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The first victims of Covid-19 in developing countries? The most vulnerable workers to the lockdown of the Tunisian economy

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The first victims of Covid-19 in developing countries? The most vulnerable workers to the lockdown of the Tunisian economy

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Abstract

While the Covid-19 pandemic had both health and economic effects in rich countries, the first wave impacted many developing countries' mainly through its economic and social consequences. The objective of this paper is to perform a first-round assessment of the potential consequences on workers using the Tunisian labor force survey. Three main factors of vulnerability are investigated, the inability to work from home, being part of a non essential industry and working for the private sector. We find that the most affected are craftsmen, machine operators and elementary occupations in non-agricultural activities. The typically vulnerable worker is a young individual with low education, a man if self-employed and a woman with a temporary contract and lower earnings if wage-earner. When we take into account self-employed workers, the managers' category becomes the most affected among high and medium skill occupations. When we look at regional effects, we unexpectedly find that the coastal regions (except the capital) are the most fragile. This is due to the fact that most of the manufacturing, tourism and international transport activities are located in coastal regions.

JEL classification: J22, J61, O30, R12, R32.

Keywords: teleworking, employment, COVID-19, lockdown, vulnerability.

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1 Introduction

For many developing countries, particularly in Africa, the damage of the first wave of Covid-19 will be mainly economic and social. Understanding who were the first victims in terms of jobs lost due to the social distancing and lockdown measures constitutes a first step in assessing the social cost of the crisis.

This is of tremendous importance for aid targeting given the difficulty for developing countries to rely on large financial resources. The assessment is also very useful in the upcoming debate on who should pay to relieve the public deficit in the coming months and years. Finally if temporary lockdown measures were to be reimposed, having this information can be helpful when excluding some occupations from the lockdown. In a next step this analysis should be completed by the assessment of the indirect impact of the supply effects on demand through network, income and consumer preferences' effects.

The first channel of impact is the ability to continue working during the lockdown. The first and most studied determinant is the ability to work from home using the O*NET occupation classification (Dingel and Neiman, 2020) or some alternative sources such as the STEP surveys[1] which describe the tasks performed by each occupation at a disaggregated level (Saltiel, 2020), the PIAAC[2] and the MENA LMPS[3] (Hatayama et al., 2020). We should however bear in mind the difference between being potentially able to work from home and being really able to do it. As highlighted by Chiou and Tucker (2020) the digital divide or unequal access to high-speed internet is the main-driver of people's capacity to self isolate at home. Other facilities may be lacking in many workers' houses. The capacity of home delivery is not much developed in many countries. This means that some regions may suffer a double burden, a first burden due to their low content of occupations with high work-from-home potential (Irlacher and Koch, 2020) and a second due to the digital divide.

Working from home is not just teleworking, it is also farming, crafting, sewing, etc. The main issue for the latter is their ability to market their products. The sectoral dimension is the second determinant given that strategic activities such as health, food, energy or telecommunication were excluded from the lockdown (del Rio-Chanona et al., 2020; Barrot et al., 2020). Finally public sector workers have had their jobs and incomes protected in most countries. For each worker the impact will thus depend on her occupation (work from home or not) and sector (public/private; essential or not if private).

The objective of this paper is to assess the first round impact of Covid-19 on workers depending on their occupation and activity and to analyze the results according to their individual characteristics. Mongey et al. (2020) show that the most affected workers in

[1] Skills Towards Employability and Productivity (STEP) skills measurement program
[2] Programme for the International Assessment of Adult Competencies
[3] Labor Market Panel Surveys

the US are the least educated, in the bottom of the income distribution and have very low levels of liquidity. Adams-Prassl et al. (2020) find that women and youth bear the highest cost. Gottlieb et al. (2020) show that the impact is stronger on self employed which share is higher in developing countries. However, the high share of agriculture in low income countries may reduce the negative impact on their economies.

Tunisia is an interesting case study for the above issue. It is a low Middle income country which was very effective in limiting the health impact of the pandemic on its population (less than 50 dead by the end of May 2020). However the cost may be high on both vulnerable SMEs and households. Using the Tunisian labor force survey, we provide an estimation on the potential effects on workers by occupation, status (public/private; wage earner/self employed), sector, region based on occupational teleworkability classification of Dingel and Neiman (2020) as well as a categorization of sectors (essential or not) according to various Government and non Government documents. The second step consists in analyzing the characteristics of the most affected workers including self-employed.

We find that the most affected are craftsmen, machine operators and elementary occupations in non-agricultural activities. These occupations had simultaneously low share of essential activities, telework potential and public service status. The typically vulnerable worker is a young individual with low education, a man if self-employed and a woman with a temporary contract and lower earnings if wage-earner. When we take into account self-employed workers, the managers' category becomes the most affected among high and medium skill occupations. When we look at regional effects, we unexpectedly find that the coastal regions are the most fragile while we spontaneously always think that the the remote ones are always the most vulnerable. This is due to the fact that most of the manufacturing, tourism and international transport activities are located in coastal regions.

2 Data and Methodology

Tunisia implemented a strict lockdown between March 22 and May 3 (stringency index of 90%)[4] and started lifting it progressively from the 4th of May to the 14th of June. The last step should be the opening of the country borders the 27th of June to save the tourism season and allow the Tunisian leaving abroad to spend their holidays in their home country.

Like many countries in the world Tunisia did not issue a list of essential activities excluded from the lockdown measures. Following del Rio-Chanona et al. (2020) we started with the Italian list and corrected it whenever we found official documents specifying differences between the two countries. We completed this document analysis by our own knowledge of the activities that were under lockdown in Tunisia.

[4]https://ourworldindata.org/grapher/covid-stringency-index?tab=chartcountry= TUN

The workers' information was from the 2017 National Population and Employment Survey (Enquête Nationale sur la Population et l'Emploi - ENPE), conducted by the Tunisian National Statistics Institute (INS). The survey consists of two main modules. The first module provides demographic information on household members, including gender, age, relationship with the householder, marital status, education, working status and industry. The second module surveys the employment of all working individuals in the household, except for the remuneration which are designed exclusively for wage workers.

To measure the teleworkability of occupations, we use the classification of teleworkable jobs developed by Dingel and Neiman (2020), referred hereafter as DN's Teleworkability. Their classification covers the questions on work context and generalized work activity in the Occupational Information Network (O*NET), a US survey database on the nature of occupation and its task composition. A 6-digit O*NET-SOC occupation is given the value 1, implying that it is able to be performed from home, if none of the statements selected by the authors is true, otherwise it takes the value 0 [5].

For robustness check, we use two other classifications of teleworkability: del Rio-Chanona et al.'s Remote labor index (2020) and Saltiel's Work-from-home classification (2020), referred hereafter as RLI and WFH respectively. Also based on O*NET database, the RLI, however, is constructed from the intermediate work activity data which describes the task composition of each occupation. The authors independently give a binary rating to each of 332 possible work activities according to its feasibility of being performed from home, then the scores are aggregated at the 6-digit occupation level.

Our choice of an American-survey-based classification suffers from the objection that the nature of occupations varies across countries, especially between the US and developing countries, given differences in labour productivity, technological progress and trade integration. As a result, the teleworkability in developing countries is expected to be much lower than in developed countries. Indeed, Saltiel (2020) finds that the share of teleworkable jobs ranges from 5.5% in Ghana to 23% in Yunnan (China) for countries in the STEP surveys while this number varies from 7% in Guatemala to 16% in the Bahamas for Latin American countries according to Delaporte and Peña (2020). This share, using DN's Teleworkability, varies from 10% to 26% in developing countries. Therefore, our second robustness check is based on Saltiel's WFH classification. Accordingly, a 3-digit ISCO-08 occupation is non-teleworkable if the worker either lifts heavy equipment,

[5] The statements include: Average respondent says they use email less than once per month; Majority of respondents say outdoors every day; Average respondent says they deal with violent people at least once a week; Average respondent says they spent majority of time wearing common or specialized protective or safety equipment; Average respondent says they are exposed to minor burns, cuts, bites, or stings at least once a week; Performing General Physical Activities is very important; Handling and Moving Objects is very important; Controlling Machines and Processes [not computers nor vehicles] is very important; Operating Vehicles, Mechanized Devices, or Equipment is very important; Performing for or Working Directly with the Public is very important; Repairing and Maintaining Mechanical Equipment is very important; Repairing and Maintaining Electronic Equipment is very important; Inspecting Equipment, Structures, or Materials is very important; Average respondent says they are exposed to diseases or infection at least once a week; Average respondent says they spent majority of time walking or running

repairs items, operates machinery, high-interaction with customers or does not use a computer. Since Tunisia wasn't surveyed by STEP, we use the weighted mean share of WFH jobs by 3-digit occupation of 11 developing countries in the STEP database.

