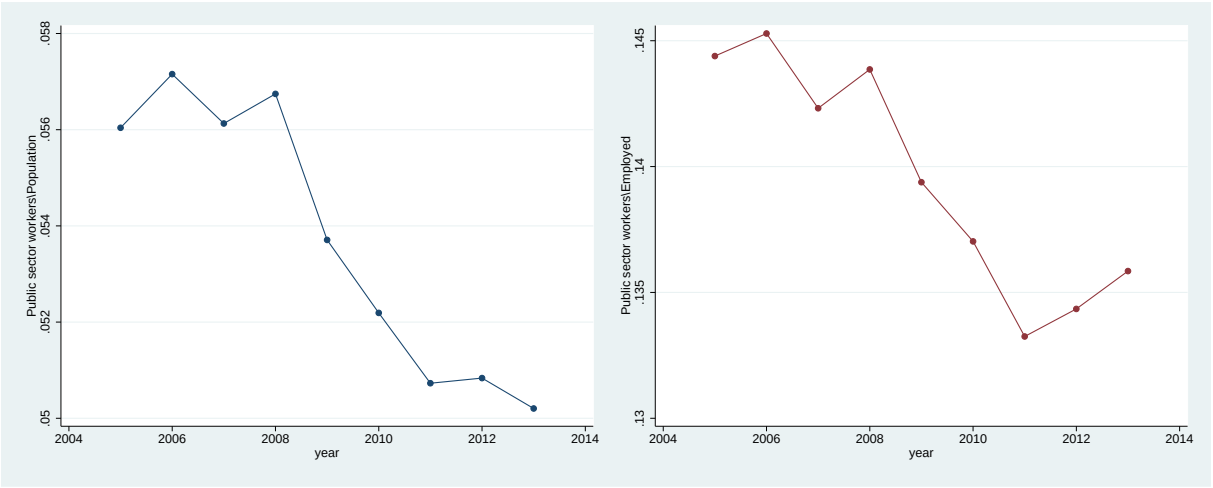
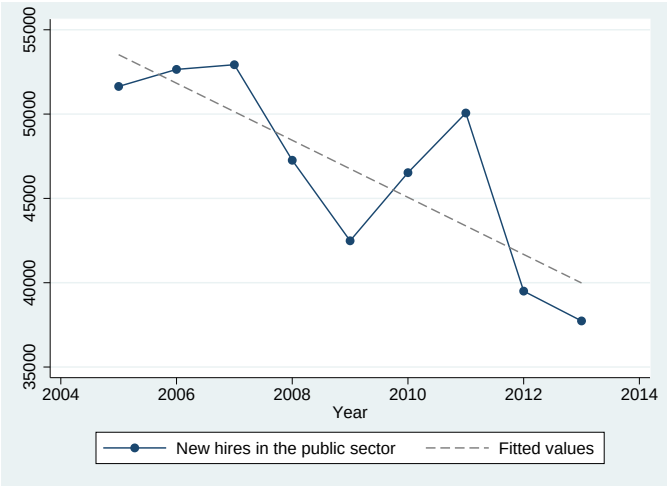
Figure 1: Trends in public sector employment



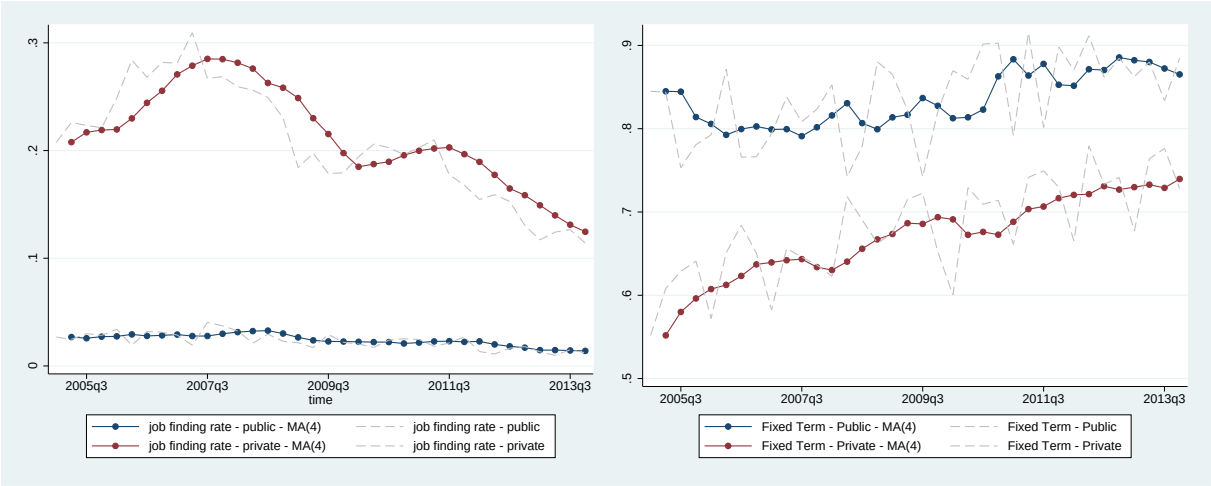
Notes: Quarterly panel weights employed.

