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LIVES VERSUS LIVELIHOODS: WHO CAN WORK FROM HOME IN MENA?

SHIREEN ALAZZAWI

SUSTAINABLE DEVELOPMENT GOALS AND EXTERNAL SHOCKS IN THE MENA REGION:

FROM RESILIENCE TO CHANGE IN THE WAKE OF COVID-19

Contact Us

erf@erf.org.eg



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Lives versus Livelihoods: Who can work from home in MENA?

Shireen AlAzzawi

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Abstract

Since it began in March 2020, the COVID-19 pandemic has devastated the world economy. The impact on MENA countries and their citizens can be framed by the trade-off between lives and livelihoods: the attempt to save lives by imposing social distancing and strict lockdowns has had a severe impact on the ability of workers to maintain their livelihoods as businesses have downsized or shut down in the face of declining demand. MENA countries have also suffered from the simultaneous oil price shock, which has had both direct effects on oil-exporting countries and indirect impacts on oil-importing and fragile countries, through the effect on migrant workers. In this study, we investigate the potential impact of the COVID-19 pandemic, by examining the extent to which jobs can be successfully performed remotely. We develop a teleworkability index using micro data on occupational characteristics. We find that relatively few jobs in MENA countries are compatible with teleworking. While this share varies considerably by industry, gender, age and the nature of employment (formal vs informal), the digital divide (a lack of reliable access to vital tools for teleworking, such as a personal computer and reliable internet access) make teleworking unlikely in practice even for those whose jobs could potentially be performed remotely. Our results confirm that the workers who were most vulnerable before the pandemic will be the hardest hit.

1. Introduction

The COVID-19 pandemic has devastated the world economy since its outbreak in early March 2020. It has damaged both health systems and economies, with over 106 million confirmed cases and over 2.3 million deaths at the time of writing.¹ Middle East and North Africa (MENA) countries at varying stages of development and integration into the world economy, some of which were already in a situation of fragility and struggling with current or past conflicts, have been no exception. MENA economies have also suffered a simultaneous oil price shock, which has direct implications for oil-exporting countries, as well as indirect impacts on oil-importing and fragile countries through the effect on migrant workers and workers' remittances.

The impact of the COVID-19 pandemic on MENA countries and their citizens can be framed as a trade-off between lives versus livelihoods: the attempt to save lives by imposing social distancing and strict lockdowns has had a severe impact on the ability of workers to maintain their livelihoods as businesses have downsized or shut down in the face of declining demand. The pandemic's impact has therefore manifest as a shock to both aggregate supply and aggregate demand. In this study, we investigate the potential impact of the COVID-19 pandemic, examining the extent to which jobs can be successfully performed remotely.

Across the globe, the pandemic has ushered in a new era in which working from home is common. A practice that was once frowned upon by many employers has become the way millions of non-essential workers have met their occupational obligations during the lockdowns imposed around the world since March 2020. In the United States, for example, surveys in May, when the strictest lockdown measures were in place in many states, found that almost twice as many workers were working from home on a full-time basis (42 percent compared to 26 percent who were working from their business premises, while the remaining 33 percent had become unemployed). Moreover, these workers accounted for over two-thirds of US GDP (Bloom, 2020). This compares to just 7 percent of workers with access to a "flexible workplace" benefit or telework before the pandemic (Desilver, 2020). These numbers mask an extremely high level of inequality in terms of the ability to work from home, even within advanced economies like the United States, due to the distribution of occupations by socio-economic group, race, gender, industry and geographic location, as well as other constraints that make working from home challenging in practice.

¹ www.worldometers.info/coronavirus/ (accessed 6 February 2021).

The lockdowns imposed by governments in an attempt to slow the spread of the COVID-19, which have now become recurring events in many countries due to the ebb and flow of infections, mean that only those who are able to work remotely have been able to maintain their livelihoods.² However, as discussed above for the United States, not every type of job lends itself to remote work. To investigate who can work from home in MENA countries, we develop an index of teleworkability based on international micro data on the occupational characteristics of workers and use it to examine the degree of heterogeneity in access to jobs compatible with teleworking. We also examine the extent to which people with such jobs have access to vital tools for remote work, such as a personal computer and reliable internet access. Furthermore, we develop a second teleworkability index using the limited information on job characteristics available in some MENA region surveys and apply it to a number of countries in the region, to ensure that our measure of teleworkability is compatible with the distinct nature of MENA region jobs.

Our results confirm that relatively few jobs in MENA countries are compatible with teleworking. The share of jobs that can potentially be performed remotely is particularly low for workers who are young (15–29 years of age), employed in the informal sector, male, rural, employed in microenterprises, work in agriculture or manufacturing, do not have university education and come from lower wealth quintiles. Moreover, we find that even for workers with potentially teleworkable jobs, very few actually have access to the tools necessary for remote work such as a personal computer and reliable internet access. The digital divide therefore makes teleworking unlikely in practice, even for those whose jobs could potentially be performed remotely. Our results confirm that the workers who were most vulnerable before the pandemic will be the hardest hit.

2. Existing estimates of labour market impacts

In response to the Covid-19 crisis, most governments implemented restrictions on gatherings, ranging from strict lockdowns, such as in Jordan, Lebanon, Qatar and the UAE (at least for some of the time since the onset of the pandemic depending on the severity of infection rates and

² For data on country lockdown measures, see the University of Oxford Coronavirus Government Response Tracker: www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker#data.