The Tunisian Labor Force Survey uses the National Nomenclature of Professions (NNP-14) which corresponds to the International Standard Classification of Occupations (ISCO-08). Therefore, we firstly map the O*NET-SOC to ISCO-08, then the NNP-14 to ISCO-08. We end up using the 4-digit ISCO-08 occupations for all our calculations. In terms of industrial classification, the survey uses the Tunisian classification system, Nomenclature d'Activités Tunisiennes (NAT-09) which is similar to the Statistical Classification of Economic Activities in the European Community (NACE Rev.2).

3 Working from home by occupation and sector

As expected the first two occupation categories[6] have the highest telework potential (between two thirds and almost 90% according to table 1). The potential is very low starting from skilled agricultural workers. When we look by broad industry (table 2) the potential is the highest for utilities (one third) and services (between one third and one half).

Table 1: Share of teleworkable jobs by 1-digit occupational group

	Share of teleworkable jobs	Mean weekly earnings (Tunisian dinar)
1 Managers	0.78	203.23
2 Professionals	0.89	182.16
3 Technicians & Associate Pro.	0.40	135.55
4 Clerical Support Workers	0.55	112.18
5 Services and Sales Workers	0.15	96.84
6 Skilled Agricultural Workers	0.12	66.89
7 Craft and Related Trades Workers	0.02	90.97
8 Machine Operators and Assemblers	0.10	83.00
9 Elementary Occupations	0.03	75.26
Total	0.25	103.63

[6]Using the ISCO 9 categories classification

Table 2: Share of teleworkable jobs by by broad industry

	Share of teleworkable jobs	Mean weekly earnings (Tunisian dinar)
Agriculture	0.08	64.35
Mining and Utilities	0.33	135.83
Manufacturing	0.09	84.12
Construction	0.03	91.54
Market services	0.30	99.46
Non-Market services	0.52	139.75

When we dig deeper at the two digits level, we find that for some major groups such as group 3 (Technicians and Associates Professional) and group 4 (Clerical Support Workers) heterogeneity can be very large (figure 1). This heterogeneity is important to take into account in lockdown policies. Moreover, it is important to analyze the telework possibilities at the sector level (figure 2) as firms are composed of different types of complementary workers. This analysis can also be very useful for digitalization policies which many governments are putting in place in most countries around the globe. These policies should target first the bottlenecks facing occupations and sectors with high telework potential.

The second step of the analysis consists in looking simultaneously at two income protecting dimensions, working remotely or being part of essential industries (figure 3). Interestingly we find that essential industries are mainly composed of low wage occupations such as market-oriented skilled agricultural workers (61), street vendors (95) and agricultural and fishery labourers (92). The only exception is composed of nurses (32) and doctors (22). If we exclude technicians and associate professionals, high income occupations are often highly teleworkable but more concentrated in non essential industries (the employment fraction is for most of them between 25 and 50%). The least protected workers appear in the inferior left quadrant. The corresponding occupations are mainly craftsmen and trade related workers, plant operators and elementary occupations.

To complete the analysis one has to add the public versus private employer dimension. In most countries public workers kept their jobs and salaries and in some countries (such as Tunisia) they kept their whole salaries even if they were not able to work from home. Figures 4 and 5 give a clearer picture of who are protected and who are not and how different occupational groups are protected. The most protected are professionals thanks to the public status of their activity and their teleworking potential. Agricultural workers are protected by the fact that people need to eat, even in pandemic times. The least protected are craftsmen, machine operators and elementary occupations in non essential industries. If we take into account self-employed workers, we find also that more than one fifth of managers are unprotected.

It would be very interesting to know how many among the unprotected were targeted

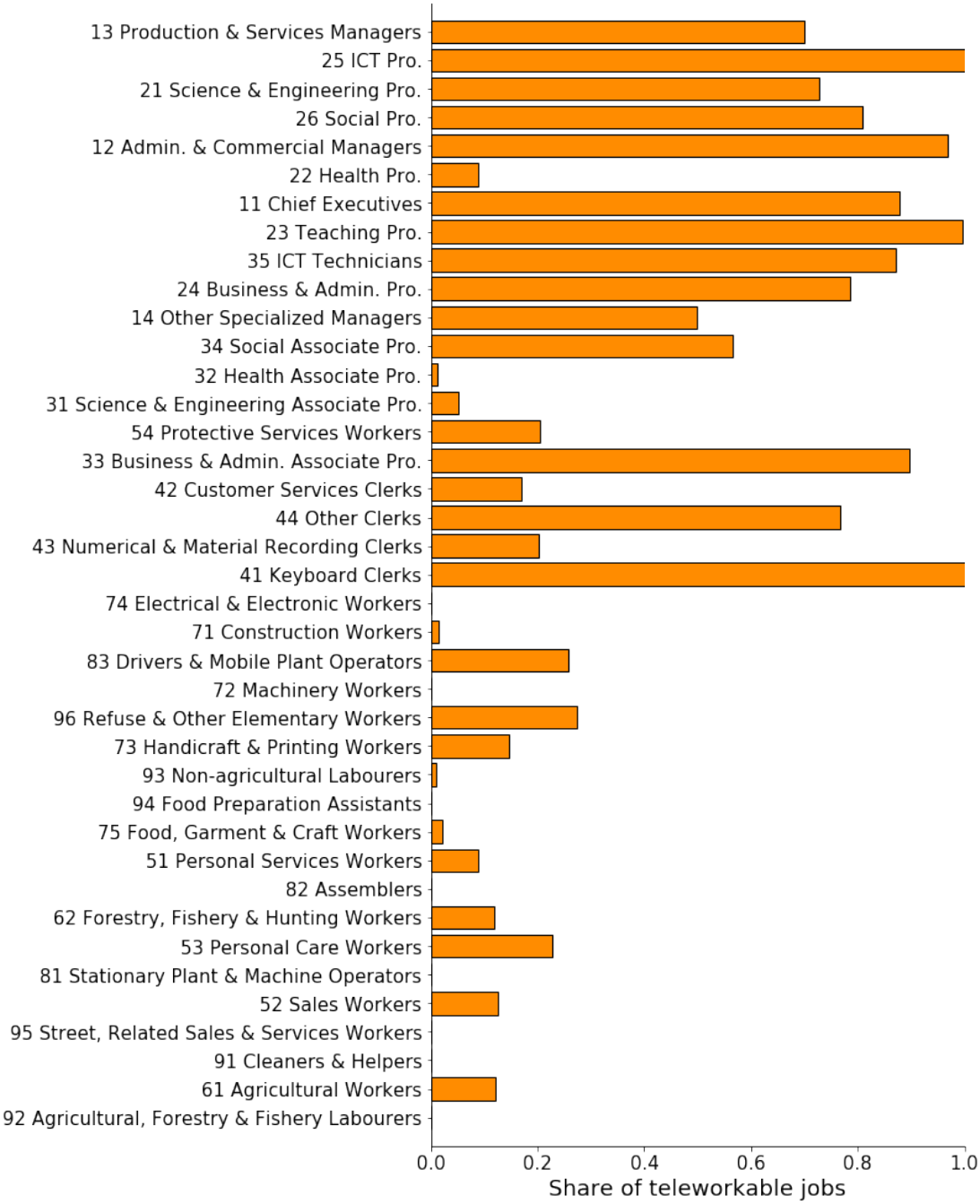

Figure 1: Share of teleworkable jobs by 2-digit occupational group (sorted by mean weekly earnings)