Figure 2: How many workers enter the public sector?



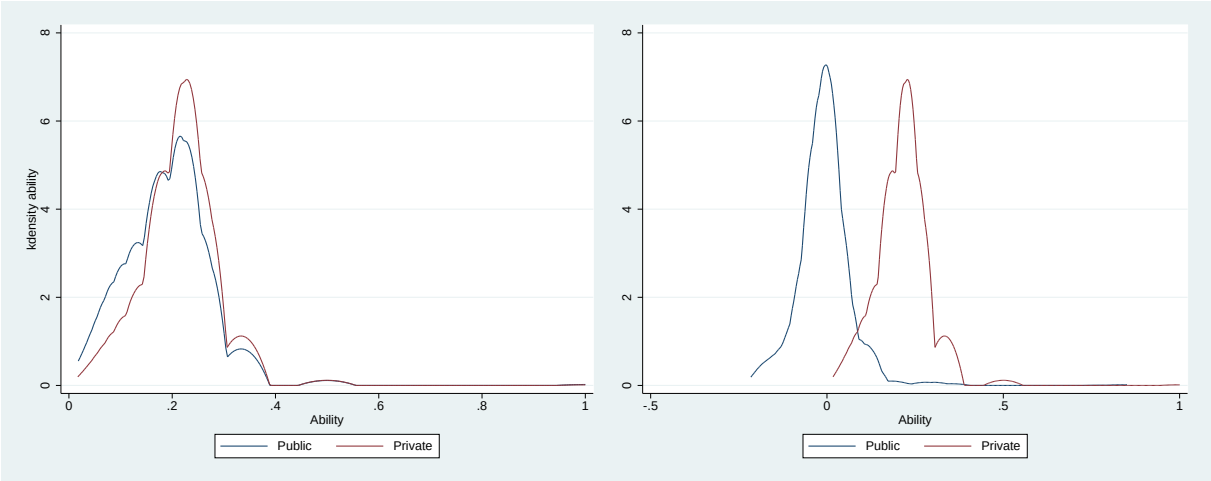
Notes: Quarterly panel weights employed.

Figure 3: Counterfactual probabilities q_{tS} and p_{tS}



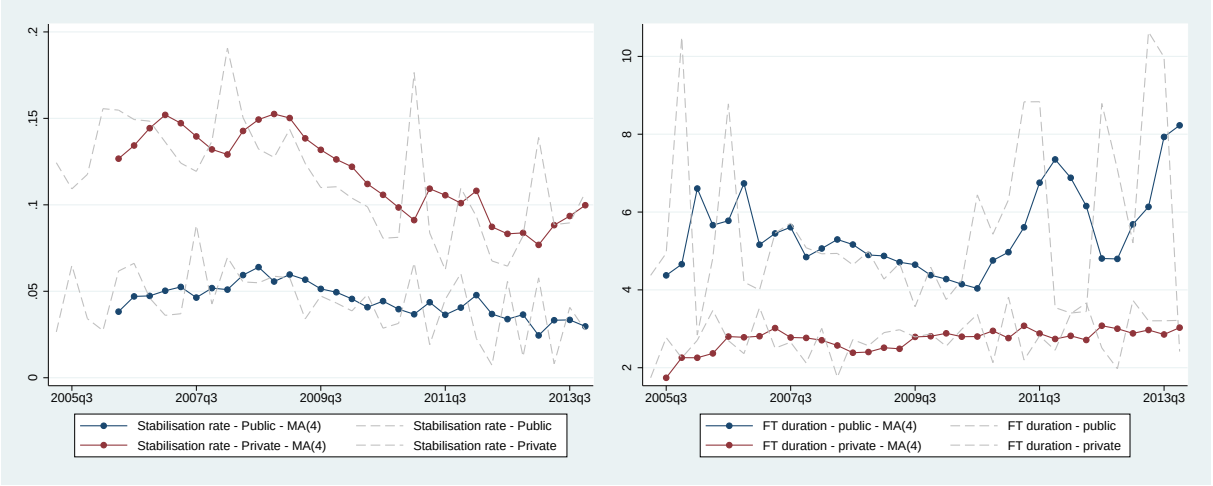
Notes: Quarterly cross-sectional weights employed to compute q_τ and p_τ .

Figure 4: Ability distribution by sector (left) and controlling for educational attainment (right).



