Gains and losses from *fixed-term* contracts. Evidence from heterogeneous Italian firms

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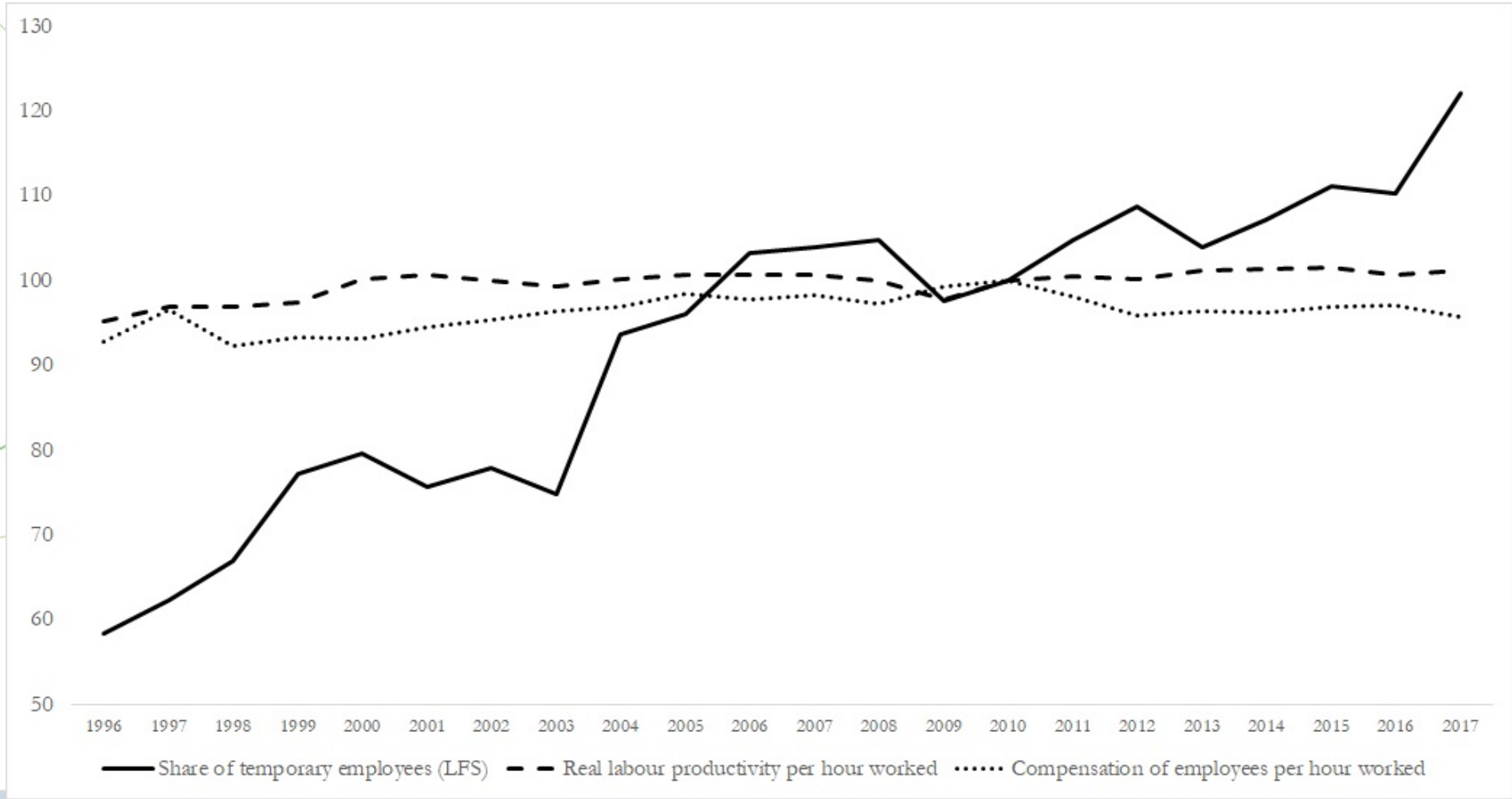
Outline

Temporary employment, labour productivity and labour compensation (Eurostat, 2010=100)