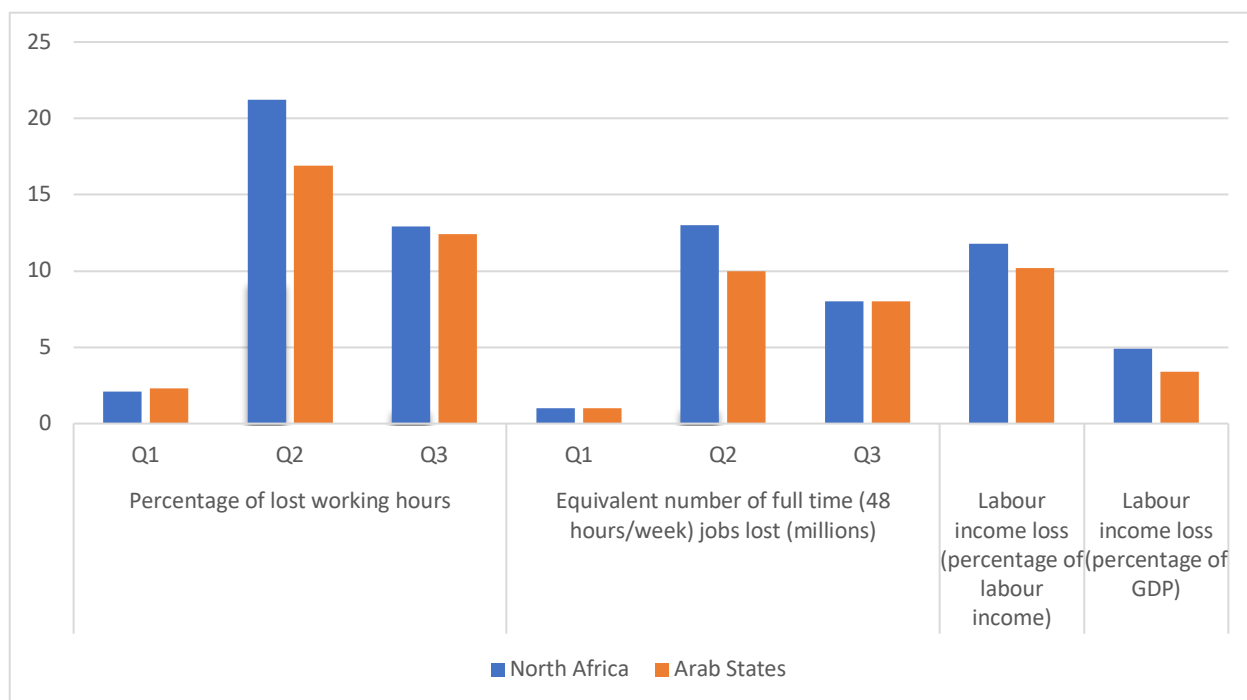
hospital capacity) to partial curfews during some night hours, such as in Egypt and Libya (UNDP 2020). These lockdowns and curfews have had severe impact on businesses and their workers. The International Labour Organization (ILO) estimates that a substantial number of working hours were lost over the first three quarters of 2020 (Figure 2.1). Relative to the last quarter of 2019, the organization estimates that MENA states lost 2.3 percent of working hours in the first quarter, 16.9 percent (revised upward from 13.2 percent in their June estimate) in the second quarter and 12.4 percent in the third quarter.³ This is equivalent to 1, 10 and 8 million full-time jobs lost in each quarter. North Africa lost 2.1 percent of working hours in the first quarter, 21 percent in the second quarter (again revised upward from 15.5 percent and with the sharpest decline in Africa) and 13 percent in the third quarter. ILO also estimates that MENA states could lose between 6 percent and 16 percent of their working hours in the fourth quarter, depending on whether an optimistic or a pessimistic scenario materializes, equivalent to between 4 and 10 million full-time jobs, respectively.^{4,5} These losses translate into a substantial loss of labour income in the region: 10 percent in MENA states (3.4 percent of GDP) and almost 12 percent North Africa (5 percent of GDP). Without adequate income support schemes, these substantial reductions in incomes will exacerbate future economic prospects as workers are pushed into poverty, reducing aggregate demand. This will create a vicious cycle, where lower demand further reduces incomes and hence the prospect of a swift recovery.

Figure 2.1. Working hours, full-time equivalent jobs and lost labour income in the first three quarters of 2020 in MENA countries.

³ The ILO monitor does not provide individual country estimates (ILO, 2020b).

⁴ The ILO optimistic scenario assumes that working hours will recover at a faster rate than GDP growth, while the pessimistic scenario assumes a further wave of strict workplace closures.

⁵ Detailed numbers for North Africa were not available from ILO. The organization estimates that Africa as a whole could lose between 5 percent and 15 percent of working hours in the fourth quarter, depending on whether an optimistic or a pessimistic scenario materializes.



Source: Author’s calculations based on ILO (2020b).

Studies⁶ since the onset of the pandemic have shown that specific groups of workers, are affected much more severely by both lockdowns and the decline in aggregate demand. Workers without access to reliable technology and hence with limited opportunities for teleworking, workers whose jobs cannot be performed from home due to the nature of their occupation and workers in informal employment whose income may have been wiped out completely due to the lockdowns will suffer most. The impact will also be far stronger in countries where limited public-sector employment is available and fiscal constraints prevent substantial response measures as part of government support. These findings highlight the need for detailed country studies on the impact of COVID-19 on the labour market, disaggregated by industry, employment sector (formal/informal), gender and age (youth/non-youth) to provide an accurate picture of the impact of the crisis on these most vulnerable groups.⁷

⁶ See for example Delaporte and Peña (2020), Dingel and Nieman (2020), Hatayama et.al. (2020), Saltiel (2020), among others as well as ILO (2020b) and references therein.

⁷ The main reason for the upward revision of estimates by ILO of working hour losses for the second quarter of 2020 in the most recent report published in September was the realization that workers in developing and emerging economies, especially those in informal employment, will be even more severely affected, due to fewer opportunities for teleworking and the greater impact of the crisis on informal workers (ILO, 2020b).

A number of international agencies, such as the World Bank⁸ and UNDP⁹, and national statistical offices have already released preliminary results of rapid surveys and assessments that examine the impact of the COVID-19 pandemic on their labour markets, as well as on other indicators of well-being. For example, the World Bank's rapid survey in Yemen (World Bank 2020a) conducted between March and April 2020) found that 18 percent of households could not reach their jobs due to COVID imposed mobility restrictions and 31 percent of households were either not receiving salaries or receiving less than before the outbreak. Moreover, the share of households citing low wages and loss of employment as the most difficult challenges facing them increased from 45 to 49 percent compared to pre-pandemic. The assessment for Iraq (World Bank 2020b) focused on poverty and found that implementing a full curfew would have severe impact on poverty due to changes in labor income raising the poverty headcount for the country as a whole by 10 percentage points, and raising the poverty gap by 3 percentage points. In Djibouti, the results of the rapid phone survey also confirmed a strong impact of the pandemic on the labor market with almost one fifth of breadwinners losing their jobs after the start of the pandemic. This impact was more pronounced for households from the lowest income quintile. Of those who lost their jobs, 68 percent identified coronavirus related reasons as the cause of their current economic inactivity. Moreover, among those who maintained their pre-pandemic employment status, 42 percent were working less, or not at all, with a simultaneous reduction in income: 45 percent of those working less than usual received no income at all, while 36 percent received only a partial wage (World Bank 2020c).