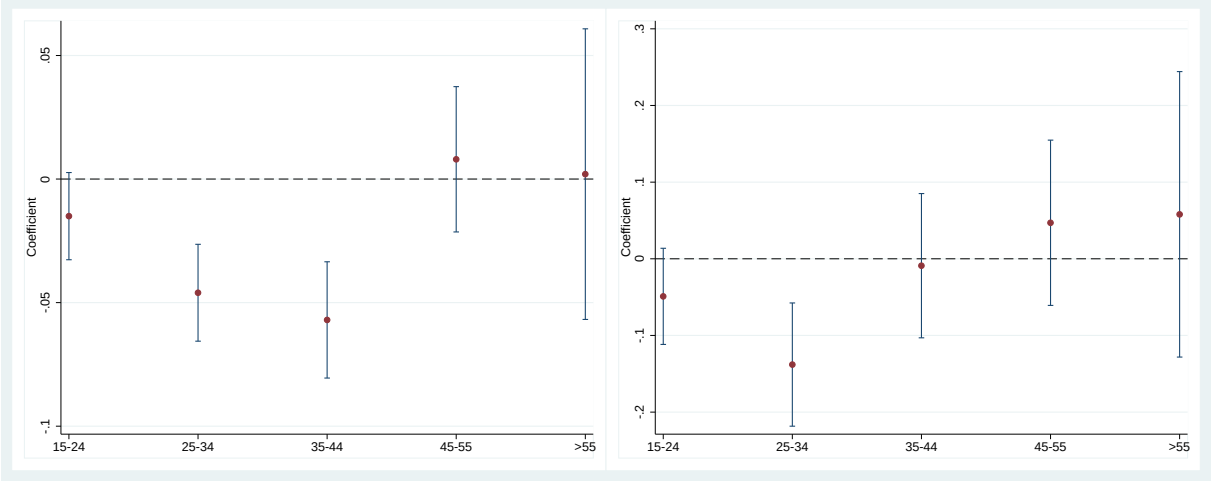
Notes: Quarterly panel weights employed.

Figure 5: Rate of stabilisation of fixed-term workers: $(1 - \pi_{tS})$ and fixed-term duration in the public and private sector d_{tS} (years)



Notes: Quarterly cross-sectional weights employed to compute π_τ and d_τ .

Figure 6: Estimated coefficients for θ_i and $(\theta_i \times p_{it})$ by age bins.



Notes: Left panel: estimated coefficient for the term θ_i in equation 1. Right panel: estimated coefficient for the term $(\theta_i \times p_{it})$ in equation 1. 95% confidence intervals reported.

Figure 7: Distribution of ability of stabilised and non stabilised public sector workers.

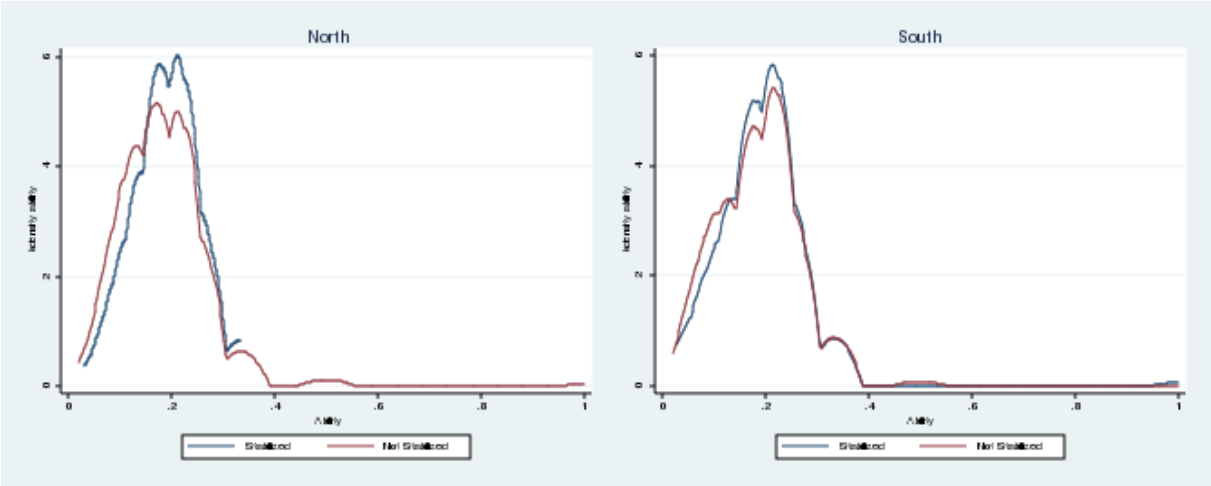


Table 1: Fixed-term workers by sector.

	Number of workers		Share of total	
	Public	Private	Public	Private
2005	508,527	1,947,790	0.156	0.144
2006	572,411	2,118,361	0.171	0.153
2007	572,542	2,159,706	0.173	0.153
2008	550,710	2,214,163	0.164	0.154
2009	477,194	2,047,999	0.149	0.144
2010	464,856	2,096,782	0.148	0.148
2011	443,105	2,254,227	0.145	0.157
2012	434,945	2,348,457	0.141	0.163
2013	409,588	2,181,323	0.134	0.156

Notes: Quarterly panel weights employed.

Table 2: Share of fixed-term by tenure.