Motivation

- Diffusion of fixed-term contracts in the Italian labour market - from 7.2% of total employment in 1995 to 14% in 2016;
- Declining trend in labour productivity re-opened the debate on the link between the use of temporary employment, labour productivity and wages;
- Reforms increasing the flexibility of the Italian labour market aiming to remove "labour rigidities" considered the major cause of stagnant labour market (OECD, 1999; 2003; IMF, 2007; Bugamelli et al., 2018);

Claiming for labour flexibility

1. **Firms' Costs**
   Temporary employment to adjust workforce to product demand fluctuations (Bentolila and Saint-Paul, 1992; Nunziata and Staffolani, 2007);
   - More flexible labour markets influence firms' decisions of new hirings impacting on firms' costs (Houseman, 2001);

2. **Screening mechanisms**
   Selecting more productive workers, the overall productivity of the workforce increase (Wang and Weiss, 1998);
   - Fixed-term employees used to substitute core workforce can negatively impact on workers' motivation resulting in lower labour productivity (Brown and Sessions, 2005);

Criticizing flexibilisation of labour markets

- Little incentive to invest in **firm specific human capital** –> decrease investments in specific human capital and labour productivity (Arulampalam et al., 2004; Booth et al., 2002; Zwick, 2006);
- Workers invest in firm-specific skills when the employment relationship is expected to last (Wasmer, 2006);
- Damaging **career prospects** for young people (Cazes and Tonin, 2010; OECD 2015);
- Negatively affecting **on-the-job training** by firms and workers' access to training (Alba-Ramirez, 1994; Booth et al., 2002; OECD, 2007; Albert et al. 2005; 2010);
- Reducing aggregate labour productivity (Kleinknecht, 1998; Vergeeer and Kleinknecht, 2011; 2014);

Temporary employment and labour productivity

- Existence of both a negative and a positive relationship at the firm level;
- **Not homogeneous among firms** –> varies accordingly to firms' characteristics, reasons for using part-time workers, human capital accumulation, macro-economic conditions;

Temporary employment and wages

- Higher compensating wages for FTCs facing poorer working conditions and risk of losing their jobs (Sattinger, 1977; Rosen, 1974; Piore, 1978; Lindbeck and Snower, 1986);
- Existence of a significant wage gap between permanent workers and short-term –> this gap cannot be attributed to jobs' or individuals' characteristics (Bosio, 2009; Brown and Sessions, 2003; Comi and Grasseni, 2012; De la Rica, 2004);
- Wage-gap not homogeneous across wage distribution (Mertens et al., 2007);

