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Adaptability towards Work from Home Arrangements: Evidence from Pakistan

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Study Objectives

- Present estimates of the share of the non-agricultural workforce that can potentially work from home in Pakistan, using ICT tools, due to COVID-19 induced mobility restrictions
- Conduct multivariate analysis of relevant individual/ household socio-economic and demographic characteristics associated with the usage of ICT tools and devices, which can increase the possibility of working from home

Data and Methodology

- Study uses data from the Pakistan Social and Living Standards Measurement Survey 2018-19 round
 - The survey includes an ICT indicators module, which gathers information on household use of and access of ICT devices, including computers/ laptops, tablets, mobile/ smart phones and the internet
- To measure the possibility of working from home
 - We take as proxy all those employed individuals aged 15 years and above who have used computers/ laptops and other such devices, over the last 3 months
 - In addition, we also take into account the employed individuals who were usually working from their homes even prior to the COVID pandemic, i.e., the home based workers

Working from home potential, by sector (%)

	Able to use Computer (A)	Home based Work (B)	Work from Home (A+B)
Mining & Quarrying	3.2	0	3.2
Manufacturing	6.7	19.4	26.1
Electricity, gas, steam & air conditioning	25.4	0	25.4
Water supply sewerage waste management	8.3	0.7	9
Construction	2.5	1.6	4.1
Whole Sale & Retail trade	6.3	1.3	7.6
Transportation storage	3.9	0.2	4.1
Accommodation food services activities	5.1	0.7	5.8
Information and communication	43.4	1.5	44.9
Financial and insurance activities	53.2	0	53.2
Real estate activities	19.4	2.3	21.7
Professional, scientific & technical activities	41.9	1.1	43
Administrative and support services activities	23.2	0.9	24.1
Public administration and defence	20.4	0.4	20.8
Education	24.7	1.4	26.1
Human health social work	25.7	2.4	28.1
Arts entertainment and recreation	8.6	0.8	9.4
Other service activities	4.8	7.7	12.5
Household activities as employers	1.1	12.8	13.9
Total	9.2	5.3	14.5

Multivariate Analysis

The following logistic regression model is estimated to identify the socio-demographic characteristics influencing the ability to work from home using ICT tools:

$$WFH = \alpha_0 + \alpha_1 X_i + \mu_i$$

where

dependent variable WFH_i is a binary variable taking the value 1 if the employed individual can work remotely from home, proxied by the ability to use computers and 0 otherwise.

X_i represents a vector of worker level characteristics, which includes age group, gender, educational attainment, occupation as well as household level factors such family type, region of residence and household consumption expenditures

Summary Statistics

	Work from home		Cannot work from home		T-test
Variable	Mean	Std. Dev.	Mean	Std. Dev.	
Individual characteristics					
Age 15- 29	0.42	0.49	0.38	0.48	-4.516***
Age 30- 45	0.41	0.49	0.39	0.49	-1.496
Age 46- 60	0.15	0.36	0.2	0.4	5.401***
Age 61 Above	0.02	0.13	0.03	0.18	4.550***
Male	0.85	0.36	0.87	0.34	3.111**
Female	0.15	0.36	0.13	0.34	-3.111**
Unmarried	0.35	0.48	0.25	0.43	-10.807***
Married	0.63	0.48	0.72	0.45	9.030***
Widow/divorce/separated	0.02	0.13	0.03	0.17	3.809***
Household Characteristics					
Household Consumption	73749.74	75708.21	38539.59	29219.00	46.216***
Family	0.45	0.5	0.52	0.5	6.627***
Urban	0.75	0.43	0.45	0.5	-28.331***
Rural	0.25	0.43	0.55	0.5	28.331***
Educational level					
No Formal Education	0.08	0.27	0.36	0.48	28.503***
Below primary	0.01	0.09	0.05	0.22	10.054***
Primary but below matric	0.1	0.3	0.3	0.46	21.127***
Matric but below intermediate	0.29	0.45	0.22	0.42	-7.855***

Summary Statistics

	Work from home		Cannot work from home		T-test
Degree	0.41	0.49	0.07	0.25	-58.334***
Professional degree	0.11	0.32	0.01	0.08	-40.989***
Occupational Groups					
Legislators	0.11	0.32	0.02	0.13	-29.334***
Professionals	0.33	0.47	0.07	0.26	-42.089***
Technicians	0.12	0.32	0.04	0.18	-18.918***
Clerks	0.11	0.31	0.02	0.14	-24.680***
Service Workers	0.15	0.36	0.24	0.43	10.416***
Craft Workers	0.1	0.3	0.23	0.42	15.054***
Plant Workers	0.04	0.2	0.12	0.32	11.628***
Elementary	0.05	0.21	0.26	0.44	24.250***
Employment Status					
Employer Less 10 employee	0.02	0.14	0.01	0.1	-4.163***
Employer above 10 employee	0.02	0.13	0	0.06	-10.708***
Self employed	0.13	0.34	0.21	0.41	9.387***
Paid Employee	0.83	0.37	0.78	0.42	-6.364***
No. of observations	2,470		24,405		