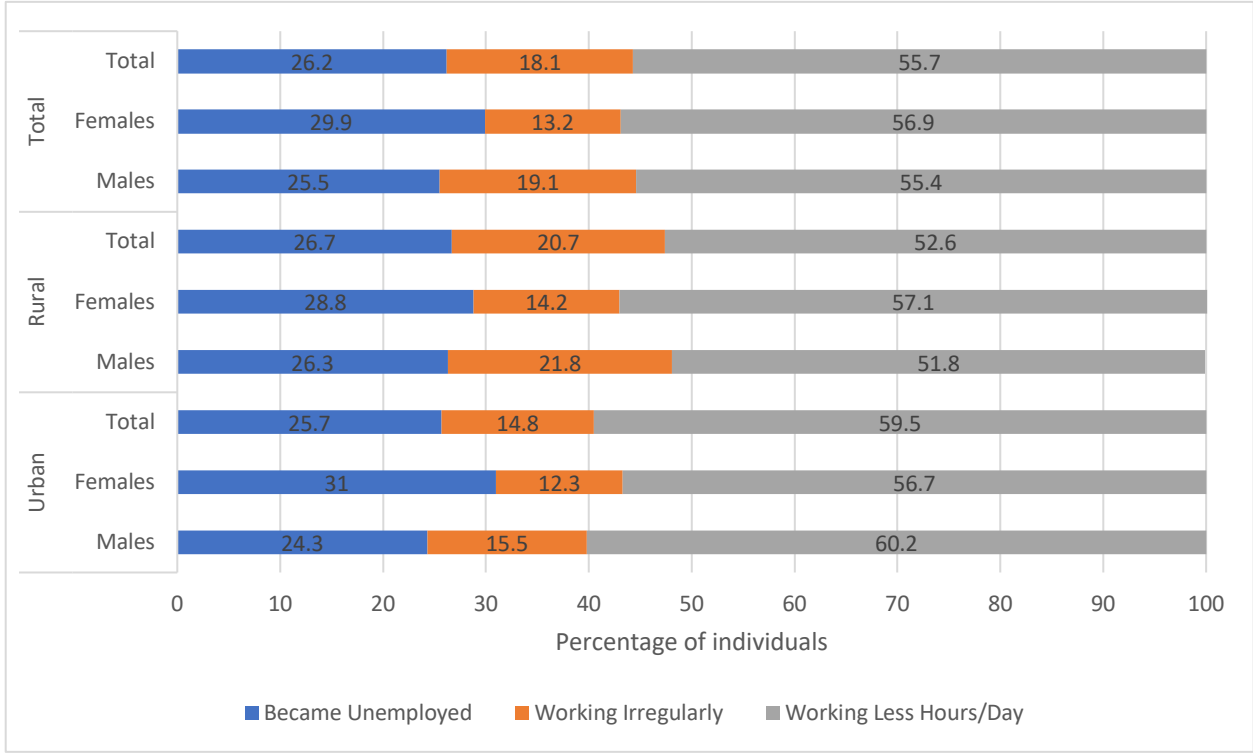
In Egypt, the Central Agency for Public Mobilization and Statistics (CAPMAS) released results of a special module of its household, income, expenditure and consumption survey conducted at the start of the pandemic (Government of Egypt, CAPMAS, 2020a). Recent results from this survey point to a very severe impact on households and workers up to the month of May, when the severest set of mobility restrictions were in place. Almost 62 percent of workers reported a change in their employment status: 55.7 percent reported working fewer days or

⁸ The World Bank just released its [COVID-19 High-Frequency Monitoring Dashboard](#) on December 22, containing preliminary results of rapid phone surveys to assess the impact of Covid-19 on households. At the time of this writing only results for Djibouti, Iraq and Yemen were available.

⁹ UNDP report "Compounding Crises: Will COVID-19 and Lower Oil Prices Lead to a New Development Paradigm in the Arab Region?" (UNDP 2020) provides detailed summaries and references to several rapid assessments conducted to examine the impact of Covid-19 on key sectors and groups including health, poverty, labor markets, migrant workers, small and medium enterprises, women, among others.

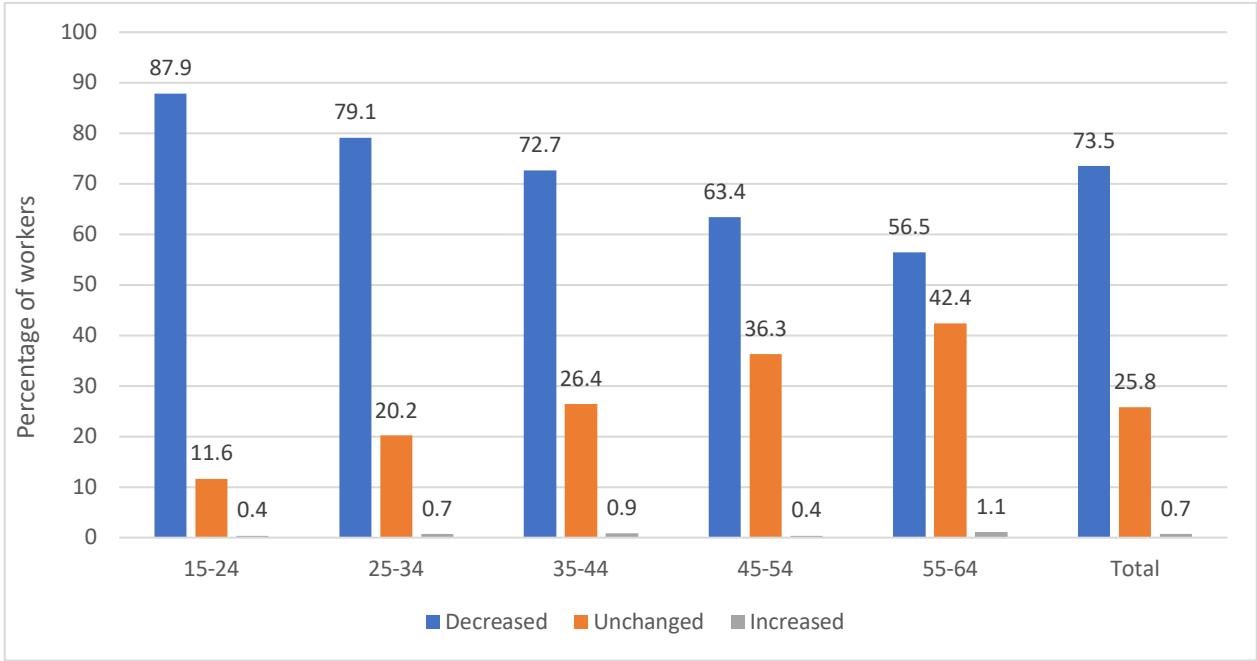
hours, 26 percent had become unemployed and 18 percent were now working irregularly, receiving their income on a daily basis, with significant fluctuation (Figure 2.2). There are also some minor differences by region and gender. Overall, 73 percent of individuals reported a decrease in their income since the onset of the pandemic, with 60 percent saying this was directly attributed to curfew restrictions, 35 percent due to becoming unemployed and 31.5 percent due to a decline in demand for their services. These impacts were also most severe among the youngest age groups (Figure 2.3).