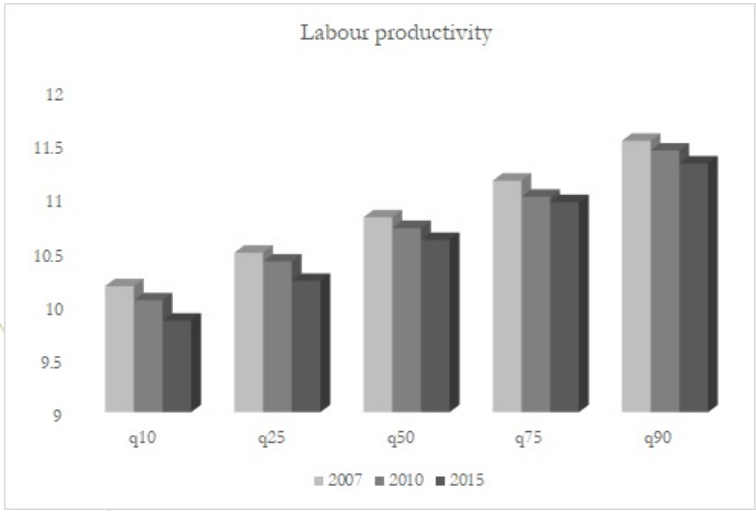
Aim and contribution of the study

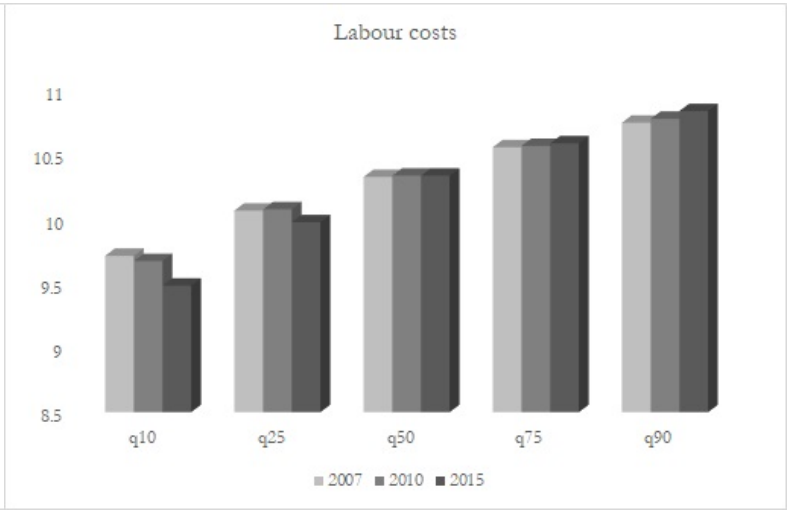
1. Distributional effect of short-term contracts (external numerical flexibility) –> how benefits or losses distributed between firms (profits) and workers (wages);
2. Heterogeneity of the Italian production structure (Bottazzi et al., 2007);
3. Special focus on small firms – with less than 50 employees;

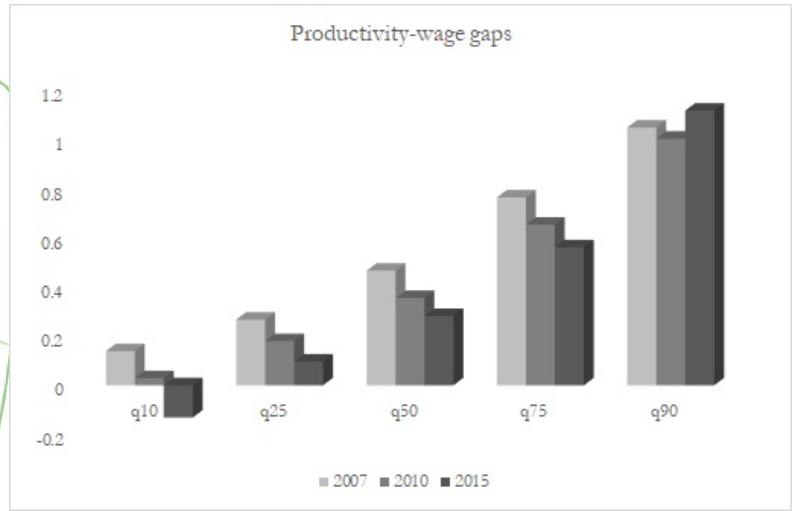
Data

- *Rilevazione su Imprese e Lavoro* - INAPP for 2007, 2010 and 2015 on a representative sample of Italian firms;
- 25.000 firms operating in non-agricultural private sector;
- A sub-sample of the included firms (around 35%) are followed over time, RIL dataset partially panel over the period under study;
- Merge RIL data with AIDA archive provided by the Bureau Van Dijk (balance sheets of almost all the Italian corporations operating in the private sector, except for the agricultural and financial industries);
- The longitudinal RIL-AIDA sample is made up of approximately 2600 firm-year observations over the period 2007-2015;

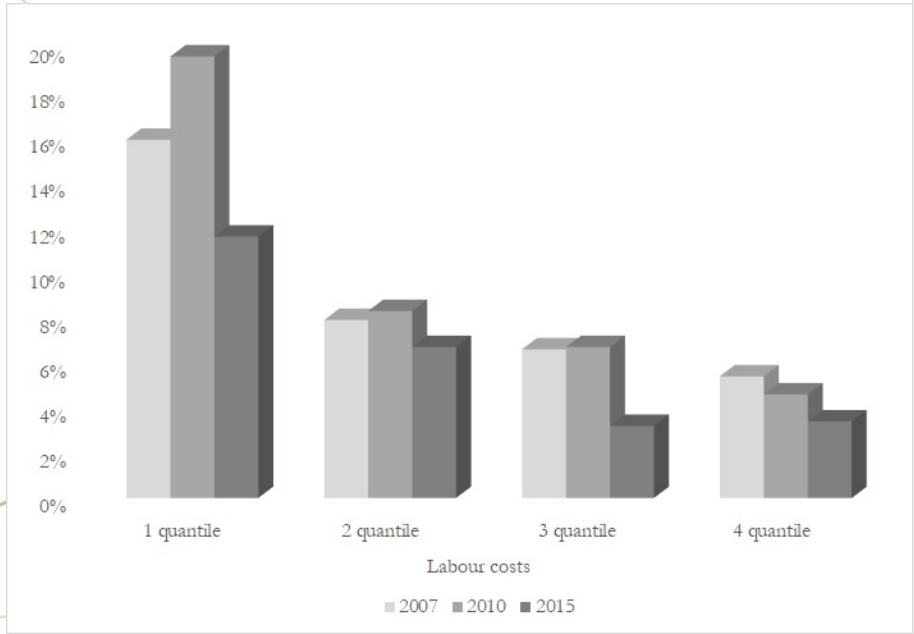
Distribution of productivity, wages and profits