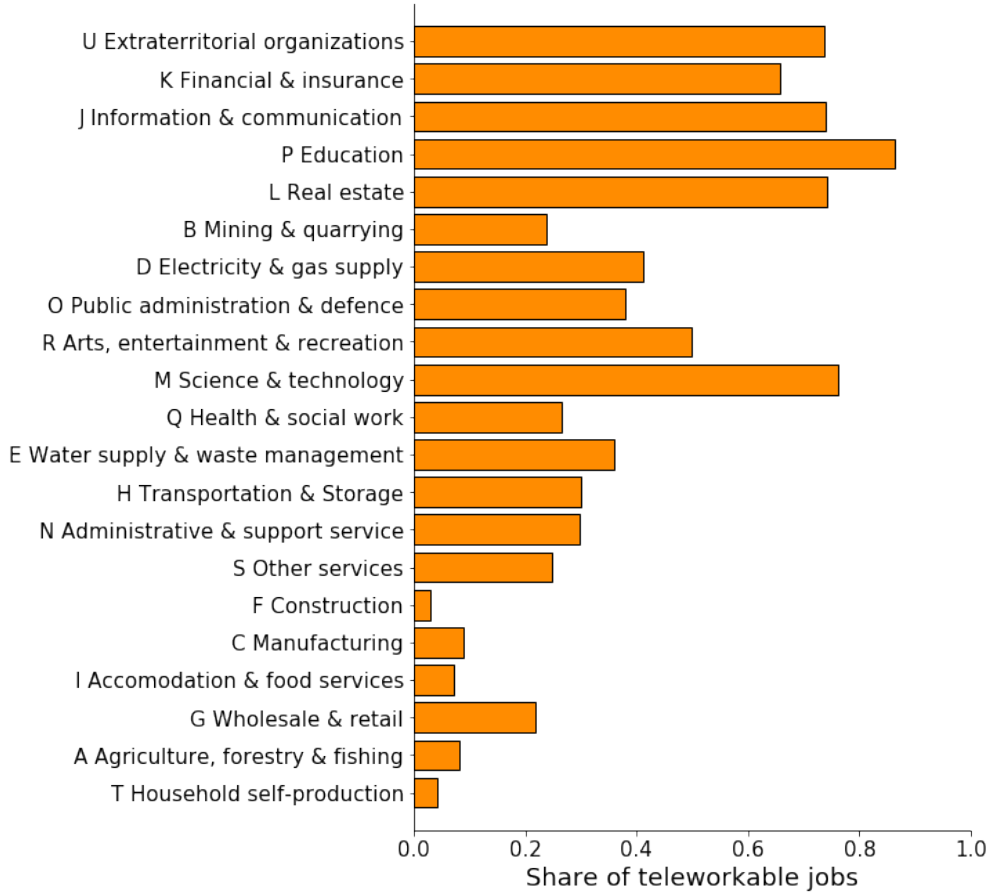

Figure 2: Share of teleworkable jobs by broad industry (sorted by mean weekly earnings)

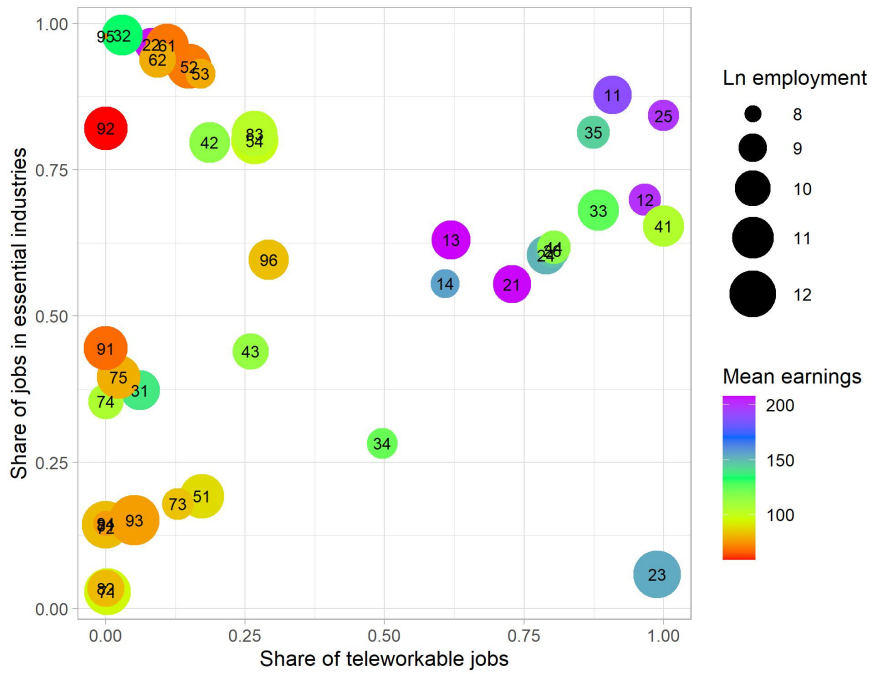

Figure 3: Share of jobs by teleworkability and essential industry

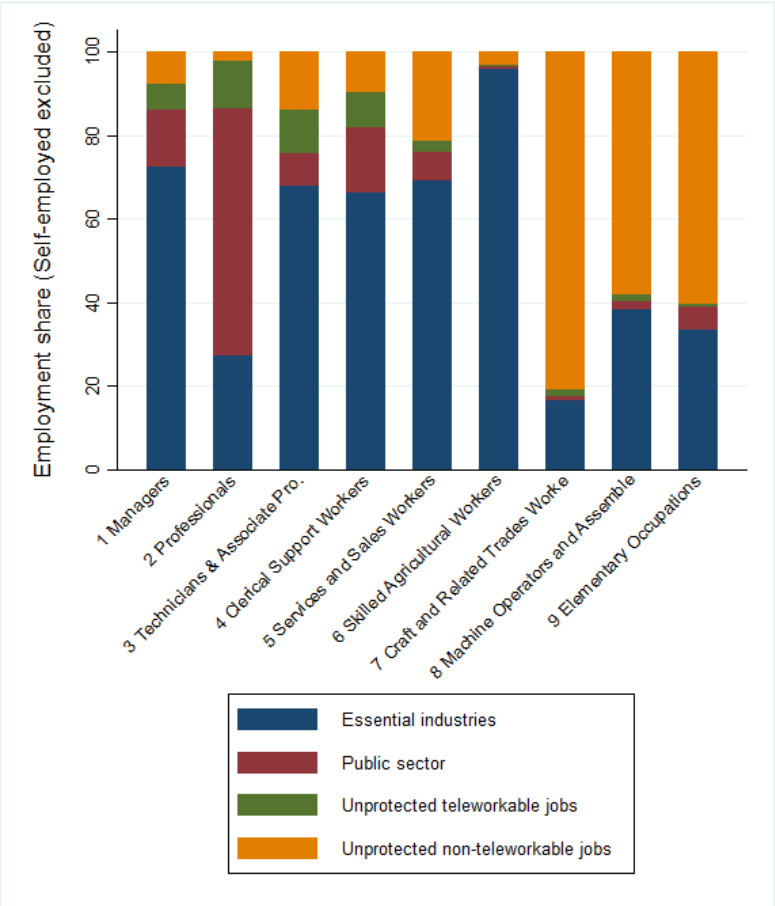

Figure 4: Unprotected workers' share (Self-employed excluded)

by Government transfers. One of the long lasting impacts for those who did not access any form of aid would be to value even more (and queue) for public jobs and/or decide to move definitely to the informal sector given the absence of protection from the State when it was the most needed.

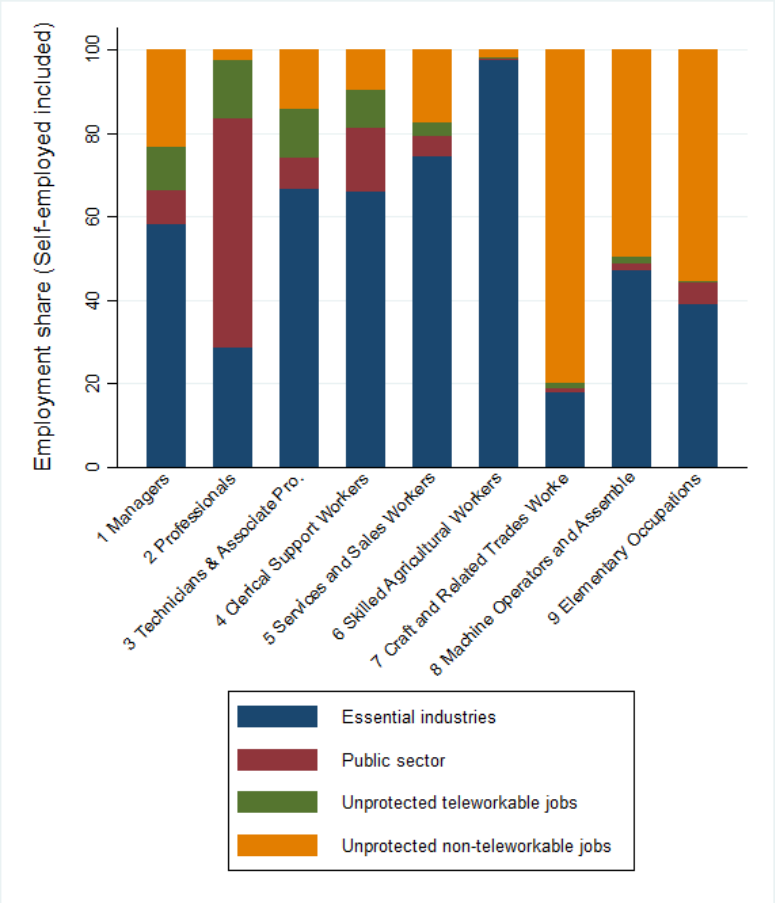

Figure 5: Unprotected workers' share (Self-employed included)

When we look at the map of Tunisia (figure 6) we find interesting results about the regions at risk. While the capital Tunis is relatively protected, some of the richest coastal regions are at risk due to their heavy involvement in manufacturing, tourism and international trade. Except for Tunis this result is different than what Irlacher and Koch (2020) found in Germany where some of the poorest regions were also potentially the most affected by the lockdown. This shows the importance of country specific studies given the difference of spatial distribution of activities between countries.