Figure 2.2. Relative distribution of affected individuals in Egypt by change in employment status, gender and region of residence (percentage).



Source: Government of Egypt, CAPMAS (2020a).

Figure 2.3. Percentage of workers experiencing changes in income in Egypt, by age group.



Source: Government of Egypt, CAPMAS (2020a).

3. Methodology and Data

The ability to work remotely varies considerably by occupation due to the nature of the job or industry. Many professions – particular customer-facing service providers (e.g., doctors, nurses, grocery store employees, hairdressers) – cannot work from home. Even within these categories, there are many distinctions: while an emergency room doctor cannot work from home, a dermatologist or endocrinologist may be able to meet patients virtually, provided adequate teleworking technology is available. We perform a detailed analysis of the prevalence of jobs compatible with remote work by country, gender, industry, age group and formality, based on the distribution of occupations, finding varying degrees of compatibility within each of these groups.

A major limitation on the ability to work remotely is having access to the necessary tools, such as a computer and a reliable internet connection. In some parts of the MENA world, having reliable electricity is still a challenge, as is having a strong enough internet connection and multiple devices to allow several family members to hold video meetings and attend classes

online simultaneously. Female workers are likely to be at a considerable disadvantage, given the multiple burdens of domestic work and childcare (still primarily performed by women in the region), in addition to their occupation. Balancing all three has already proven to be extremely difficult, even for women in developed countries, with many dropping out of the labour force in the absence of external childcare services.¹⁰ This means that our analysis must also consider the degree to which workers with jobs compatible with teleworking actually have the tools required to perform them from home.

Another important consideration is the degree of proximity to others required to carry out work: while many jobs may have limited potential for working from home, some do not necessarily require close physical contact with other individuals and hence will be low-risk in terms of transmission. For example, a farmer cannot work from home but many farming activities require very little physical proximity, which depends on the crop in question, the degree of automation and the season (e.g. ploughing or harvest). It is therefore important to distinguish physical proximity from compatibility with working from home, since jobs that do not require physical proximity to others can easily return to work without increasing the risk of transmission and hence will mitigate the overall impact on the economy and health services.

Finally, the formality status of the worker is another crucial consideration. Informal workers are particularly vulnerable to aggregate demand shocks, given that their jobs lack the stability of contracts, social security and insurance to help them mitigate the impact of crises, and paid sick leave if they become infected. Many are also employed in jobs with a greater risk of health impacts due to close proximity to others and lack of proper health and hygiene standards.

¹⁰ For example, the monthly jobs report from the US Bureau of Labor Statistics in September reported that women have been leaving the labour force at four times the rate of men, primarily due to the increased burdens of parenting with children home from school, the lack of child care services for very young children and increased household chores of cooking and cleaning due to families being home all day (Hsu, 2020).

As a first step in this analysis, we developed an index of the compatibility of various types of occupations with working from home. We call this the teleworkability index (TWI). Existing surveys, such as those from the US Department of Labour O*NET programme or the World Bank STEP Skills Measurement Program,¹¹ provide information on the daily activities of workers in various occupations, which offers insights into the jobs that can successfully be performed from home and those that cannot. We follow the methodology of Dingel and Nieman (2020),¹² Saltiel (2020) and Hatayama, Viollaz and Winkler (2020) in using skills surveys to determine the TWI of a job. Dingel and Nieman (2020) and Saltiel (2020) develop binary variables that eliminate the potential for remote work if a job satisfies any of several criteria that they deem to require a physical presence. In contrast, Hatayama et. al. (2020) develop a continuous variable that reflects the varying degree of potential for remote work by occupation, depending on how many of the criteria are met. The more criteria a particular job satisfies, the less likely it can be performed from home, and vice versa. This allows a more flexible approach, which better captures variability within sectors and within occupations.¹³ Most existing studies rely on the classification of Dingel and Nieman (2020), which is based on the O*NET occupational classification.

As noted by Delaporte and Pena (2020), the task content of occupations may vary significantly from one country to another. Depending on the potential to substitute labour, capital or technology in a given occupation, a job that can be performed from home in a wealthy advanced economy, such as the United States or Germany) may need to be performed face-to-face in a developing one. Saltiel (2020) addresses this limitation and estimates the share of jobs that are compatible with work from home in 10 developing economies using the information on workers' tasks in the STEP survey. While this is a better approach, the distinct nature of MENA labour markets may also limit the accuracy of this classification. We address this by developing a

¹¹ See, for example, the O*NET database Content Model (<https://www.dol.gov/agencies/eta/onet>) or World Bank Group (2018).

¹² Dingel and Nieman classify the work from home potential for all occupations using the responses to two surveys from the database administered by O*NET, sponsored by the US Department of Labor. The O*NET database contains detailed information on daily activities of workers for almost 1,000 occupations. See Dingel and Nieman (2020) for details.

¹³ We rely on the Dingel and Nieman (2020) classification in this study, given its wide use and comparability across countries. As discussed in section 6, the questions in the surveys we have access to that could be used to construct a region-specific TWI are limited in their capacity to gauge workers' daily tasks in various occupations, meaning it is not feasible to follow the method of Hatayama, Viollaz and Winkler (2020).

specific TWI for the region, using data from the Egypt Labour Market Panel Survey as a further robustness check.

Dingel and Nieman (2020) constructed an index of teleworkability based on responses to 15 questions from two O*NET surveys. As mentioned above, the O*NET surveys are sponsored by the US Department of Labour and provide information on the daily activities of workers by occupation, with occupations defined according to the standard occupational classification system (SOC). Dingel and Nieman (2020) used questions from the questionnaires on “Work Context” and “Generalized Work Activities”. The former includes questions that seek to capture the “physical and social factors that influence the nature of work” such as the use of email, interpersonal relationships, exposure to hazardous work conditions and structural job characteristics. The latter includes questions that capture the “general types of job behaviors occurring on multiple jobs”, such as interaction with others, handling machines and equipment, and performing physical activities.¹⁴ If any of the chosen statements are true, they marked the six-digit SOC occupation code as one that cannot be performed from home.

