WORKING FROM HOME, CARATTERISTICHE DEI LAVORATORI E SALARI: EVIDENZE DAI DATI AMMINISTRATIVI

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MOTIVATIONS

- The adoption of innovative methods in the organization and management of human resources was a widely debated issue even before the onset of the health emergency from Covid-19 (Blinder and Krueger 2013)

- The Covid-19 pandemic has accelerated this diffusion and has had a crucial role by strengthening the opportunity to innovate and reorganize working life

- A new hybrid model in which the remote mode can coexist and integrate with face-to-face work

- Functional and operational flexibility as the main feature that makes remote work a convenient option for businesses

- Remote work favors the efficiency of organizational processes and productivity growth, then its diffusion can also have positive effects on individual's wages (Hill et al. 1998)

AIMS OF THE PAPER

- Investigate the **relationship between jobs exposed to the opportunity' of being carried out remotely** and **individual's wages**

- Use an **innovative dataset** that links statistical-information sources of sampling and administrative nature: Sampling survey on professions and tasks (*Indagine Campionaria delle Professioni - Inapp*), administrative archives on wages (INPS), and administrative labor market histories of employees (SISCO) for a wide range of workers

WORKING FROM HOME VS SMART WORKING

- Rather than talking about smart working, we must speak about **Working From Home (WFH)**, or teleworking

- Both methods are made possible thanks to the use of IT and telematic tools, allowing the carrying out of work to be released from geographical location. The difference relies on how these methods are regulated and the degree of flexibility that follows

- Telework is defined as **a work performance carried out outside the firm's context**

- Smart working refers to a **managerial philosophy that introduces a new idea of time and workspace**, which may eventually include working remotely

- Being a smart working worker means having the **autonomy** and the **responsibility** to choose your working hours, having the ability to **flexibly** use the different tools according to your needs; **choose** workplaces outside the firm location or inside the office depending on the work activity to be performed

LITERATURE
REMOTE WORKING AND PRODUCTIVITY

- Face-to-face meetings allow for more effective communication than remote forms such as email, chat or phone calls (Roghanizad and Bohns 2017; Battiston *et al*. 2017; Bonet and Salvadora 2017).

- Lack of personal interactions can reduce knowledge flows between workers as they learn through interactions with colleagues and can acquire new skills in the workplace (*learning by doing*) (Arrow 1971; Bonet and Salvadora 2017).

- Barrier and worsening of the principal-agent problem: the worker would have an incentive to escape monitoring and not to carry out his work

- A productivity decrease could occur also as a result of a greater disutility of work as a consequence of assisting children and the elderly (Bélanger 1999).

Remote work decreases productivity

LITERATURE
REMOTE WORKING AND PRODUCTIVITY'

- Bloom *et al.* 2015; Beckmann 2016; Godart *et al.* 2017; Clancy 2020: positive relationship between remote working and labor productivity

- White (2019): US workers who work remotely went from bearing a 26% wage penalty in 1980 to a 5% premium in 2014

- Pabilonia and Vernon (2021): some types of teleworkers earn a higher salary than others

Remote work increases productivity

There is no a general consensus on the relationship between remote work and productivity

LITERATURE
REMOTE WORKING AND WAGES

- Gariety and Shaer (2007), Bloom *et al*. (2015), Arntz *et al*. (2019), Angelici and Profeta (2020): Remote working can reduce (or at least not increase) the wage gap between men and women. Weeden (2005), Goldin (2015) and Bertrand (2018) find results in the opposite direction

- Pigini and Staffolani (2019): a small number of teleworkers (1% of the total) earn an average wage premium of between 2.7 and 8%

- Dingel and Neiman (2020): Workers whose jobs can be done remotely typically earn more suggesting a clear positive relationship between working from home and hourly wages. Similarly, Mongey et al. (2021): Individuals for whom working from home is impossible are more likely to have a lower income