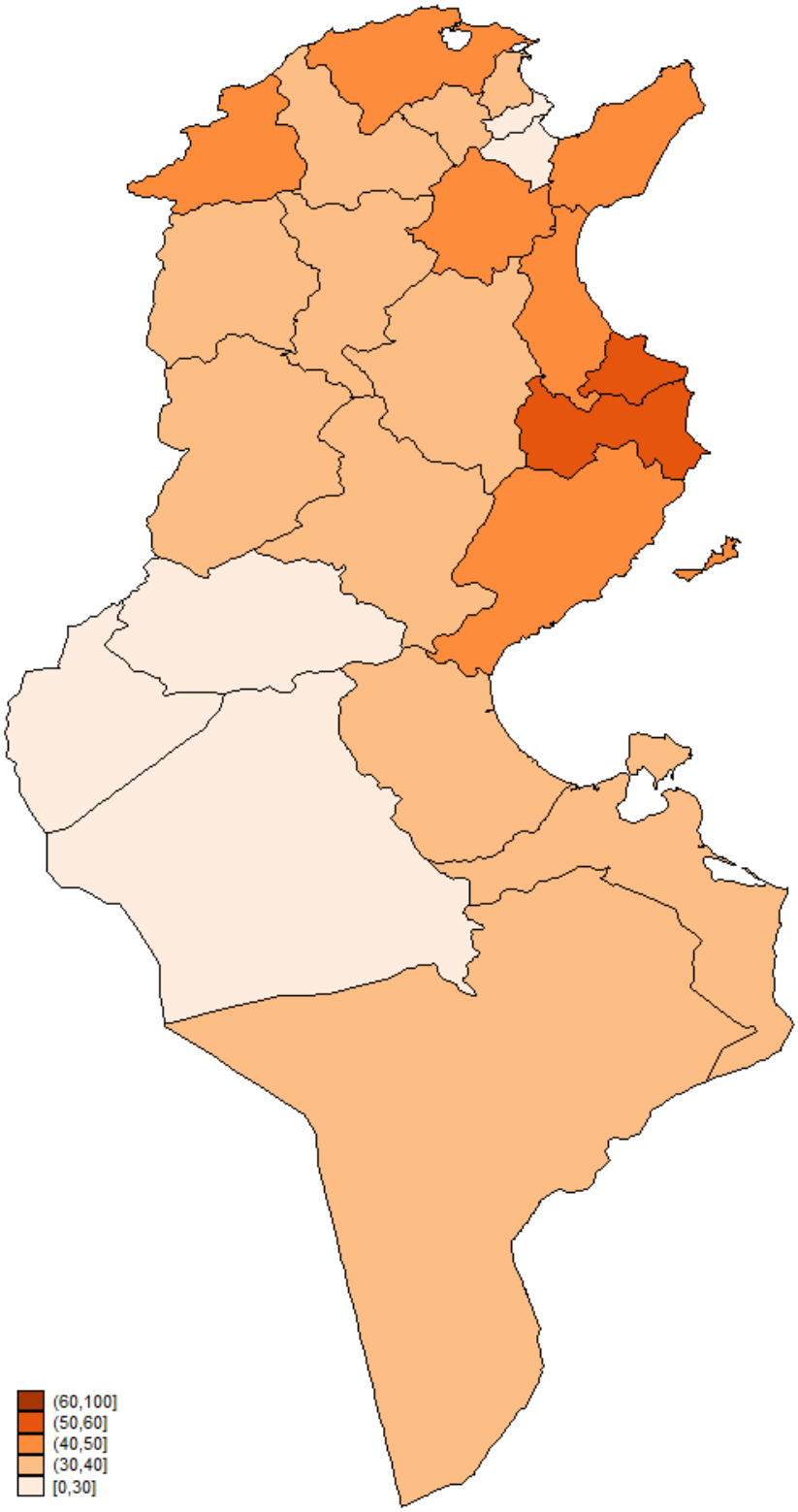

Figure 6: Share of unprotected non-teleworkable jobs by governerate

4 Worker characteristics

We take the analysis one step further by portraying the most vulnerable workers operating in low-teleworkablity jobs. This section contributes to the growing literature on workers' characteristics of low-teleworkability jobs, including the studies of Mongey et al. (2020) and Mongey and Weinberg (2020); Cho and Winters (2020); Montenovo et al. (2020) on the US, Delaporte and Peña (2020) on Latin American countries and Saltiel (2020) on developing countries using the STEP surveys. The labor force survey of Tunisia allows us to document and compare the characteristics of self-employed and wage earners. For this purpose we run a simple OLS regression for each group of workers as follows:

$$y_{ij} = \beta_0 + \beta_1 X_{ij} + \epsilon_{ij} \tag{1}$$

Where y_{ij} is a binary variable which takes the the value 1 if the 4-digit-occupational teleworkability is 0 (non-teleworkable). The set of workers' characteristics includes education, gender, age, marital status, living in urban areas and working in essential industries for both self-employed and wage workers. Further information on sector, contract and income are available only for wage workers. We also control for region and industry fixed effects.

As presented in table 3, self-employed working in low-teleworkability jobs tend to be men, aged below 40, have a lower level of education attainment and live in rural areas. The OLS regressions on the wage worker subset are slightly different. Table 4 shows that wage workers in low-teleworkability jobs are likely to be women, less educated, work in non-essential industries and have lower earnings. Unprotected wage workers in low-teleworkability jobs shared almost the same traits with their counterparts in public sector and/or essential industries. A visualisation of the point estimates is provided in figure 7 and figure 8.

Our results are in line with those of Cho and Winters (2020); Delaporte and Peña (2020); Hatayama et al. (2020); Mongey et al. (2020); Montenovo et al. (2020). Our findings for wage-earners are similar to Adams-Prassl et al. (2020); Bonacini et al. (2020); Redmond and McGuinness (2020); Alstadsæter et al. (2020) in terms of gender of individuals in low work-from-home occupations. However, we might take in consideration differences regarding to age. Mongey and Weinberg (2020) find that age does not differ between low work-from-home occupations and high work-from-home occupations and Saltiel (2020) finds that workers aged above 40 are more vulnerable compared to the youth. This reflects differences in terms of labor market compositions between countries.

When we adjust the standard errors by clustering, the standard errors become much more larger and some point estimates of the coefficients are not statistically significant anymore. Technically, this confirms the strong correlation of errors within occupation, therefore standard-error clustering effectively helps control for this correlation.

Table 3: Worker characteristics of low-teleworkability jobs using - Self-employed

	Low Teleworkability	
	(1)	(2)
Man	0.126***	0.126***
	(0.009)	(0.042)
Age below 40	0.022***	0.022**
	(0.007)	(0.009)
No college degree	0.090***	0.090***
	(0.020)	(0.033)
Living with partner	0.007	0.007
	(0.009)	(0.007)
Urban	-0.050***	-0.050*
	(0.008)	(0.029)
Essential industry	-0.137***	-0.137
	(0.018)	(0.179)
Constant	-0.085**	-0.085
	(0.033)	(0.192)
Region fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Cluster-robust	No	Yes
Observations	18,704	18,704
R-squared	0.451	0.451
Adj. R-squared	0.449	0.449
F-test	814.38	191.84
P-value of F-test	0.000	0.000

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Worker characteristics of low-teleworkability jobs - Wage workers

	Low Teleworkability			
	All wage workers		Unprotected wage workers	
	(1)	(2)	(3)	(4)
Age below 40	-0.018***	-0.018	-0.003	-0.003
	(0.004)	(0.015)	(0.006)	(0.012)
Man	-0.094***	-0.094**	-0.100***	-0.100**
	(0.005)	(0.047)	(0.009)	(0.048)
No college degree	0.152***	0.152***	0.234***	0.234***
	(0.007)	(0.044)	(0.015)	(0.049)
Living with partner	-0.011**	-0.011	-0.007	-0.007
	(0.005)	(0.011)	(0.006)	(0.010)
Urban	-0.006	-0.006	-0.010*	-0.010
	(0.005)	(0.013)	(0.005)	(0.008)
Essential industry	-0.158***	-0.158***		
	(0.007)	(0.055)		
Public	0.059***	0.059		
	(0.010)	(0.052)		
Permanent contract	-0.016***	-0.016	-0.067***	-0.067**
	(0.006)	(0.029)	(0.007)	(0.032)
Earnings quintile				
2nd Quintile	-0.010*	-0.010	0.007	0.007
	(0.006)	(0.018)	(0.006)	(0.012)
3rd Quintile	-0.049***	-0.049**	-0.023***	-0.023
	(0.007)	(0.022)	(0.008)	(0.015)
4th Quintile	-0.091***	-0.091**	-0.032***	-0.032
	(0.007)	(0.041)	(0.009)	(0.022)
5th Quintile	-0.147***	-0.147**	-0.088***	-0.088*
	(0.008)	(0.071)	(0.016)	(0.053)
Constant	0.548***	0.548***	0.666***	0.666***
	(0.016)	(0.193)	(0.031)	(0.146)
Region fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Cluster-robust	No	Yes	No	Yes
Observations	59,994	59,994	27,331	27,331
R-squared	0.448	0.448	0.354	0.354
Adj. R-squared	0.448	0.448	0.353	0.353
F-test	1353.49	111.09	1389.94	112.55
P-value of F-test	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