We use international concordance tables to cross-reference the Dingel and Nieman teleworkability index using the six-digit SOC occupational classification and the equivalent two-digit 2008 International Standard Classification of Occupations (ISCO) code used in the labour market panel surveys for Egypt, Tunisia, Palestine and Jordan. The data for Algeria was only available with the three-digit 1988 ISCO classification and a separate process was used to obtain the correct correspondence. One of the complications that arises in this type of cross-referencing is that each six-digit SOC code maps to more than one ISCO occupation. To overcome this problem and avoid placing more weight on SOC codes that map to multiple ISCO codes, we

¹⁴ The complete set of statements from the “Work Context” questionnaire are (1) the average respondent states they use email less than once per month; (2) the majority of respondents say they work outdoors every day; (3) the average respondent says they deal with violent people at least once a week; (4) the average respondent says they spend the majority of time wearing common or specialized protective or safety equipment; (5) the average respondent says they spent the majority of time walking or running; (6) the average respondent says they are exposed to minor burns, cuts, bites, or stings at least once a week; and (7) the average respondent says they are exposed to diseases or infection at least once a week. The complete set of statements from the “Generalized Work Activities” are (1) performing general physical activities is very important; (2) handling and moving objects is very important; (3) controlling machines and processes [not computers or vehicles] is very important; (4) operating vehicles, mechanized devices, or equipment is very important; (5) performing for or working directly with the public is very important; (6) repairing and maintaining mechanical equipment is very important; (7) repairing and maintaining electronic equipment is very important; (8) inspecting equipment structures or materials is very important. If any of these statements are true the occupation is coded as one that cannot be performed from home.

follow Dingel and Nieman’s approach in allocating the US employment weight for the SOC codes across the ISCO codes in proportion to the employment share for the ISCO in question in the respective MENA country.¹⁵ Applying the employment shares for each country gives the teleworkability index (TWI) for that country for each ISCO occupation. These are then merged with the micro data for each survey to obtain a measure of teleworkability at the individual level based on the individual’s two- or three-digit ISCO occupation code. We can then calculate the TWI index for the country as a whole by gender, industry, age group and formality based on the distribution of the ISCO occupations within each of these groups. For example, an industry with many managers and professionals, who typically have jobs that are highly compatible with teleworking will end up with a high TWI. In all our calculations, we also use survey weightings to ensure the results are representative at the national level.

The final step of the analysis will investigate the distinction between teleworkability and the ability to work from home in practice. Teleworkability does not automatically translate into actually being able to work remotely, given the digital divide prevalent in most countries in the region. A lack of a reliable internet connection or access to a personal computer or other device that can be used to work from home can prevent even the most eligible jobs from being successfully performed at home. Many household and labour market surveys in the region ask questions in this area (e.g. “Do you have access to the internet at home?”, “Does your family have an internet connection?”, “Does your family own a wireless internet router?”, “Does your family own a desktop computer/notebook/laptop/tablet?”). This information is then used to develop a secondary index of TWI feasibility to capture how feasible teleworkability is in practice.

We use micro surveys for a group of five MENA countries based on data availability at the 2-digit ISCO classification of occupations, or higher. Data from the Algeria labour force survey in 2014 is used as representative of the group of oil-exporting countries. For the group of oil-importing middle-income countries, we have access to the labour market panel surveys for Egypt (2018), Jordan (2016) and Tunisia (2014). The datasets are nationally representative and

¹⁵ Dingel and Nieman (2020) provide the following example to explain this process: “if a particular SOC has 100 US employees and is associated with two ISCOs that have respective totals of 3000 and 1000 employees in a country, we allocate 75 of the SOC’s US employees to the larger ISCO and 25 to the smaller one. Those values of 75 and 25 are then used as that SOC’s weight when calculating the average across all SOC’s within each ISCO for that country”.

provide a rich source of information on labour markets in each of these countries. For the group of fragile and conflict-affected countries, we used data from the Palestine labour force survey for 2019, which provides detailed individual-level data, including occupational classification.¹⁶

4. Results

4.1 Teleworkability in selected MENA countries

The share of jobs that are amenable to telework (the average TWI for each country weighted by occupational employment shares in that country), is presented in Figure 4.1. The index varies widely across countries, depending on the prevalence of different types of occupations in each economy. In Tunisia, only 17 percent of jobs are amenable to telework, while in Jordan 29 percent of jobs are teleworkable. For comparison, Dingel and Nieman (2020) found that 37 percent of jobs in the USA are teleworkable using the same teleworkability classification.¹⁷

Some groups of workers will be concentrated in the occupations that are more conducive to telework. The table next reports the TWI for women and men by country, as well as the share of overall employment in each country¹⁸. Men make up the majority of the working population in all countries and therefore their TWI drives the overall country TWI. The TWI for women in Algeria, Jordan and Palestine are three times higher than for men, reflecting the fact that working women in these countries are concentrated in fewer occupations that are more compatible with remote working, such as teaching and administrative work. In Egypt and Tunisia, however, the TWI for women is much lower and much closer to the TWI for men. Women in these two