- Bonacini et al. (2021): if the adoption of working from home will persist in the long and medium run the existing inequalities could worsen because the wage premium due to remote work is higher for the most skilled, men, and among the highest paid workers. The wage gap between workers employed in professions with high and low feasibility of working from home increases along the income distribution

- Aina et al. (2021): having worked from home seems to mitigate the negative consequences of Covid-19, especially for those who are in the lower end of the wage distribution

THE DATASET

- **INPS archive**: administrative dataset on population of employees. It records information on annual gross wages, age, gender, occupation, annual weeks worked, the type of contract, on the sector of activity, and on the geographical localization (the province) of the work the workplace. From this INPS archive, it's extracted a dataset based on a random sample of all employees born on four different days of each month of any year.

- **COB (*Sistema delle Comunicazioni Obbligatorie* - MdI) archive**: administrative dataset on work arrangements. It records detailed educational and occupational information (5-digit), and from year 2009, each job relationship that started, transformed or ended (for firing, dismissal, retirement, or transformation (e.g. from a fixed-term to an open-ended arrangement) of the contractual arrangement within the same firm) for all individuals working in Italy as employee or through apprenticeship, temporary agency work arrangements, and para-subordinate collaborations.

- **ICP (*Indagine Campionaria delle Professioni* - Inapp) survey**: a survey last run in 2013 that involves 16,000 workers recording detailed information on all the 5-digit occupations (i.e. 811 occupational codes). The ICP-Inapp is the Italian equivalent of the American O*NET. Tasks and skills variables are specific to the Italian economy, allowing for the definition of the structure of the labor market and the industrial relations characterizing the Italian economy.

THE ECONOMETRIC STRATEGY

$$\ln(\text{wage})_{it} = \alpha + \beta_1 \text{WFH}_{ipt} + \beta_2 \cdot X_{it} + \beta_3 \cdot F_{it} + \text{year} + \eta_{it}$$

- $\ln(\text{wage})_{it}$ is the (log) of (FTE) real wage of individual i, at time t, over the period 2011-2018

- WFH_{ipt} is the key explanatory variable: the working from home index for individual i employed in profession p and year t

- X_{it} vector of workers' characteristics: age, sex, educational level, type of contract (part-time or full time), occupation (executive, managers, office workers, blue collars), experience

- F_{it} vector of firm-level characteristics: sector of activity (2 digit), firm's size, geographical localization (Italian provinces)

- Year fixed effects and η_{it} the idiosyncratic error term with zero mean and finite variance

- One model estimated: Pooled OLS with year and province fixed effects

- The unit of observation is the **employee**. INPS and COB datasets have been merged by using tax codes of workers as the matching key. Then, we match to this dataset the WFH index deriving from ICP-Inapp survey through the code of profession (5 digit)

- Following Dingel and Neiman (2020), we adopt the WFH_{ipt} index (Barbieri et al. 2020) computed by considering workers' replies to different questions:

  (i) importance of working with computers;
  (ii) importance of performing general physical activities (which enters reversely);
  (iii) importance of maneuvering vehicles, mechanical vehicles or equipment (reversely);
  (iv) requirement of face-to-face interactions (reversely);
  (v) dealing with external customers or with the public (reversely);
  (vi) physical proximity (reversely);
  (vii) time spent standing (reversely)

- For each item, replies of workers are overall standardized to an index with a 0–100 range:

$$X = \left(\frac{Y-min}{max-min} \right) * 100$$
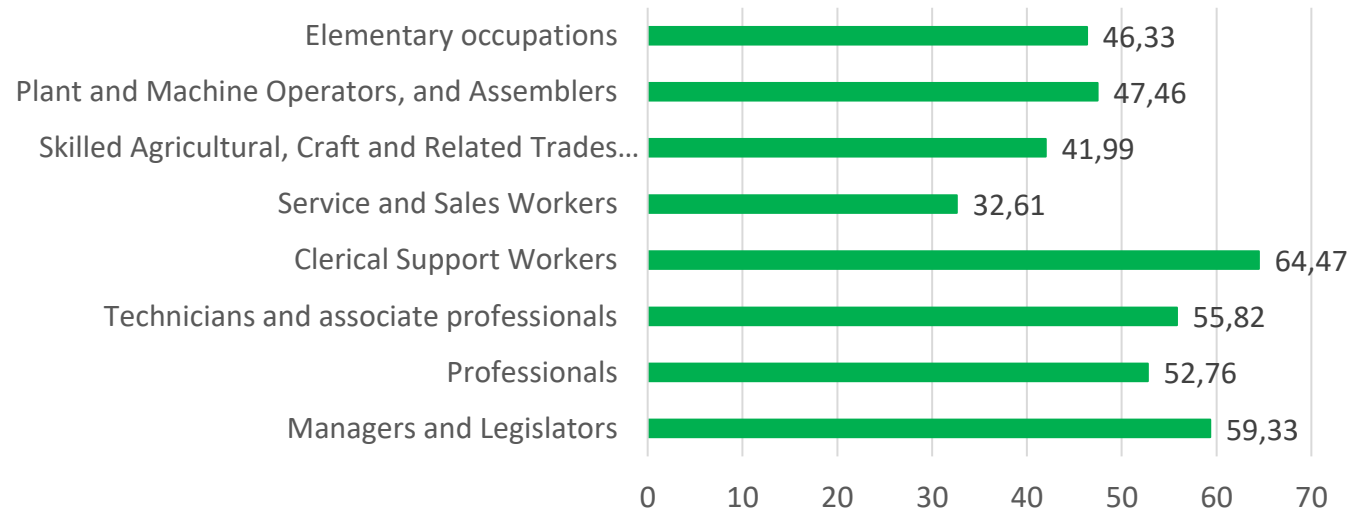
where Y is the original answer (from 1 to 5) to the question and max and min are the maximum and the minimum value reported for each occupation
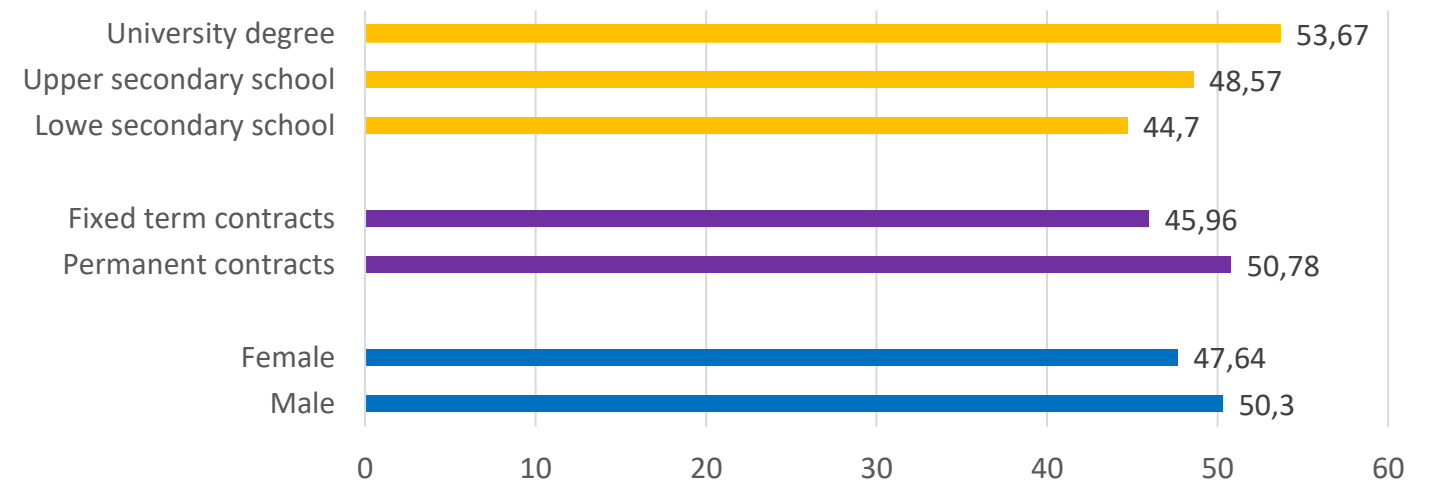
- We select all employees that in 2009 are max 34 years old and for each of them we select the **"main" contractual agreement** in any given year (the one with the highest number of weeks worked): about **2.5 milion observations**