	At time of hiring		After 12 months		After 24 months		After 3 years		After 10 years	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
2005	0.805	0.607	0.594	0.315	0.381	0.212	0.331	0.125	0.092	0.051
2006	0.793	0.638	0.620	0.382	0.449	0.214	0.392	0.143	0.139	0.055
2007	0.814	0.630	0.621	0.355	0.450	0.209	0.384	0.160	0.133	0.055
2008	0.817	0.673	0.541	0.348	0.461	0.225	0.369	0.146	0.115	0.052
2009	0.808	0.690	0.579	0.381	0.366	0.220	0.294	0.150	0.123	0.045
2010	0.885	0.688	0.565	0.413	0.312	0.234	0.347	0.159	0.130	0.049
2011	0.852	0.718	0.572	0.417	0.415	0.271	0.318	0.169	0.097	0.043
2012	0.881	0.730	0.579	0.467	0.440	0.276	0.360	0.206	0.103	0.043
2013	0.864	0.736	0.616	0.473	0.400	0.272	0.290	0.194	0.115	0.048

Notes: The table reports the share of workers hired at $t - x$ who are fixed-term at t. x being 0, 12 and 24 months, 3 years and 10 years. Quarterly panel weights employed.

Table 3: Characteristics of new hires by type of contract. Year 2013.

	Public		Private	
	Permanent	Fixed term	Permanent	Fixed term
Female	0.720	0.648	0.468	0.464
	(0.454)	(0.478)	(0.499)	(0.499)
Age	39.34	35.94	37.42	34.37
	(10.82)	(10.51)	(10.85)	(11.09)
North	0.412	0.359	0.432	0.472
	(0.497)	(0.480)	(0.496)	(0.499)
Center	0.233	0.269	0.215	0.203
	(0.427)	(0.444)	(0.411)	(0.402)
South	0.355	0.373	0.353	0.324
	(0.484)	(0.484)	(0.478)	(0.468)
Secondary education	0.402	0.417	0.440	0.459
	(0.496)	(0.494)	(0.497)	(0.498)
Tertiary education	0.481	0.444	0.140	0.151
	(0.505)	(0.498)	(0.347)	(0.358)
Age at degree	23.56	22.21	18.03	18.23
	(7.788)	(6.122)	(4.718)	(4.814)
Monthly wage	1282.9	923.3	929.8	851.5
	(736.6)	(375.0)	(532.6)	(419.0)
Job finding method:				
Newspaper or internet ads	0.00771	0.0360	0.0239	0.0429
	(0.0884)	(0.187)	(0.153)	(0.203)
Direct request to employer	0.191	0.265	0.242	0.278
	(0.398)	(0.442)	(0.429)	(0.448)
Relatives or friends	0.0540	0.158	0.545	0.395
	(0.229)	(0.365)	(0.498)	(0.489)
Previous experience in same firm	0.111	0.182	0.147	0.140
	(0.318)	(0.386)	(0.355)	(0.347)
Public competition	0.610	0.275		
	(0.493)	(0.447)		
Other	0.0258	0.0846	0.0258	0.114
	(0.160)	(0.279)	(0.159)	(0.317)
Observations	347		3293	

Notes: Mean coefficients; standard deviations in parentheses. Quarterly panel weights employed.

Table 4: Descriptive statistics of main regression samples and excluded groups

	New hires (employees)	Former public fixed term	Other employees	Unemployed	Self employed
Female	0.470	0.649	0.438	0.590	0.288
	(0.499)	(0.477)	(0.496)	(0.490)	(0.453)
Age	33.54	37.55	40.79	43.76	44.56
	(10.897)	(10.342)	(10.575)	(28.542)	(11.69)
High school	0.332	0.114	0.302	0.238	0.339
	(0.471)	(0.317)	(0.459)	(0.426)	(0.473)
College	0.443	0.433	0.438	0.590	0.288
	(0.497)	(0.495)	(0.499)	(0.375)	(0.489)
Ability	0.216	0.180	0.210	0.227	0.209
	(0.078)	(0.082)	(0.076)	(0.080)	(0.075)

Notes: Mean coefficients, sd in parentheses. Quarterly panel weights employed.