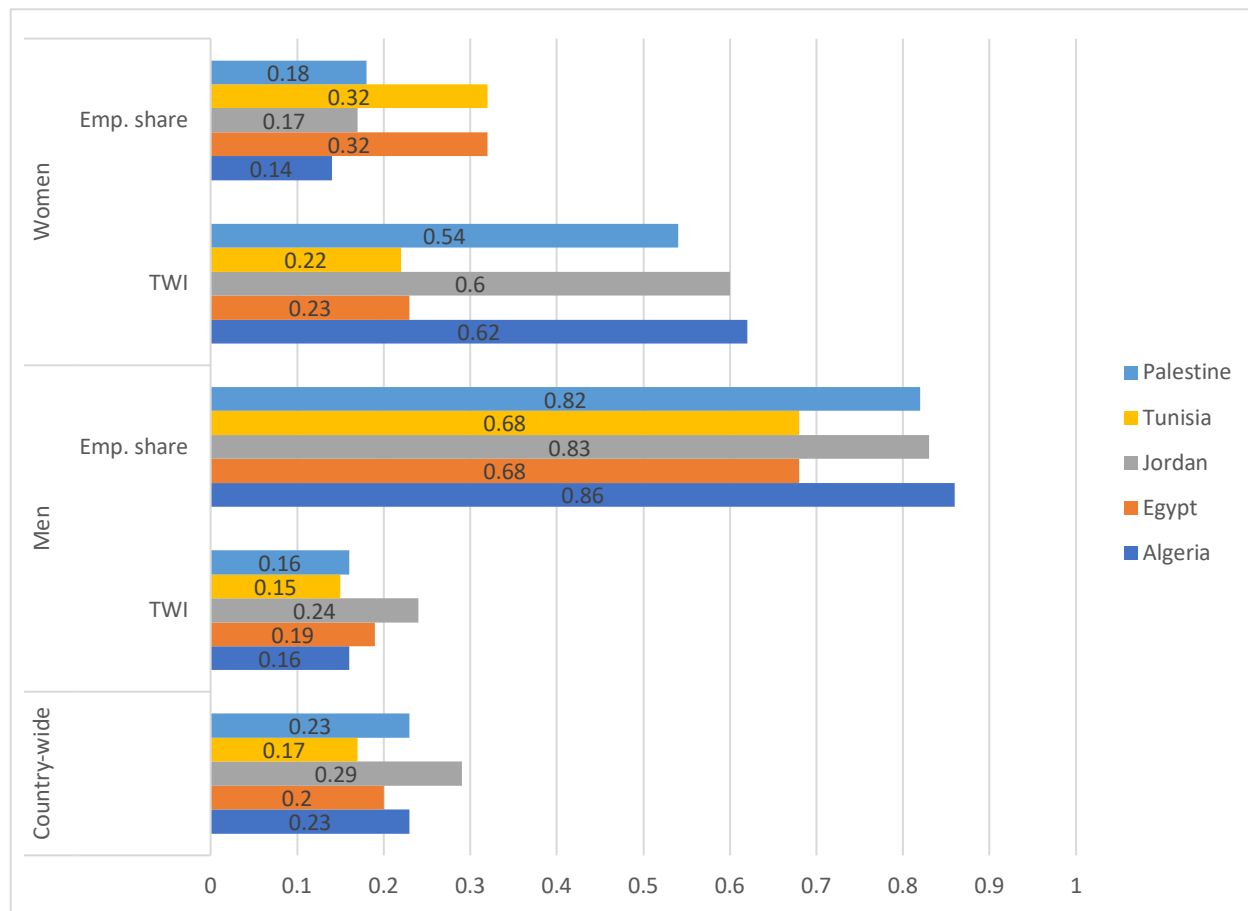
¹⁶ We also attempted to use data from a recent high frequency survey in Somalia. However, occupational classification in the survey is only available at the one-digit level which does not provide enough detail to perform the analysis.

¹⁷ The Labor Market Panel Surveys for Egypt, Jordan and Tunisia include a question on current place of work. This can give insight into jobs that are already performed at home, even though they might not be ‘teleworkable’ per se, such as a home-based catering business or craft business. The response to this question includes many categories such as “own home”, “shop/restaurant”, “workshop/factory”, etc. We calculated the share of workers in each survey who responded that their current place of work was “own home”. That share was 2.9 percent for Egypt, 1.6 percent for Jordan and 1.5 percent for Tunisia. For those whose place of work is home, the share of teleworkable jobs according to the TWI is 15 percent in Egypt, 12 percent in Jordan and 10 percent in Tunisia. Women are more likely to have responded that their place of work is home in Egypt and Tunisia (in Egypt 5.8 percent for females versus 1.4 percent for males, in Jordan 1.3 percent for females versus 1.7 percent for males, in Tunisia 3.9 percent for females versus 0.6 percent for males). While this distinction between work from home and telework is important to consider, those who were actually working from home in those surveys represent a very small share of workers in all three countries (under 3%) and therefore do not significantly alter our results. Thanks to an anonymous referee for raising the issue of current work place location and how it relates to the TWI.

¹⁸ Employment shares are reported in all tables to give perspective on how large a particular group of workers is compared to overall employment.

countries are concentrated in low teleworkability occupations like farming as detailed in section 4.3.

Figure 4.1. Teleworkability by country and gender.



Source: Author’s calculations based on labour market surveys and the methodology described in the text.

4.2 Teleworkability by industry

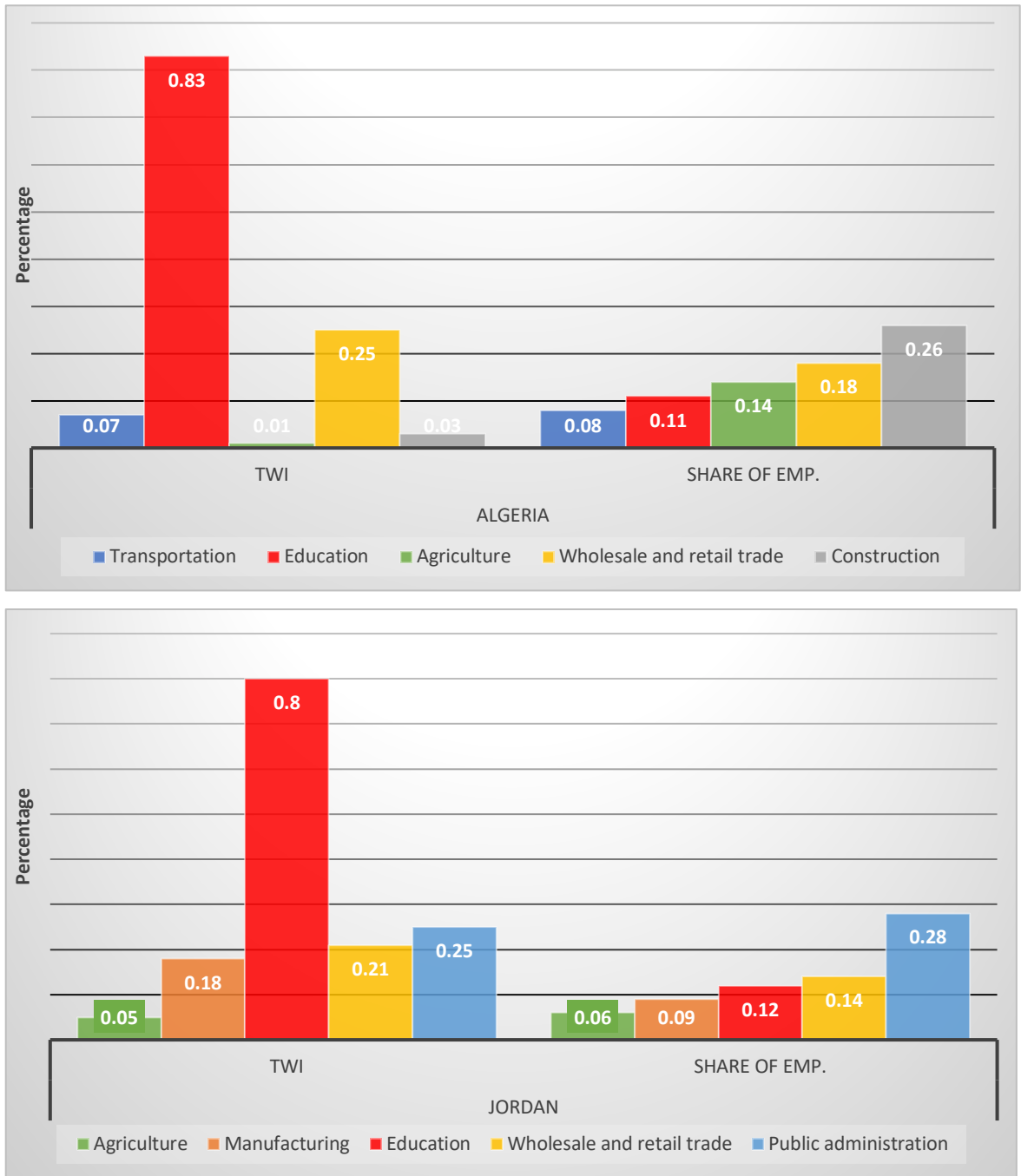
Teleworkability also varies significantly across industries. Figure 4.2 shows teleworkability levels by industry for the five largest industries in terms of employment in each country. (Tables A1a, A1b and A1c in the appendix present the full results of the TWI and employment shares by industry across the three country groupings.) In Algeria, construction and agriculture, two of the largest industries in terms of employment and which together account for 40 percent of workers, have a very low TWI. Wholesale and retail trade (18 percent of employment) and education¹⁹ (11 percent of employment) have higher TWIs (0.25 and 0.83 respectively).