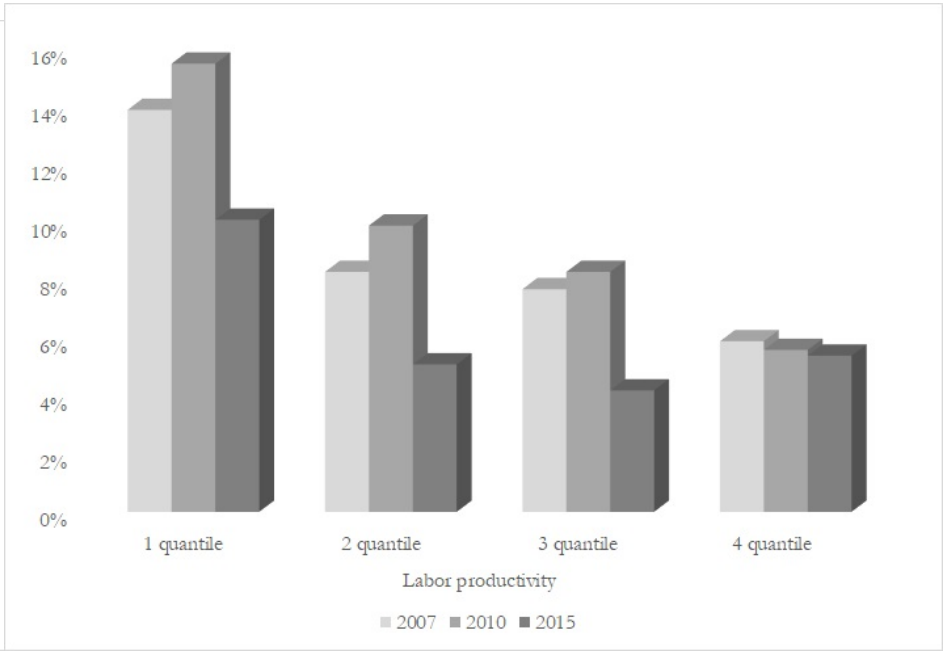






Share of temporary employment





Econometric analysis

$$Ln(labprod)_{it} = \alpha_\theta * FT_{i,t} + \beta_\theta * X_{i,t} + \eta_i + \epsilon_{i,t} \quad (1)$$

$$Ln(wage)_{it} = \alpha_\theta * FT_{i,t} + \beta_\theta * X_{i,t} + \eta_i + \epsilon_{i,t} \quad (2)$$

$$Ln(productivitywagegap)_{it} = \alpha_\theta * FT_{i,t} + \beta_\theta * X_{i,t} + \eta_i + \epsilon_{i,t} \quad (3)$$

- $Ln(labprod)_{it}$ and $Ln(wage)_{it}$ are (log of) valued added per employee and (log) of labour cost per employee;
- i is the firm subscript and t is the time subscript for years 2007, 2010 and 2015;
- $FT_{i,t}$ is the share of employees covered by fixed term contracts;
- η_i denotes the firms' time-invariant unobserved heterogeneity;
- $\epsilon_{i,t}$ is an error term capturing the idiosyncratic component;
- The vector of the coefficients α_θ and β_θ are estimated at each of chosen quantiles 0.1, 0.25, 0.5, 0.75 and 0.9.
- X_{it} controls included: employment composition (gender, executives, blue collar, white collar, trained, hirings, immigrants), vacancy, product innovation, process innovation, mergers acquisitions, firms' age, sector of activity, macro-region, ecc.), employers' membership, performance related pay;

Econometric analysis

- Quantile regression with robust and clustered standard errors (Machado and Santos Silva, 2000; Parente and Santos-Silva, 2016);
- Two step procedure proposed by Canay (2011) in order to control for time-invariant firm-specific unobserved heterogeneity:
  1. First step: estimating the unobserved fixed effect using a standard within FE estimators;
  2. Second step: this transformed (adjusted) measure is taken as dependent variable for conditional quantile regression;
- Selection of firms into an intensive use of flexible contractual arrangements:
  1. Selection bias: instrumental variable quantile regression technique (Abadie et al.) to identify the causal effect of the share of FT contracts.