Table 5: Probit results equation 1. Dependent variable: $Pr(Pub_{it}|NH_{it} = 1)$ - All new hires.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
q_{it}	0.296***	0.295***	0.270***	0.271***	0.256***	0.056***	0.058***	0.032
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.021)	(0.022)	(0.023)
p_{it}		-0.017	-0.018*	-0.002	0.001	0.012	0.010	0.012
		(0.011)	(0.011)	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)
θ_i			-0.032***	0.023	0.023	0.054*	0.053*	0.055*
			(0.005)	(0.028)	(0.027)	(0.028)	(0.028)	(0.028)
$(\theta_i \times p_{it})$				-0.045**	-0.046**	-0.051**	-0.049**	-0.050**
				(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
$\Delta w_{i,r,T-1}$					0.119***	0.097***	0.094***	-0.070
					(0.024)	(0.024)	(0.024)	(0.053)
High School						0.047***	0.047***	0.058***
						(0.007)	(0.007)	(0.007)
College						0.181***	0.182***	0.218***
						(0.019)	(0.019)	(0.022)
Female						0.054***	0.054***	0.066***
						(0.005)	(0.005)	(0.006)
Age						0.002***	0.002***	0.002***
						(0.000)	(0.000)	(0.000)
Observations	21764	21764	21764	21764	21764	21764	21764	21764
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 6: Probit results equation 1. Dependent variable: $Pr(Pub_{it}|NH_{it} = 1)$ - By firm's economic activity sector.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Public administration, defense and social security								
q_{it}	0.310***	0.317***	0.316***	0.330***	0.311***	0.309***	0.060	-0.116
	(0.090)	(0.088)	(0.088)	(0.085)	(0.089)	(0.105)	(0.121)	(0.133)
p_{it}		-0.010	-0.010	0.025	0.024	0.018	0.004	-0.004
		(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.019)
θ_i			0.001	0.156*	0.158*	0.165*	0.172*	0.133
			(0.010)	(0.080)	(0.080)	(0.084)	(0.093)	(0.083)
$(\theta_i \times p_{it})$				-0.087***	-0.088***	-0.094***	-0.092***	-0.074**
				(0.032)	(0.032)	(0.033)	(0.031)	(0.029)
$\Delta w_{i,r,T-1}$					0.087***	0.095***	0.105***	-0.069*
					(0.016)	(0.017)	(0.018)	(0.038)
Observations	2732	2732	2732	2732	2732	2732	2732	2678
B. Education, health and social work activities								
q_{it}	0.317***	0.311***	0.287***	0.285***	0.243***	0.055**	0.069**	0.036
	(0.024)	(0.024)	(0.023)	(0.023)	(0.023)	(0.028)	(0.028)	(0.032)
p_{it}		-0.043**	-0.042**	-0.030	-0.035*	-0.009	-0.004	0.006
		(0.017)	(0.017)	(0.019)	(0.019)	(0.016)	(0.016)	(0.018)
θ_i			-0.039***	0.049	0.055	0.058	0.066	0.070
			(0.008)	(0.062)	(0.063)	(0.056)	(0.058)	(0.059)
$(\theta_i \times p_{it})$				-0.070*	-0.075*	-0.057*	-0.060*	-0.061*
				(0.042)	(0.041)	(0.034)	(0.035)	(0.035)
$\Delta w_{i,r,T-1}$					0.229***	0.121***	0.116***	0.052
					(0.023)	(0.024)	(0.024)	(0.046)
Observations	7879	7879	7879	7879	7879	7879	7879	7873
C. Other services activities								
q_{it}	0.018	0.009	-0.034	-0.032	-0.076	-0.273	-0.345	-0.379
	(0.220)	(0.220)	(0.213)	(0.214)	(0.215)	(0.192)	(0.214)	(0.316)
p_{it}		-0.008	-0.019*	-0.017	-0.015	-0.027*	-0.028	-0.029
		(0.011)	(0.011)	(0.015)	(0.014)	(0.016)	(0.020)	(0.019)
θ_i			-0.021***	-0.017	-0.016	-0.010	-0.008	-0.013
			(0.008)	(0.028)	(0.027)	(0.027)	(0.025)	(0.023)
$(\theta_i \times p_{it})$				-0.003	-0.004	-0.005	-0.005	-0.001
				(0.023)	(0.022)	(0.021)	(0.020)	(0.018)
$\Delta w_{i,r,T-1}$					0.013	-0.014	-0.009	-0.005
					(0.015)	(0.015)	(0.016)	(0.032)
Observations	2676	2676	2676	2676	2676	2676	2676	2676
Controls						y	y	y
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 7: Probit results equation 1. Dependent variable: $Pr(Pub_{it}|NH_{it}=1)$ - By area.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. North								
q_{it}	0.351***	0.354***	0.323***	0.321***	0.308***	0.047	0.029	-0.022
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.045)	(0.046)	(0.053)
p_{it}		-0.023	-0.026	-0.011	-0.004	0.007	0.007	0.017
		(0.018)	(0.018)	(0.023)	(0.022)	(0.022)	(0.022)	(0.023)
θ_i			-0.032***	0.022	0.015	0.055	0.064	0.069
			(0.008)	(0.048)	(0.046)	(0.050)	(0.051)	(0.052)
$(\theta_i \times p_{it})$				-0.044	-0.038	-0.053	-0.059	-0.061*
				(0.036)	(0.036)	(0.036)	(0.036)	(0.036)
Observations	10425	10425	10425	10425	10425	10425	10425	10425
B. Centre								