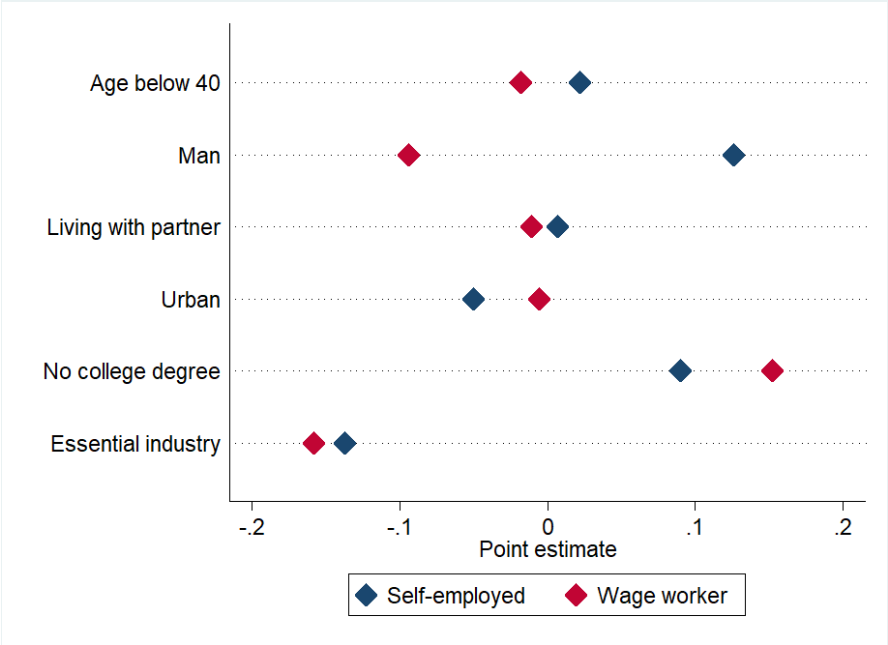

Figure 7: Worker characteristics of low-teleworkability jobs: Self-employed vs. Wage workers

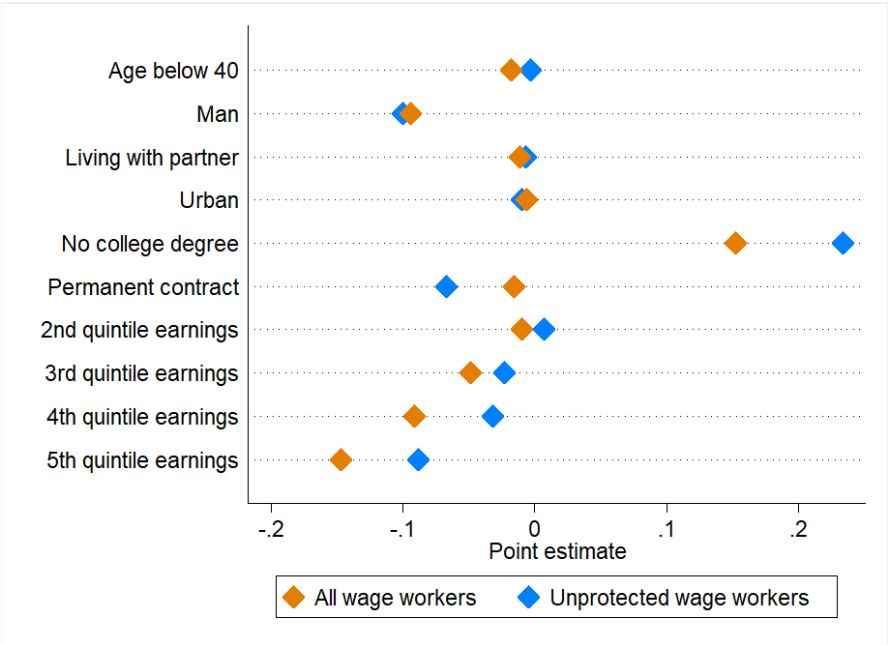

Figure 8: Worker characteristics of low-teleworkability jobs: All vs. Unprotected wage workers

5 Conclusion

The objective of this paper was to perform a first-round assessment of the potential consequences of the lockdown of the Tunisian economy on workers. Three main factors of vulnerability were investigated, the inability to work from home, being part of a non essential industry and working for the private sector. The methodology was first based on the computation of indicators at the occupation, industry and region levels. At a second step we ran simple regressions to deepen our knowledge on the characteristics of individuals unable to work from home.

We find that the most affected are craftsmen, machine operators and elementary occupations in non-agricultural activities. The typically vulnerable worker is a young individual with low education, a man if self-employed and a woman with a temporary contract and lower earnings if wage-earner. When we take into account self-employed workers, the managers' category becomes the most affected among high and medium skill occupations. When we look at regional effects, we unexpectedly find that the coastal regions (except the capital) are the most fragile. This is due to the fact that most of the manufacturing, tourism and international transport activities are located in coastal regions.

Our objective in the near future is to tackle the demand side by looking at the impact of the initial shock on demand mainly through income and local or external network effects. This will allow to capture better the medium-run effects of the shock, including on occupations that were not affected by the first round.

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A Appendix

A.1 Tables

Table A.1.1: Share of teleworkable jobs by 1 digit occupational group WFH and RLI

Mean	WFH	RLI
1 Managers	0.12	0.70
2 Professionals	0.19	0.63
3 Technicians & Associate Pro.	0.17	0.48
4 Clerical Support Workers	0.26	0.51
5 Services and Sales Workers	0.03	0.35
6 Skilled Agricultural Workers	0.00	0.22
7 Craft and Related Trades Workers	0.01	0.31
8 Machine Operators and Assemblers	0.01	0.14
9 Elementary Occupations	0.01	0.09
Total	0.06	0.32

Table A.1.2: Share of teleworkable jobs by broad industry - WFH and RLI

Mean	WFH	RLI
Agriculture	0.01	0.18
Mining and Utilities	0.10	0.34
Manufacturing	0.04	0.20
Construction	0.01	0.21
Market services	0.09	0.42
Non-Market services	0.10	0.42

Table A.1.3: Summary statistics by Low - High Teleworkability

	Share of teleworkable jobs	
	Low	High
No College	0.918	0.513
Male	0.762	0.655
Youth	0.263	0.150
Age below 40	0.552	0.493
Age below 50	0.797	0.799
Living with partner	0.629	0.739
Permanent	0.445	0.672
Formal	0.599	0.743
Public	0.134	0.461
Urban	0.657	0.867
Self-employed	0.149	0.1458
Wage worker	0.753	0.777
Essential Industry	0.509	0.548
Weekly earnings	86.687	148.819
Obs.	87355	30828

Table A.1.4: Summary statistics by Essential - Non-essential industries

	Share of teleworkable jobs	
	Non Essential	Essential
Demographic Characteristics		
Male	0.18	0.28
Female	0.35	0.32
Youth	0.12	0.23
Non-Youth	0.26	0.31
Rural	0.11	0.17
Urban	0.27	0.34
Eduation		
No-schooling	0.04	0.14
Primary	0.05	0.21
Secondary	0.15	0.28
Tertiary	0.77	0.52
Contract		
Fixed-term contract	0.10	0.22
Permanent contract	0.34	0.31
No contract	0.11	0.28
Skills		
High	0.78	0.58
Medium	0.08	0.31
Low	0.01	0.09
Sector		
Private	0.10	0.27
Public	0.74	0.35
Working status		
Employer	0.24	0.37
Self-employed	0.16	0.34
Employee	0.23	0.27
Trainee	0.05	0.18
Family business worker	0.15	0.09
Others	0.35	0.29

Table A.1.5: Worker characteristics of low-teleworkability jobs using RLI and WFH index - Self-employed