Pooled quantile estimates. Whole sample

	q10	q25	q50	q75	q90
Panel A: Lab productivity					
share of FT contracts	-0.590***	-0.419***	-0.282***	-0.125***	-0.107
	[0.109]	[0.072]	[0.042]	[0.047]	[0.078]
other controls	yes	yes	yes	yes	yes
constant	9.352***	9.511***	9.531***	9.691***	10.732***
	[0.113]	[0.142]	[0.140]	[0.316]	[0.151]
N of Obs	8228	8228	8228	8228	8228
R2	0.231	0.259	0.274	0.255	0.229
Panel B: Wages					
share of FT contracts	-0.695***	-0.577***	-0.457***	-0.338***	-0.196***
	[0.094]	[0.044]	[0.036]	[0.034]	[0.064]
other controls	yes	yes	yes	yes	yes
constant	9.525***	9.800***	10.120***	10.654***	11.425***
	[0.124	[0.108	[0.088	[0.083	[0.308
N of Obs	8278	8278	8278	8278	8278
R2	0.271	0.3	0.307	0.274	0.212
Panel C: Profits					
share of FT contracts	0.091***	0.091***	0.125***	0.145***	0.191**
	[0.021]	[0.021]	[0.032]	[0.042]	[0.078]
other controls	yes	yes	yes	yes	yes
constant	-0.246***	-0.246***	-0.269***	-0.254***	-0.085
	[0.059]	[0.059]	[0.077]	[0.088]	[0.315]
N of Obs	8202	8202	8202	8202	8202
R2	0.123	0.123	0.13	0.127	0.117

FE quantile estimates (Canay technique). Whole sample.

	q10	q25	q50	q75	q90
Panel A: Lab productivity					
share of FT contracts	-0.386***	-0.284***	-0.217***	-0.149***	-0.068
	[0.037]	[0.023]	[0.012]	[0.023]	[0.043]
other controls	yes	yes	yes	yes	yes
constant	-0.403	-0.381***	-0.366***	-0.260*	-0.387
	[0.293]	[0.141]	[0.093]	[0.152]	[0.249]
N of Obs	8228	8228	8228	8228	8228
R2	0.809	0.817	0.818	0.816	0.81
Panel B: Wages					
share of FT contracts	-0.482***	-0.371***	-0.306***	-0.219***	-0.138***
	[0.038]	[0.019]	[0.008]	[0.017]	[0.025]
other controls	yes	yes	yes	yes	yes
constant	10.741***	10.884***	10.958***	11.180***	11.381***
	[0.046]	[0.033]	[0.056]	[0.034]	[0.166]
N of Obs	8278	8278	8278	8278	8278
R2	0.876	0.884	0.885	0.882	0.876
Panel C: Profits					
share of FT contracts	0.063**	0.063***	0.055***	0.062***	0.114***
	[0.031]	[0.013]	[0.009]	[0.016]	[0.028]
other controls	yes	yes	yes	yes	yes
constant	-0.104**	-0.111	-0.038	0.014	0.013
	[0.044]	[0.069]	[0.046]	[0.057]	[0.032]
N of Obs	8202	8202	8202	8202	8202
R2	0.335	0.363	0.367	0.36	0.332