q_{it}	0.311***	0.311***	0.291***	0.292***	0.259***	0.006	0.003	0.000
	(0.042)	(0.042)	(0.042)	(0.042)	(0.041)	(0.068)	(0.069)	(0.076)
p_{it}		-0.025	-0.025	0.006	0.008	0.052	0.052	0.051
		(0.027)	(0.026)	(0.032)	(0.032)	(0.032)	(0.032)	(0.033)
θ_i			-0.028*	0.124	0.117	0.204**	0.205**	0.202**
			(0.015)	(0.081)	(0.079)	(0.091)	(0.091)	(0.091)
$(\theta_i \times p_{it})$				-0.115**	-0.109**	-0.143***	-0.145***	-0.143***
				(0.052)	(0.051)	(0.051)	(0.051)	(0.051)
Observations	7879	7879	7879	7879	7879	7879	7879	7873
C. South								
q_{it}	0.273***	0.272***	0.247***	0.247***	0.235***	0.015	0.022	0.002
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.032)	(0.033)	(0.035)
p_{it}		-0.013	-0.013	-0.006	-0.012	0.008	0.007	-0.003
		(0.015)	(0.015)	(0.019)	(0.019)	(0.019)	(0.019)	(0.020)
θ_i			-0.033***	-0.013	-0.014	0.006	0.001	-0.005
			(0.008)	(0.037)	(0.037)	(0.037)	(0.036)	(0.037)
$(\theta_i \times p_{it})$				-0.017	-0.015	-0.009	-0.005	0.002
				(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Observations	8391	8391	8391	8391	8391	8391	8391	8391
Controls						y	y	y
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 8: Probit results equation 2. Dependent variable: $Pr(Pub_{it} = 0|Pub_{it-1} = 1, FT_{it-1} = 1)$ - All public fixed-term worker at $t-1$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
q_{it}	0.006	0.006	0.015	0.015	0.030	0.023	0.022	0.035
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	(0.023)	(0.023)	(0.025)
π_{it}		0.046	0.047	0.088	0.069	0.054	0.013	0.016
		(0.093)	(0.093)	(0.112)	(0.112)	(0.111)	(0.113)	(0.113)
θ_i			0.016	0.147	0.109	0.075	0.056	0.016
			(0.010)	(0.218)	(0.213)	(0.205)	(0.202)	(0.194)
$(\theta_i \times \pi_{it})$				-0.126	-0.087	-0.061	-0.044	-0.004
				(0.200)	(0.200)	(0.197)	(0.197)	(0.198)
$\Delta w_{i,r,T-1}$					-0.152***	-0.239***	-0.224***	-0.000
					(0.042)	(0.043)	(0.044)	(0.100)
High School						0.034*	0.039**	0.049**
						(0.019)	(0.019)	(0.020)
College						-0.016	-0.015	-0.010
						(0.012)	(0.012)	(0.012)
Female						0.079***	0.079***	0.065***
						(0.009)	(0.009)	(0.012)
Age						-0.001***	-0.001***	-0.001***
						(0.000)	(0.000)	(0.000)
Observations	14370	14370	14370	14370	14370	14370	14370	14370
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 9: Probit results equation 2. Dependent variable: $Pr(Pub_{it} = 0|Pub_{it-1} = 1, FT_{it-1} = 1)$ - By firm's economic activity sector.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Public administration, defense and social security								
q_{it}	-0.040	-0.017	-0.015	-0.012	-0.012	0.031	0.237	0.307*
	(0.228)	(0.220)	(0.216)	(0.212)	(0.212)	(0.181)	(0.177)	(0.181)
π_{it}		0.038	0.039	0.020	0.020	0.027	-0.002	-0.007
		(0.060)	(0.060)	(0.070)	(0.071)	(0.071)	(0.067)	(0.066)
θ_i			0.003	-0.049	-0.048	-0.028	-0.004	-0.024
			(0.012)	(0.124)	(0.121)	(0.118)	(0.120)	(0.104)
$(\theta_i \times \pi_{it})$				0.051	0.050	0.024	-0.000	0.020
				(0.133)	(0.130)	(0.122)	(0.114)	(0.106)
Observations	2423	2423	2423	2423	2423	2423	2423	2423
B. Education, health and social work activities								
q_{it}	0.194	0.207	0.220	0.218	0.216	0.119	0.172	0.226
	(0.158)	(0.159)	(0.163)	(0.163)	(0.164)	(0.232)	(0.242)	(0.250)
π_{it}		0.082	0.077	0.201	0.203	0.230	0.290*	0.271
		(0.118)	(0.118)	(0.155)	(0.156)	(0.158)	(0.166)	(0.166)
θ_i			0.009	0.322	0.323	0.320	0.348	0.300
			(0.021)	(0.262)	(0.263)	(0.265)	(0.264)	(0.268)
$(\theta_i \times \pi_{it})$				-0.280	-0.281	-0.277	-0.301	-0.261
				(0.237)	(0.237)	(0.239)	(0.241)	(0.241)
Observations	3460	3460	3460	3460	3460	3460	3460	3460
C. Other services activities								
q_{it}	-0.818	-0.807	-0.691	-0.653	-0.436	-0.866	-1.095	-1.066
	(0.644)	(0.643)	(0.648)	(0.647)	(0.663)	(0.703)	(0.705)	(0.772)
π_{it}		0.100	0.087	-0.118	-0.132	-0.149	-0.073	-0.031
		(0.113)	(0.113)	(0.212)	(0.211)	(0.213)	(0.216)	(0.212)
θ_i			0.060*	-0.287	-0.318	-0.338	-0.316	-0.369
			(0.032)	(0.251)	(0.246)	(0.243)	(0.247)	(0.233)
$(\theta_i \times \pi_{it})$				0.324	0.352	0.353	0.326	0.369
				(0.249)	(0.247)	(0.246)	(0.247)	(0.242)
Observations	1230	1230	1230	1230	1230	1230	1230	1230
Controls						y	y	y