	Low RLI		Low WFH	
	(1)	(2)	(3)	(4)
Age below 40	0.005	0.005	0.012	0.012
	(0.006)	(0.006)	(0.007)	(0.008)
No college degree	0.028*	0.028	0.114***	0.114***
	(0.014)	(0.026)	(0.017)	(0.033)
Man	0.065***	0.065	0.233***	0.233***
	(0.008)	(0.058)	(0.009)	(0.076)
Living with partner	-0.006	-0.006	0.010	0.010
	(0.008)	(0.010)	(0.009)	(0.008)
Urban	-0.031***	-0.031	-0.056***	-0.056**
	(0.008)	(0.033)	(0.008)	(0.027)
Essential industry	-0.138***	-0.138	0.066***	0.066
	(0.024)	(0.257)	(0.024)	(0.256)
Constant	1.030***	1.030***	0.528***	0.528*
	(0.032)	(0.247)	(0.037)	(0.291)
Region fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Cluster-robust	No	Yes	No	Yes
Observations	18,699	18,699	18,704	18,704
R-squared	0.638	0.638	0.469	0.469
Adj. R-squared	0.637	0.637	0.468	0.468
F-test	1918.5	457.01	864.24	735.06
P-value of F-test	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.1.6: Worker characteristics of low-teleworkability jobs using RLI - Wage workers

	Low RLI			
	All wage workers		Unprotected wage workers	
	(1)	(2)	(3)	(4)
Age below 40	0.033***	0.033	0.040***	0.040
	(0.004)	(0.024)	(0.007)	(0.029)
Man	-0.034***	-0.034	-0.139***	-0.139*
	(0.005)	(0.055)	(0.010)	(0.074)
No college degree	0.286***	0.286***	0.257***	0.257***
	(0.007)	(0.054)	(0.015)	(0.058)
Living with partner	-0.034***	-0.034**	-0.039***	-0.039*
	(0.005)	(0.017)	(0.007)	(0.021)
Urban	-0.062***	-0.062***	-0.026***	-0.026*
	(0.005)	(0.018)	(0.006)	(0.014)
Essential industry	-0.046***	-0.046		
	(0.008)	(0.072)		
Public	0.151***	0.151***		
	(0.009)	(0.043)		
Permanent contract	-0.007	-0.007	-0.026***	-0.026
	(0.006)	(0.020)	(0.008)	(0.029)
Earnings quintile				
2nd Quintile	0.035***	0.035*	0.057***	0.057***
	(0.006)	(0.020)	(0.007)	(0.022)
3rd Quintile	-0.016**	-0.016	0.020**	0.020
	(0.007)	(0.025)	(0.009)	(0.022)
4th Quintile	-0.160***	-0.160***	-0.161***	-0.161**
	(0.008)	(0.047)	(0.011)	(0.063)
5th Quintile	-0.226***	-0.226***	-0.363***	-0.363***
	(0.009)	(0.079)	(0.020)	(0.082)
Constant	0.603***	0.603***	0.824***	0.824***
	(0.014)	(0.116)	(0.025)	(0.084)
Region fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Cluster-robust	No	Yes	No	Yes
Observations	59,577	59,577	27,028	27,028
R-squared	0.421	0.421	0.386	0.386
Adj. R-squared	0.421	0.421	0.385	0.385
F-test	1294.06	81.73	1311.35	95.62
P-value of F-test	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.1.7: Worker characteristics of low-teleworkability jobs using WFH index - Wage workers

	Low WFH			
	All wage workers		Unprotected wage workers	
	Robust	Cluster	Robust	Cluster
Age below 40	-0.032***	-0.032	-0.015**	-0.015
	(0.004)	(0.020)	(0.007)	(0.015)
Man	0.089***	0.089	0.196***	0.196*
	(0.005)	(0.072)	(0.011)	(0.104)
No college degree	0.183***	0.183***	0.197***	0.197***
	(0.006)	(0.055)	(0.015)	(0.057)
Living with partner	-0.008*	-0.008	-0.037***	-0.037**
	(0.005)	(0.013)	(0.007)	(0.016)
Urban	-0.015***	-0.015	-0.008	-0.008
	(0.004)	(0.012)	(0.006)	(0.010)
Essential industry	0.037***	0.037		
	(0.008)	(0.093)		
Public	-0.069***	-0.069		
	(0.009)	(0.051)		
Permanent contract	-0.050***	-0.050***	-0.052***	-0.052***
	(0.006)	(0.012)	(0.008)	(0.014)
Earnings quintile				
2nd Quintile	-0.019***	-0.019	0.005	0.005
	(0.006)	(0.022)	(0.008)	(0.021)
3rd Quintile	0.024***	0.024	0.052***	0.052*
	(0.007)	(0.025)	(0.009)	(0.028)
4th Quintile	-0.031***	-0.031	0.033***	0.033
	(0.007)	(0.048)	(0.010)	(0.028)
5th Quintile	-0.141***	-0.141*	-0.090***	-0.090*
	(0.007)	(0.079)	(0.015)	(0.048)
Constant	0.681***	0.681***	0.466***	0.466***
	(0.014)	(0.102)	(0.032)	(0.145)
Observations	59,997	59,997	27,331	27,331
R-squared	0.504	0.504	0.518	0.518
Adj. R-squared	0.504	0.504	0.517	0.517
F-test	3117.85	279.2	3296.83	357.23
P-value of F-test	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