Pooled quantile estimates (<50 employees)

	q10	q25	q50	q75	q90
Panel A: Lab productivity					
share of FT contracts	-0.695***	-0.512***	-0.346***	-0.238***	-0.163*
	[0.104]	[0.083]	[0.043]	[0.059]	[0.086]
other controls	yes	yes	yes	yes	yes
constant	9.495***	9.458***	9.673***	9.947***	10.707***
	[0.174]	[0.114]	[0.392]	[0.308]	[0.121]
N of Obs	6443	6443	6443	6443	6443
R2	0.16	0.215	0.236	0.221	0.191
Panel B: Wages					
share of FT contracts	-0.812***	-0.650***	-0.512***	-0.400***	-0.248***
	[0.095]	[0.049]	[0.037]	[0.042]	[0.049]
other controls	yes	yes	yes	yes	yes
constant	8.733***	9.551***	9.882***	10.188***	10.482***
	[2.689]	[0.165]	[0.129]	[0.336]	[0.080]
N of Obs	6487	6487	6487	6487	6487
R2	0.208	0.241	0.255	0.227	0.16
Panel C: Profits					
share of FT contracts	0.077***	0.077***	0.121***	0.137***	0.158**
	[0.020]	[0.020]	[0.032]	[0.037]	[0.071]
other controls	yes	yes	yes	yes	yes
constant	-0.161**	-0.161**	-0.159	-0.157	0.105
	[0.067]	[0.067]	[0.312]	[0.098]	[0.108]
N of Obs	6424	6424	6424	6424	6424
R2	0.124	0.124	0.131	0.128	0.116

FE quantile estimates (<50 employees)

	q10	q25	q50	q75	q90
Panel A: Lab productivity					
share of FT contracts	-0.372***	-0.269***	-0.195***	-0.133***	-0.051*
	[0.040]	[0.023]	[0.015]	[0.021]	[0.031]
other controls	yes	yes	yes	yes	yes
constant	10.569***	10.781***	10.893***	11.129***	11.174***
	[0.064]	[0.323]	[0.085]	[0.156]	[0.269]
N of Obs	6443	6443	6443	6443	6443
R2	0.647	0.664	0.666	0.661	0.654
Panel B: Wages					
share of FT contracts	-0.482***	-0.368***	-0.297***	-0.203***	-0.135***
	[0.047]	[0.036]	[0.009]	[0.022]	[0.022]
other controls	yes	yes	yes	yes	yes
constant	10.542***	10.698***	10.737***	10.905***	11.416***
	[0.050]	[0.074]	[0.031]	[0.209]	[0.548]
N of Obs	6487	6487	6487	6487	6487
R2	0.756	0.776	0.779	0.773	0.762
Panel C: Profits					
share of FT contracts	0.063**	0.062***	0.051***	0.074***	0.132***
	[0.027]	[0.019]	[0.009]	[0.019]	[0.027]
other controls	yes	yes	yes	yes	yes
constant	0.036	-0.027	0.132*	0.180***	0.140***
	[0.101]	[0.063]	[0.078]	[0.035]	[0.046]
N of Obs	6424	6424	6424	6424	6424
R2	0.213	0.268	0.275	0.262	0.236

IVQR estimates. Whole sample.

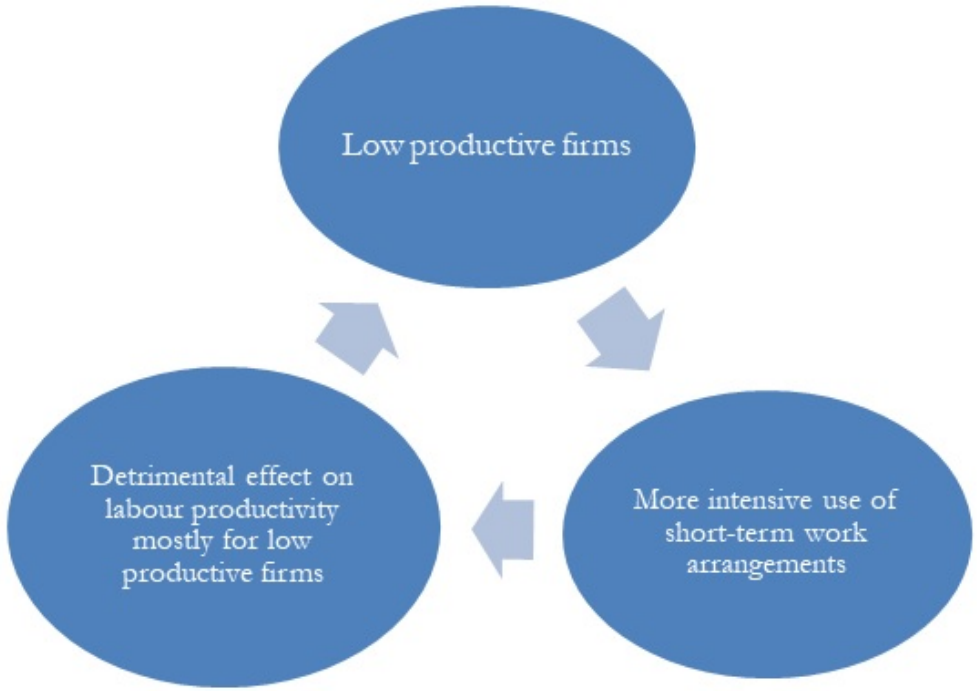
- Selection bias in conventional quantile regression: low-productivity/low wage firms (Y) may have a higher probability of hiring with fixed term contracts (D);
- Instrument for the use of fixed term contracts: the past volatility (standard deviation) of hires (hiring firms) calculated for each 2 digit sector (Z), i.e a proxy for uncertainty –> expected to randomly affect sample firms and to influence their use of fixed term contracts;
- Binary instrument: 1 if the sectoral volatility of hires is higher than median value found for the economy on the whole, 0 otherwise;
- Binary endogenous variable: 1 if $FT_{i,t} > \widetilde{FT}_t$, 0 otherwise;
- *Quantile Treatment Effect Estimator* of Abadie et al. (2002) comparing the performance of both treated firms (firms using an high share of fixed term contracts) and the control group (firms adopting a low share of fixed term contracts) to undertake a counterfactual analysis;
- Causal effect identified for sub-population of compliers