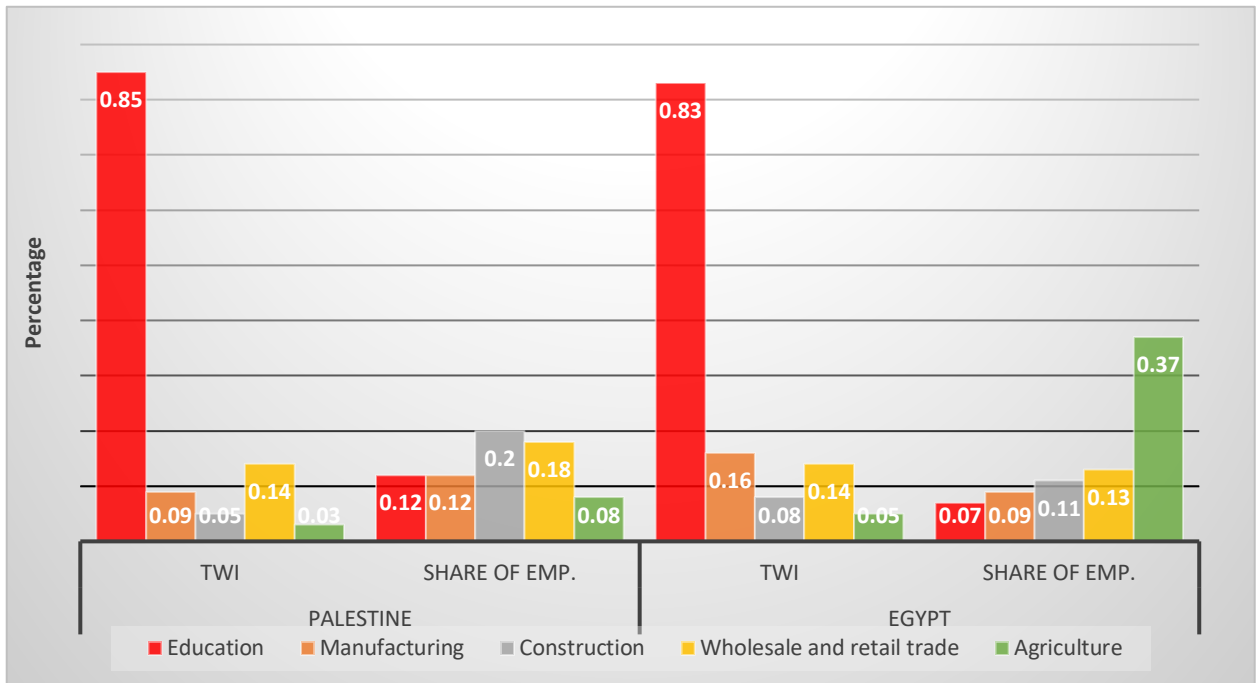
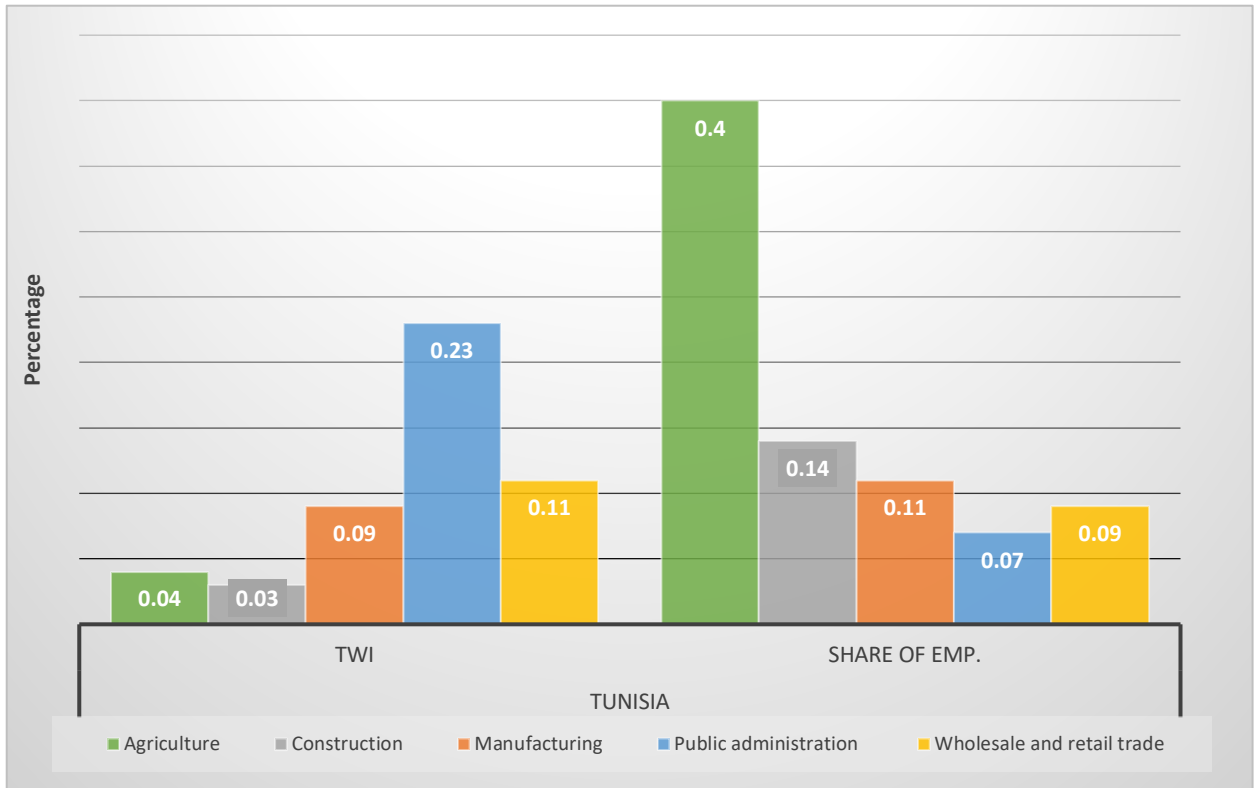
¹⁹ It is worth noting while education jobs may be teleworkable in principle, their teleworkability depends critically on access to appropriate devices and a reliable internet connection for both students and teachers, which varies drastically by country and socioeconomic group within each country.