A.2 Figures

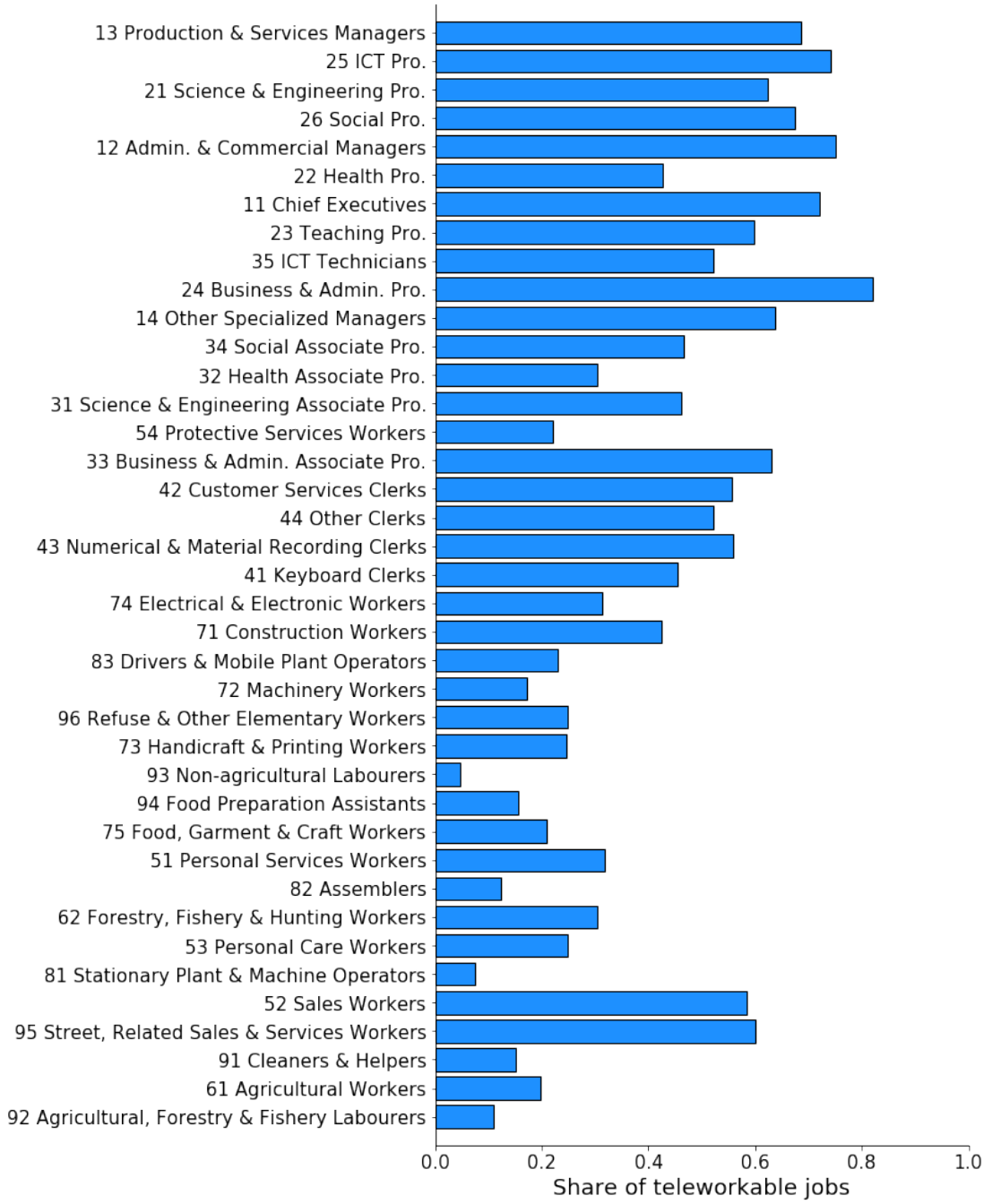

Figure A.2.1: Share of teleworkable jobs by 2-digit occupational group - RLI

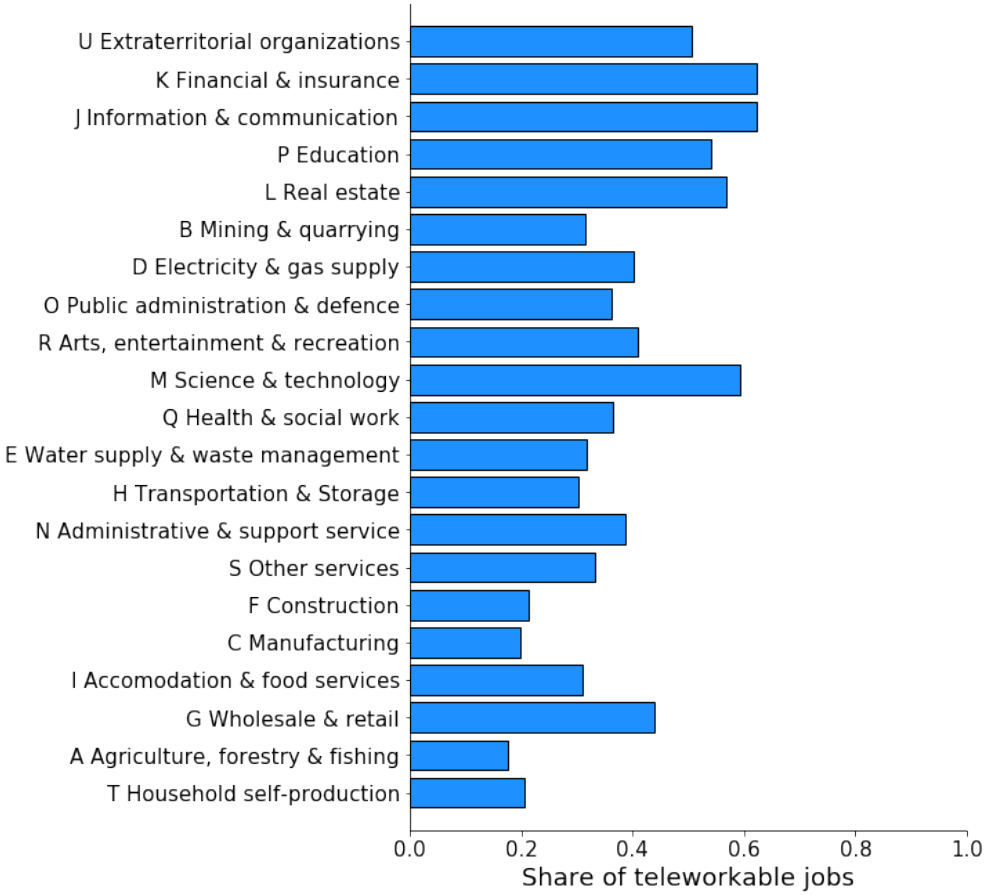

Figure A.2.2: Share of teleworkable jobs by broad industry - RLI

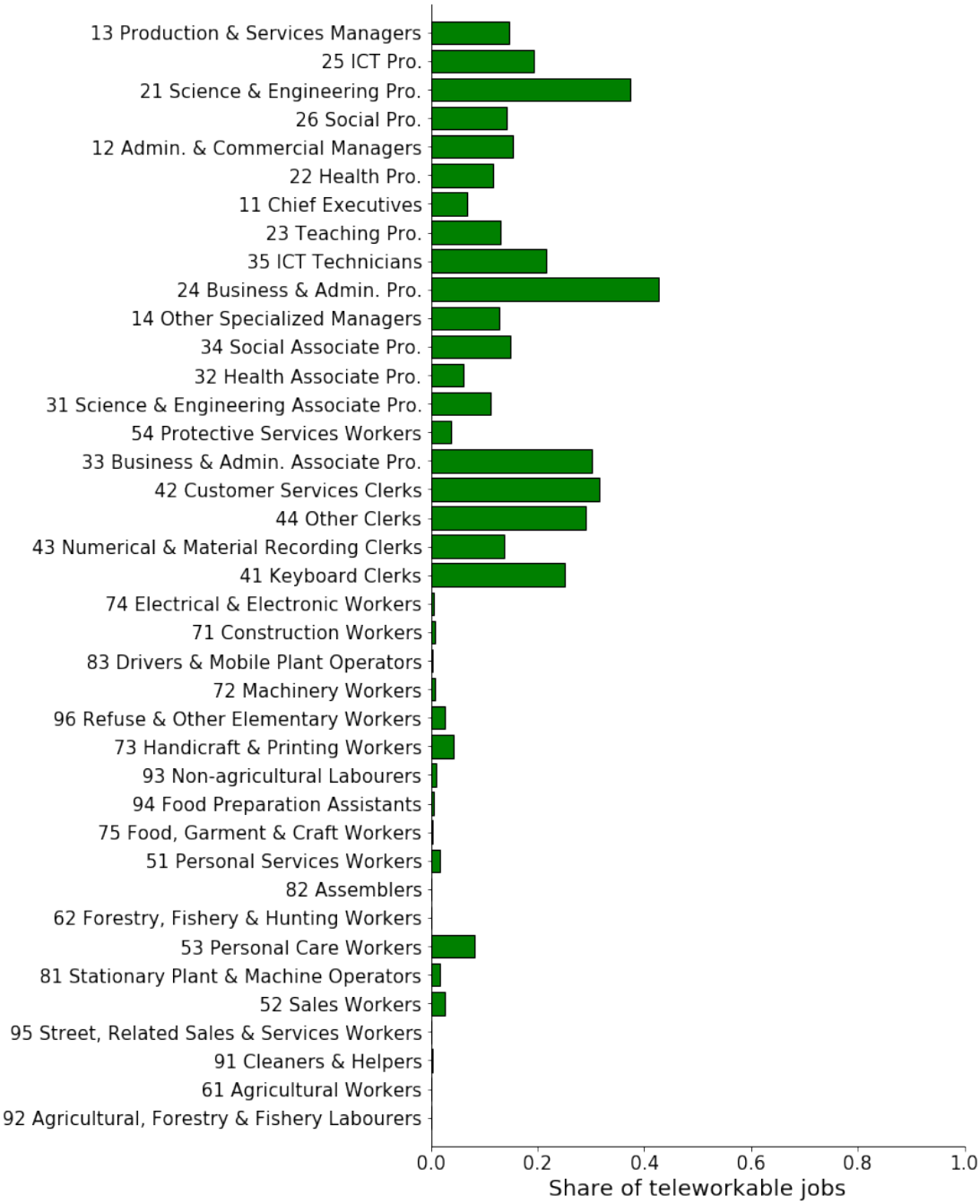

Figure A.2.3: Share of teleworkable jobs by 2-digit occupational group - WFH

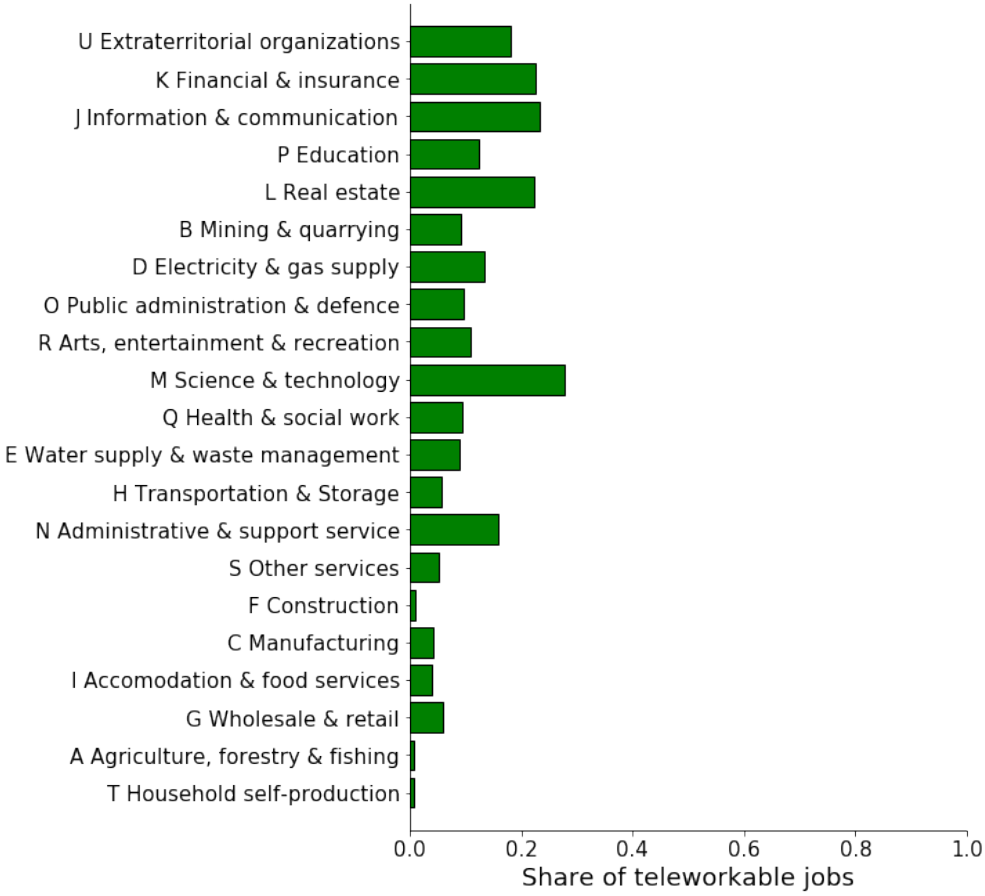