IVQR estimates. Whole sample.

	q10	q25	q50	q75	q90
Panel A: Lab productivity					
use of FT contracts (0/1)	-0.293*	-0.208**	-0.173*	-0.192*	-0.269
	[0.159]	[0.098]	[0.098]	[0.105]	[0.164]
other controls	Yes	Yes	Yes	Yes	Yes
Constant	9.329***	9.482***	9.690***	9.766***	9.694***
	[0.936]	[0.471]	[0.760]	[0.685]	[1.211]
N of obs	8,228	8,228	8,228	8,228	8,228
Panel B: Wages					
use of FT contracts (0/1)	-0.157	-0.119	-0.104**	-0.079	-0.074
	[0.147]	[0.084]	[0.053]	[0.069]	[0.096]
Constant	9.572***	9.893***	10.133***	10.137***	10.586***
	[0.797]	[0.538]	[0.282]	[0.431]	[0.631]
N of obs	8,260	8,260	8,260	8,260	8,260
Panel C: Profits					
use of FT contracts (0/1)	-0.035	-0.031	-0.042	-0.082	-0.152
	[0.063]	[0.052]	[0.063]	[0.085]	[0.202]
Constant	-0.177	-0.248	-0.24	-0.346	0.252
	[0.278]	[0.280]	[0.347]	[0.439]	[1.210]
N of obs	8,184	8,184	8,184	8,184	8,184

Take home message

Figure: Vicious cycle for low-productive firms



Conclusions

- Implementation of labour market reforms to spur labour productivity facilitating "allocative efficiency" (Scarpetta and Martin, 2012);
- A detrimental effect stemming from the diffusion of fixed-term contracts on productivity can emerge due to weaker incentives by both the employer and the employee to invest in firm-specific skills (Lotti and Viviano, 2012);

Summing up
Temporary employment and labour productivity

- A) Strong and negative relationship between the share of temporary employees and both labour productivity and wages;
- B) Lower productivity of temporary employment is compensated by lower labour costs, so that profits – here productivity-wage gaps – remain unchanged.
- C) Relation is not constant:
  1. An increasing share of temporary employment is more detrimental in low productive firms than in high-productive ones;
  2. Most productive firms – 90th percentile -, an increase in the share of temporary employment does not reduce average labour productivity;
  3. Low productive firms - 10th and 25th percentiles - small increase of temporary employment in the workforce reduces firm productivity.

Summing up
Temporary employment, wages and profits

- Temporary employment associated with lower labour costs –> stronger in low-paying firms more than in high-paying ones;
- In high-profits firms –> an increasing use of short-term contracts is not associated with productivity slowdown, while reduces by a small amount firm labour costs;
- In low-profits firms –> the increasing use of temporary employment compresses labour productivity and, consequently, average labour costs in order to guarantee firm profitability.