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 10: Probit results equation 2. Dependent variable: $Pr(Pub_{it} = 0|Pub_{it-1} = 1, FT_{it-1} = 1)$ - By area.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. North								
q_{it}	-0.025	-0.034	-0.030	-0.034	-0.031	0.046	0.041	-0.007
	(0.046)	(0.047)	(0.048)	(0.048)	(0.048)	(0.061)	(0.063)	(0.069)
π_{it}		0.235	0.236	0.467**	0.460**	0.530***	0.478**	0.520***
		(0.150)	(0.150)	(0.189)	(0.189)	(0.193)	(0.197)	(0.200)
θ_i			0.005	0.651***	0.641**	0.622**	0.581**	0.489
			(0.016)	(0.253)	(0.257)	(0.267)	(0.282)	(0.314)
$(\theta_i \times \pi_{it})$				-0.627**	-0.616**	-0.613**	-0.567*	-0.474
				(0.304)	(0.304)	(0.303)	(0.302)	(0.305)
Observations	6284	6284	6284	6284	6284	6284	6284	6284
B. Centre								
q_{it}	-0.007	-0.008	0.018	0.017	0.009	0.023	0.016	0.038
	(0.042)	(0.042)	(0.042)	(0.042)	(0.043)	(0.049)	(0.049)	(0.055)
π_{it}		-0.170	-0.180	-0.164	-0.224	-0.110	-0.249	-0.260
		(0.218)	(0.217)	(0.260)	(0.260)	(0.261)	(0.271)	(0.275)
θ_i			0.054**	0.106	0.152	0.140	0.082	0.060
			(0.027)	(0.498)	(0.514)	(0.522)	(0.502)	(0.494)
$(\theta_i \times \pi_{it})$				-0.050	-0.093	-0.083	-0.031	-0.010
				(0.468)	(0.469)	(0.480)	(0.481)	(0.483)
Observations	2421	2421	2421	2421	2421	2421	2421	2421
C. South								
q_{it}	0.055***	0.055***	0.068***	0.068***	0.062***	-0.013	-0.020	-0.002
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.027)	(0.028)	(0.029)
π_{it}		-0.068	-0.076	-0.227	-0.226	-0.224	-0.238	-0.248
		(0.134)	(0.134)	(0.152)	(0.152)	(0.148)	(0.153)	(0.153)
θ_i			0.027*	-0.361**	-0.362**	-0.361**	-0.390***	-0.399***
			(0.015)	(0.162)	(0.163)	(0.153)	(0.148)	(0.146)
$(\theta_i \times \pi_{it})$				0.549*	0.554*	0.554*	0.614**	0.633**
				(0.322)	(0.323)	(0.304)	(0.305)	(0.302)
Observations	5665	5665	5665	5665	5665	5665	5665	5665
Controls						y	y	y
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 11: Probit results equation 3. Dependent variable: $Pr(Pub_{it}|NH_{it} = 1)$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
q_{it}	0.312***	0.312***	0.312***	0.282***	0.279***	0.270***	0.043	0.051	0.016
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.031)	(0.031)	(0.035)
p_{it}		-0.014	-0.007	-0.011	0.010	0.016	0.019	0.021	0.029
		(0.013)	(0.021)	(0.020)	(0.023)	(0.023)	(0.022)	(0.021)	(0.022)
d_{it}			0.002	0.002	0.002	0.003	0.001	0.008	0.011*
			(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
$(p_{it} \times d_{it})$			-0.002	-0.002	-0.001	-0.002	0.000	0.000	-0.003
			(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
θ_i				-0.036***	0.047	0.047	0.085**	0.085**	0.084**
				(0.007)	(0.036)	(0.036)	(0.038)	(0.037)	(0.038)
$(\theta_i \times p_{it})$					-0.057**	-0.057**	-0.066**	-0.068**	-0.067**
					(0.028)	(0.028)	(0.027)	(0.027)	(0.028)
$(\theta_i \times p_{it} \times d_{it})$					-0.003*	-0.003*	-0.003*	-0.003*	-0.003
					(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	13566	13566	13566	13566	13566	13566	13566	13566	13566
Controls							y	y	y
Year FE								y	y
Region FE									y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 12: Probit results equation 4. Dependent variable: $Pr(Pub_{it} = 0|Pub_{it-1} = 1, FT_{it-1} = 1)$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
q_{it}	0.055***	0.055***	0.055***	0.069***	0.069***	-0.014	-0.022	-0.004
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.027)	(0.028)	(0.029)
π_{it}		-0.068	0.586	0.591	0.286	0.171	0.072	0.151
		(0.134)	(0.789)	(0.787)	(0.804)	(0.783)	(0.800)	(0.817)
d_{it}			0.112	0.114	0.087	0.065	0.042	0.058
			(0.137)	(0.136)	(0.137)	(0.134)	(0.137)	(0.140)
$(\pi_{it} \times d_{it})$				-0.121	-0.092	-0.071	-0.059	-0.074
				(0.141)	(0.142)	(0.139)	(0.142)	(0.146)
θ_i				0.027*	-0.349**	-0.353**	-0.382**	-0.390***
				(0.015)	(0.166)	(0.155)	(0.150)	(0.147)
$(\theta_i \times p_{it})$					0.544	0.534*	0.593*	0.606*
					(0.333)	(0.316)	(0.315)	(0.313)
$(\theta_i \times p_{it} \times d_{it})$					-0.003	0.001	0.001	0.002
					(0.015)	(0.015)	(0.015)	(0.015)
Observations	5665	5665	5665	5665	5665	5665	5665	5665
Controls						y	y	y
Year FE							y	y
Region FE								y