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DESCRIPTIVE STATISTICS

WFH index

Category	Value
Elementary occupations	46,33
Plant and Machine Operators, and Assemblers	47,46
Skilled Agricultural, Craft and Related Trades...	41,99
Service and Sales Workers	32,61
Clerical Support Workers	64,47
Technicians and associate professionals	55,82
Professionals	52,76
Managers and Legislators	59,33

WFH index

Category	Value
University degree	53,67
Upper secondary school	48,57
Lowe secondary school	44,7
Fixed term contracts	45,96
Permanent contracts	50,78
Female	47,64
Male	50,3

MAIN RESULTS (I)

	[1]	[2]	[3]
WFH	0.0021***	0.0031***	0.0025***
	[0.000]	[0.000]	[0.000]
WFH *Female		-0.0019***	
		[0.000]	
WFH *Fixed Term contract			-0.0011***
			[0.000]
Female	-0.1305***	-0.0365***	-0.1306***
	[0.001]	[0.003]	[0.001]
Fixed term contract	-0.2006***	-0.2004***	-0.1490***
	[0.001]	[0.001]	[0.003]
University degree	0.1410***	0.1402***	0.1415***
	[0.001]	[0.001]	[0.001]
Part time	-0.0573***	-0.0599***	-0.0573***
	[0.001]	[0.001]	[0.001]
Age	0.0090***	0.0089***	0.0090***
	[0.000]	[0.000]	[0.000]
Year fixed effects	Si	Si	Si
Other controls	Si	Si	Si
Constant	6.1216***	6.0681***	6.1004***
	[0.004]	[0.005]	[0.005]
Obs	2.384.487	2.384.487	2.384.487
R2	0.39	0.39	0.39

ROBUSTNESS

	[1]	[2]	[3]
WFH	0.0617***	0.0751***	0.0733***
	[0.001]	[0.001]	[0.001]
WFH *Female		-0.0275***	
		[0.002]	
WFH *Fixed Term contract			-0.0297***
			[0.002]
Female	-0.1305***	-0.1151***	-0.1307***
	[0.001]	[0.001]	[0.001]
Fixed term contract	-0.2008***	-0.2010***	-0.1867***
	[0.001]	[0.001]	[0.001]
University degree	0.1424***	0.1424***	0.1435***
	[0.001]	[0.001]	[0.001]
Part time	-0.0562***	-0.0574***	-0.0560***
	[0.001]	[0.001]	[0.001]
Age	0.0091***	0.0091***	0.0091***
	[0.000]	[0.000]	[0.000]
Year fixed effects	Si	Si	Si
Other controls	Si	Si	Si
Constant	6.1978***	6.1901***	6.1905***
	[0.004]	[0.004]	[0.004]
Obs	2,323,060	2,323,060	2,323,060

CONCLUSIONS

- There is a positive and significant correlation between the WFH index and the gross weekly wage. This evidence supports the hypothesis that the diffusion of managerial and organizational practices that go hand in hand with a deconstruction of work times and spaces within firms - such as those reflected in the WFH phenomenon - can increase individual's wages (Bloon et al. 2021; Pabilonia and Vernon 2021; Chiou and Tucker 2020)

- The 'observed' heterogeneity of workers plays a fundamental role in understanding how relatively innovative models of human resource organization - such as those inherent in the spread of WFH - can be reflected in an increase in the occupational opportunities and wages of individuals, or alternatively to a widening of inequalities within firms

- In this case, the WFH for those on a fixed-term contract and for the female component of employment is accompanied by a lower increase of wages

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THANKS FOR YOUR ATTENTION