Results of logistic regression model

	Coefficients	Std. Err.	z-statistics	Marginal Effects
Age 15- 29	1.129	0.201	5.61***	0.045
Age 30- 45	0.782	0.195	4.02***	0.029
Age 46- 60	0.284	0.200	1.42	0.010
Male	0.534	0.081	6.56***	0.015
Married	-0.359	0.072	-5.00***	-0.013
Widow/divorced/separated	-0.315	0.200	-1.58	-0.009
Log Household Consumption	1.105	0.056	19.83***	0.037
Urban	0.709	0.056	12.62***	0.024
Nuclear	0.182	0.055	3.31***	0.006
Below primary	-0.639	0.252	-2.54***	-0.017
Primary but below matric	0.120	0.102	1.18	0.004
Matric but below intermediate	0.976	0.090	10.90***	0.043
Degree	1.810	0.098	18.52***	0.126
Professional degree	2.407	0.143	16.78***	0.244
Legislators	2.016	0.144	14.01***	0.171
Professionals	1.662	0.122	13.64***	0.109
Technicians	1.599	0.131	12.22***	0.110

Results of logistic regression model

	Coefficients	Std. Err.	z-statistics	Marginal Effects
Clerks	2.006	0.134	14.98***	0.169
Service workers	0.592	0.118	5.02***	0.023
Craft workers	0.632	0.120	5.26***	0.025
Plant workers	0.427	0.143	2.99**	0.017
Employer Less 10 employee	0.176	0.200	0.88	0.006
Employer above 10 employee	0.183	0.240	0.76	0.007
Paid Employee	0.104	0.076	1.36	0.003
Constant	-17.518	0.661	-26.52***	
Pseudo R2	0.3277			
Log likelihood	-5545.3376			
Number of observation	26,875			

Main Findings

- Probability of working remotely from home is higher for the youth and the middle aged employed.
- Individuals living in urban areas and in smaller nuclear family structures have a higher likelihood of working from home.
- Education is also a strong predictor of the ability to work from home remotely using ICT devices, with employed individuals with higher education having higher probability of working from home.
- Workers engaged in white collar occupations are more likely to work from home in comparison to their counterparts involved in the lower skilled level occupations

List of Variables used in model

Variables	Description
Dependent Variable	
Work from home (WFH)	Employed 15 year of age and above who used desktop, laptop, tablet or other devices during last 3 months, 0 otherwise
Independent Variables	
Individual characteristics	
Age (15- 29)	Employed in age group of 15-29 years
Age (30- 45)	Employed in age group of 30-45 years
Age (46- 60)	Employed in age group of 46-60 years (age 60 year and above, reference category)
Male	Male employed =1, 0 otherwise (female, reference category)
Married	Employed married =1, 0 otherwise
Widow/divorce/separated	Employed widow, divorce (unmarried reference category)
Household Characteristics	
Household Consumption	Household monthly consumption in Rupees
Family	Nuclear family (head spouse and unmarried children in the house) type=1, 0 otherwise (joint family, reference category)
Urban	Urban areas = 1, 0 otherwise (rural, reference category)
Educational level	
Below primary	Below primary include (classes 1 to 4), play group, nursery, prep, =1, 0 otherwise
Primary but below matric	Primary (pass class 5 and enroll in classes up to 9 th class) but below matric =1, 0 otherwise

List of Variables used in model

Educational level	
Matric but below inter	Matric but below intermediate include (Class 10 /O-Level, Polytechnic diploma/Diploma, F.A/F.Sc/I.Com/ICS/A-Level =1, 0 otherwise
Degree	B.A/B.Sc./B.Com/etc (2 year program), .Ed/M.Ed, B.A/B.SC/BS/BE),etc (4 year program), M.A/M.S.C ,etc (2 year program), MS=1, 0 otherwise
Professional degree	Prof degree include (Medicine(MBBS/BDS/Pharm-D etc), Degree in Agriculture, Law, Engineering & Accountancy, M. Phil/ PhD =1, 0 otherwise (No formal education, reference category)
Occupational Groups	
Legislators	Legislators & senior managers =1, 0 otherwise
Professionals	Professionals=1, 0 otherwise
Clerks	Clerk =1, 0 otherwise
Service worker	Service worker =1, 0 otherwise
Craft Workers	Craft Workers=1, 0 otherwise
Plant Workers	Plant Workers=1, 0 otherwise, (Technicians, reference category)
Technicians	Technicians occupations=1, 0 otherwise, (Elementary, reference category)
Employment Status	
Employer Less 10 employee	Employer employing less than 10 employee =1, 0 otherwise
Employer above 10 employee	Employer employing greater than 10 employee=1, 0 otherwise
Paid Employee	Paid employees = 1, 0 otherwise (self employed, reference category)