Summing up
Temporary employment and small firms

- In the most productive small firms, fixed-term employment reduces labour productivity;
- Comparing small and medium-large high productive firms –> the use of temporary employment compresses labour productivity only in small firms;

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Thank you!

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Distribution of productivity, wages and profits. Whole sample

		Mean	q10	q25	q50	q75	q90
Panel A: Productivity							
	2007	10.81	10.17	10.48	10.81	11.15	11.52
	2010	10.72	10.04	10.4	10.71	11	11.43
	2015	10.56	9.85	10.22	10.6	10.95	11.31
Total		10.69	9.95	10.33	10.7	11.03	11.44
Panel B: Wages							
	2007	10.27	9.71	10.06	10.32	10.55	10.74
	2010	10.28	9.67	10.07	10.33	10.56	10.77
	2015	10.16	9.48	9.97	10.33	10.58	10.83
Total		10.23	9.63	10.04	10.33	10.57	10.78
Panel C: Profits							
	2007	0.539	0.139	0.267	0.466	0.764	1.048
	2010	0.444	0.029	0.18	0.355	0.653	1.003
	2015	0.398	-0.131	0.097	0.282	0.561	1.117
Total		0.458	0.024	0.175	0.368	0.668	1.062

Source RIL-INAPP 2007-2010-2015. Sampling weights applied.

Distribution of productivity, wages and profits. Small firms

	Mean	q10	q25	q50	q75	q90
Panel A: Productivity						
2007	10.79	10.15	10.47	10.79	11.14	11.52
2010	10.71	10.02	10.39	10.7	10.99	11.43
2015	10.55	9.85	10.21	10.6	10.94	11.3
Total	10.68	9.95	10.32	10.69	11.03	11.43
Panel B: Wages						
2007	10.25	9.69	10.03	10.3	10.53	10.72
2010	10.26	9.67	10.06	10.32	10.55	10.75
2015	10.15	9.48	9.97	10.33	10.57	10.82
Total	10.22	9.62	10.03	10.32	10.55	10.77
Panel C: Profits						
2007	0.54	0.14	0.27	0.47	0.77	1.06
2010	0.45	0.03	0.18	0.36	0.66	1.01
2015	0.4	-0.13	0.09	0.28	0.56	1.12
Total	0.46	0.02	0.17	0.37	0.67	1.07

Source RIL-INAPP 2007-2010-2015. Sampling weights applied.

Sample characteristics by year. Longitudinal sample RIL-AIDA

	2007		2010		2015		whole period	
	Mean*	Std dev	Mean*	Std dev	Mean*	Std dev	Mean	Std dev
% FT contracts	10.5	0.21	10.6	0.2	0.07	0.18	9.2	0.2
% executives	3.6	0.11	3.3	0.1	0.05	0.15	4.1	0.12
%withe collar	44.1	0.37	44.8	0.37	0.54	0.37	47.7	0.37
% blue collar	52.1	0.37	51.9	0.38	0.41	0.38	48.2	0.38
% female	37.3	0.33	42.2	0.33	0.44	0.35	41.3	0.34
% trained	19.6	0.35	18	0.33	0.28	0.41	22.1	0.37
vacancy	15.4	0.36	6.8	0.25	0.05	0.22	8.9	0.28
ln(n of employees)	1.95	1.19	1.73	1.16	1.55	1.09	1.74	1.16
ln(physical capital pc)	9.82	1.5	9.96	1.73	9.8	1.97	9.86	1.75
process innovation	34.8	0.48	25.6	0.44	0.26	0.44	28.7	0.45
product innovation	54.5	0.5	37.3	0.48	0.33	0.47	41.3	0.49
employers' association	54	0.5	49.2	0.5	0.49	0.5	50.5	0.5
merger & acquistion	1.2	0.11	3.9	0.19	0.03	0.16	2.6	0.16
performance related pay	4.1	0.2	4.1	0.2	0.03	0.18	3.9	0.19
foreign ownership	1	0.1	0.8	0.09	0.01	0.09	0.9	0.09
North West	35.1	0.48	30.1	0.46	0.39	0.49	35	0.48
North East	23	0.42	25.7	0.44	0.26	0.44	25	0.43
Centre	22.4	0.42	26.3	0.44	0.19	0.39	22.5	0.42
South	19.4	0.4	17.9	0.38	0.16	0.36	17.6	0.38
N of Obs	2,668		2,824		2,697		8,189	