Notes: Robust standard errors in parentheses. Marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 13: Robustness checks equation 1. Dependent variable: $Pr(Pub_{it}|NH_{it} = 1)$ - All new hires.

	(1)	(2)	(3)	(4)	(5)
q_{it}	0.058***	0.056***	0.058***	0.066***	0.118***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.037)
p_{it}	0.010	0.017	0.008	0.010	0.014
	(0.013)	(0.029)	(0.012)	(0.013)	(0.018)
θ_i	0.053*	0.049	0.088**	0.063**	0.040
	(0.028)	(0.165)	(0.043)	(0.029)	(0.034)
$(\theta_i \times p_{it})$	-0.049**	-0.125	-0.068***	-0.050**	-0.041
	(0.021)	(0.136)	(0.025)	(0.021)	(0.026)
$(\theta_i \times q_{it})$				-0.061	
				(0.038)	
Observations	21764	21764	21764	21764	21764
Controls	y	y	y	y	y
Year FE	y	y	y	y	y
Region FE	n	n	n	n	n

Notes: Column (1) reports the baseline results of table 5; column (2) employs a continuous measure of ability θ_i; column (3) uses the measure of ability ζ_i; column (4) replicates the results of column (1) controlling for the term $(q_{it} \times \theta_i)$; column (5) reports the OLS results with double revel clustering. Robust standard errors in parentheses. In columns (1) to (4) estimates are obtained through probit and marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

Table 14: Robustness checks equation 2. Dependent variable: $Pr(Pub_{it} = 0|Pub_{it-1} = 1, FT_{it-1} = 1)$ - By area.

	(1)	(2)	(3)	(4)	(5)
A. North					
q_{it}	0.041	0.041	-0.042	0.042	0.045
	(0.063)	(0.063)	(0.062)	(0.065)	(0.117)
π_{it}	0.478**	1.044**	0.468***	0.477**	0.460
	(0.197)	(0.418)	(0.169)	(0.197)	(0.299)
θ_i	0.581*	3.666*	0.918***	0.581**	0.520**
	(0.282)	(1.904)	(0.088)	(0.283)	(0.271)
$(\theta_i \times \pi_{it})$	-0.567*	-3.944**	-1.192***	-0.566*	-0.557*
	(0.302)	(1.971)	(0.399)	(0.305)	(0.309)
$(\theta_i \times q_{it})$				-0.006	
				(0.134)	
Observations	6284	6284	6284	6284	6284
B. Centre					
q_{it}	0.016	0.018	0.015	0.002	0.015
	(0.049)	(0.049)	(0.049)	(0.050)	(0.105)
π_{it}	-0.249	-0.028	-0.119	-0.248	-0.251
	(0.271)	(0.549)	(0.264)	(0.270)	(0.232)
θ_i	0.082	1.324	0.662	0.033	0.093
	(0.502)	(2.685)	(0.442)	(0.482)	(0.498)
$(\theta_i \times \pi_{it})$	-0.031	-1.233	-0.567	-0.013	-0.044
	(0.481)	(2.783)	(0.514)	(0.482)	(0.525)
$(\theta_i \times q_{it})$				0.166	
				(0.139)	
Observations	2421	2421	2421	2421	2421
C. South					
q_{it}	-0.020	-0.022	-0.025	-0.025	0.022
	(0.028)	(0.028)	(0.028)	(0.029)	(0.045)
π_{it}	-0.238	-0.637**	-0.072	-0.239	-0.240
	(0.153)	(0.301)	(0.150)	(0.153)	(0.259)
θ_i	-0.390***	-3.076*	-0.051	-0.394***	-0.567**
	(0.148)	(1.578)	(0.283)	(0.148)	(0.224)
$(\theta_i \times \pi_{it})$	0.614**	3.312**	0.051	0.614**	0.617***
	(0.305)	(1.634)	(0.322)	(0.305)	(0.225)
$(\theta_i \times q_{it})$				0.048	
				(0.068)	
Observations	5665	5665	5665	5665	5665
Controls	y	y	y	y	y
Year FE	y	y	y	y	y
Region FE	n	n	n	n	n

Notes: Column (1) reports the baseline results of table 5; column (2) employs a continuous measure of ability θ_i; column (3) uses the measure of ability ζ_i; column (4) replicates the results of column (1) controlling for the term $(q_{it} \times \theta_i)$; column (5) reports the OLS results with double revel clustering. Robust standard errors in parentheses. In columns (1) to (4) estimates are obtained through probit and marginal effects at the mean reported. *** p<0.01, ** p<0.05, * p<0.1. Quarterly panel weights employed.

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