Figure A.2.4: Share of teleworkable jobs by broad industry - WFH

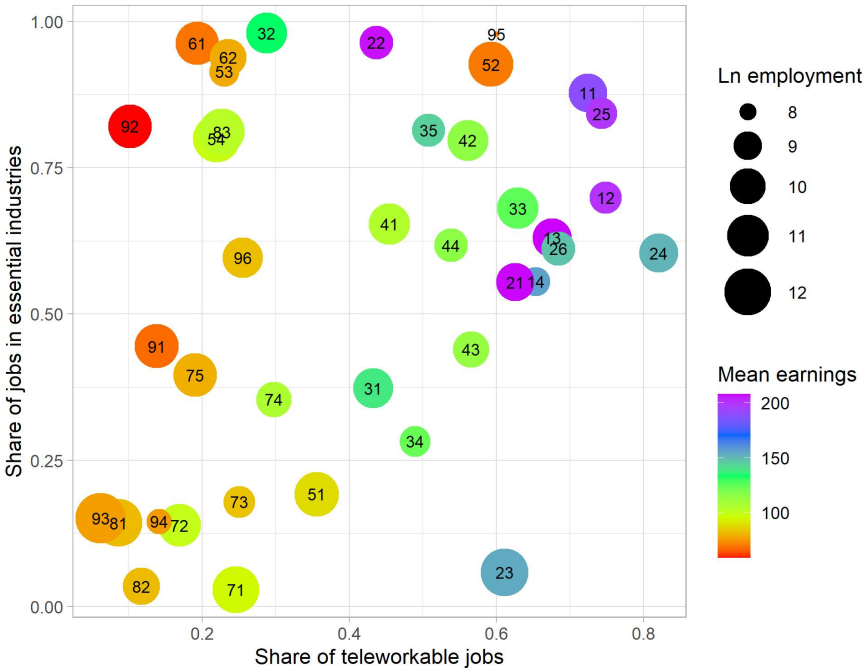

Figure A.2.5: Share of jobs by teleworkability and essential industry - RLI

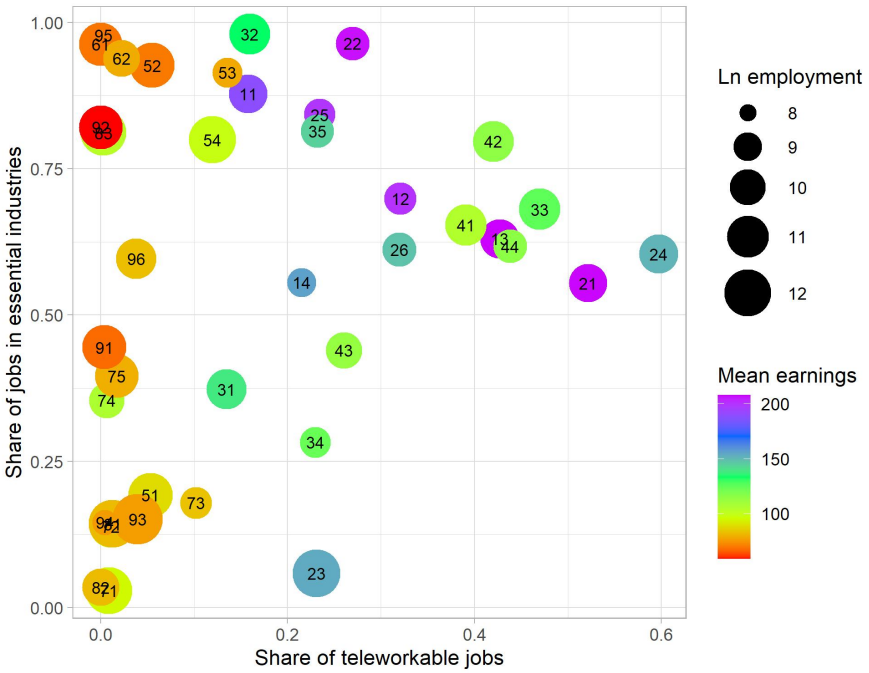

Figure A.2.6: Share of jobs by teleworkability and essential industry - WFH

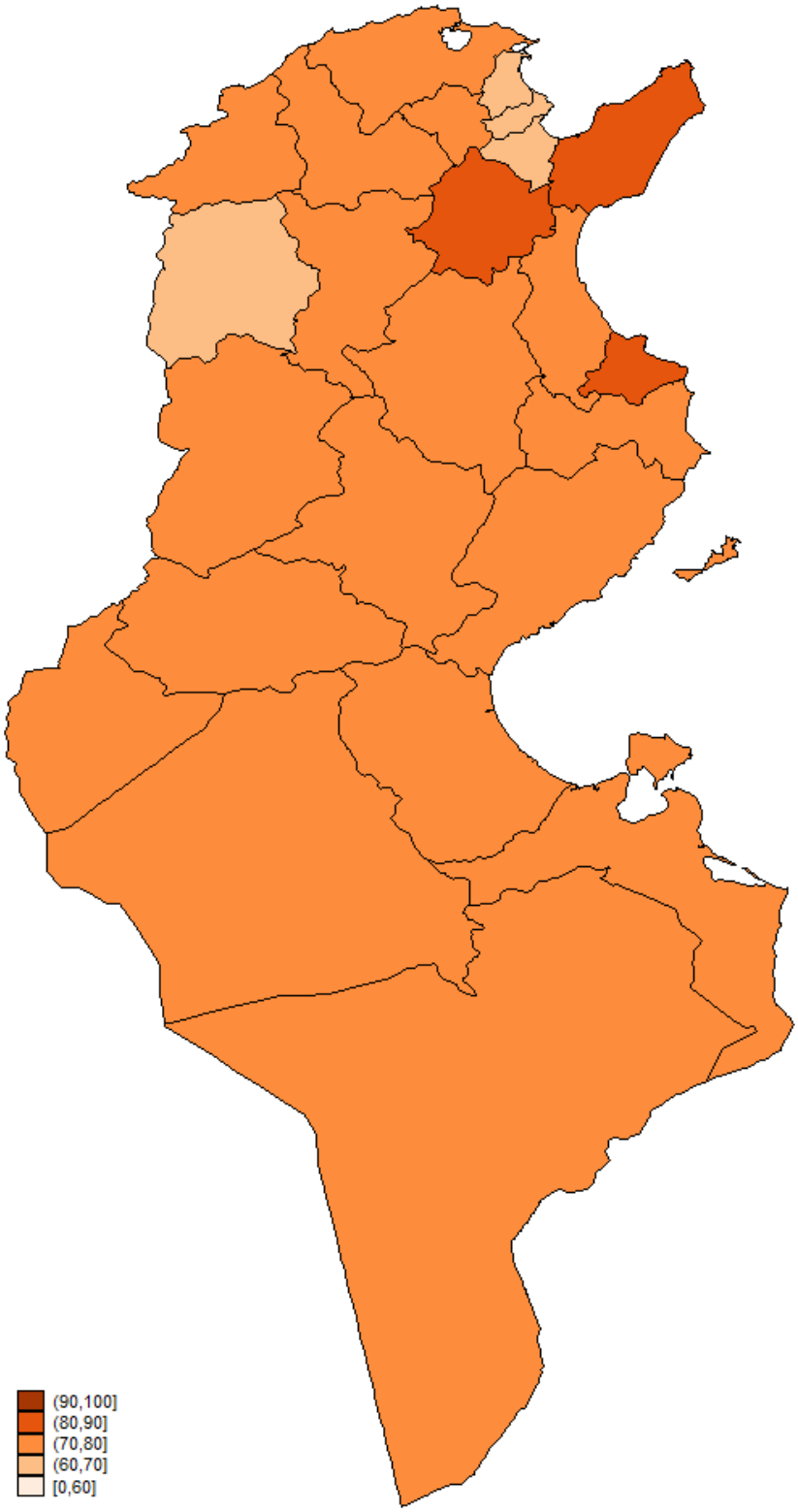

Figure A.2.7: Employment share of non-teleworkable jobs by governerate