In oil-importing middle-income countries, there is a significant difference between Egypt and Tunisia, on the one hand, and Jordan on the other. In both Egypt and Tunisia, almost 50 percent of employment is in agriculture and construction, both of which have a very low TWI. Manufacturing, and wholesale and retail trade, which employ approximately another 20 percent of workers, also have relatively low TWIs, albeit slightly higher than for agriculture and construction. Note that the TWIs for these two industries vary significantly across countries, reflecting the differing number of occupations within industries and the concentration of certain occupations in different countries. For example, the TWI for manufacturing in Tunisia is only 0.09, while in Jordan it is twice as high. In Jordan, education and public administration are the two largest industries in terms of employment, accounting for a combined total of 40 percent of employment. These two industries have relatively high TWIs, especially education. manufacturing, and wholesale and retail trade, the two other major employers in Jordan, also have higher TWIs than in Egypt and Tunisia, meaning workers in Jordan are in a better position than the other two countries.

Workers in Palestine are more equally dispersed across industries. Agriculture and construction, which have very low TWIs, as elsewhere, account for just 28 percent of employment. Manufacturing, and wholesale and retail trade account for around 40 percent of employment, with slightly higher TWIs, albeit still lower than in Egypt and Jordan for the same industry. Education and public administration together account for about 20 percent of employment and have much higher TWIs (0.85 and 0.4 respectively). These TWIs are comparable to Egypt, although employment shares are higher in Palestine.

Figure 4.2. TWI for the five largest industries in terms of employment in each country.





Source: Author's calculations based on labour market surveys and the methodology described in the text.

4.3 Teleworkability by industry and gender

Tables 4.1a to 4.1c show the gender-disaggregated TWI by industry. In Algeria, women are concentrated in education, public administration and human health services, which together account for 70 percent of all women's employment in the country. Women's occupations in education and public administration have a very high TWI, while those in health services have moderate TWI, resulting in a very high level of TWI overall for women in Algeria. This suggests that working women in Algeria have a very high probability of continuing to work remotely even in the event of strict lockdowns. However, the burdens of domestic work and child care, as well as gender inequality in accessing technology may still hinder this potential.

In oil-importing middle-income countries (Table 4.1b), gender differences are also stark, both within and across countries. In Egypt and Tunisia, women are concentrated in agriculture (over 60 percent), with low TWIs, albeit higher than those of their male counterparts within the industry. In Egypt, education is the second largest employer for women (12 percent) and women have very high TWI within the sector. In Tunisia, manufacturing is the second largest employer of women (14 percent) but their occupations within the sector have very low TWIs. In Jordan, women are concentrated in education (36 percent), human health services (14 percent) and public administration (10 percent). Their occupations in these industries are also much more compatible with teleworking than those of their male counterparts in the same industries. Agriculture employs 11 percent of women in Jordan but in occupations with very low TWIs (far lower than those of men in agriculture).

In Palestine (Table 4.1c), women are concentrated in education (40 percent) and health (11 percent) and their occupations in these industries have higher TWIs than their male counterparts. Wholesale and retail trade, manufacturing and agriculture also account for a sizeable share of women's employment but the corresponding occupations have relatively low TWIs, albeit still higher than those of their male counterparts.

Table 4.1a. TWI by Industry and Gender, oil-exporting countries: Algeria.

Industry	Algeria			
	Men		Women	
	TWI	Share of emp.	TWI	Share of emp.
A: Agriculture, forestry and fishing	0.01	0.16	0.05	0.06
B: Mining and quarrying	0.24	0.01	0.78	0.00
C: Manufacturing	0.10	0.06	0.32	0.03
D: Electricity, gas and water supply	0.24	0.01	0.58	0.01
F: Construction	0.03	0.30	0.21	0.02
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	0.25	0.20	0.26	0.06
H: Hotels and restaurants	0.11	0.02	0.14	0.01
I: Transportation and storage	0.05	0.09	0.51	0.02
K: Financial and insurance activities	0.72	0.00	0.68	0.02
L: Real estate activities	0.48	0.01	0.68	0.02
O: Public administration and defence	0.48	0.04	0.78	0.13
P: Education	0.78	0.05	0.86	0.44
Q: Human health and social work	0.26	0.02	0.33	0.12
S: Other service activities	0.34	0.02	0.44	0.05
T: Activities of households as employers	0.03	0.00	0.18	0.01
U: Activities of extraterritorial organizations and bodies	0.29	0.00	0.18	0.00

Table 4.1b. TWI by industry and gender, oil-importing middle-income countries: Egypt, Jordan and Tunisia.

	Egypt				Jordan				Tunisia			
	Men		Women		Men		Women		Men		Women	
	TWI	Share of emp.	TWI	Share of emp.	TWI	Share of emp.	TWI	Share of emp.	TWI	Share of emp.	TWI	Share of emp.
A: Agriculture; forestry and fishing	0.03	0.23	0.06	0.66	0.06	0.05	0.01	0.11	0.03	0.30	0.05	0.61
B: Mining and quarrying	0.26	0.00	0.54	0.00	0.18	0.01			0.12	0.01	–	–
C: Manufacturing	0.15	0.11	0.23	0.03	0.18	0.10	0.21	0.08	0.11	0.09	0.05	0.14
D: Electricity; gas	0.39	0.01	0.56	0.00	0.49	0.00	0.91	0.00	0.55	0.00	0.06	0.00
E: Water supply; sewage; waste management	0.23	0.01	0.56	0.00	0.25	0.00	0.52	0.00	0.03	0.00	–	–
F: Construction	0.08	0.16	0.37	0.00	0.06	0.07	0.91	0.01	0.03	0.21	0.04	0.00
G: Wholesale and retail trade	0.15	0.16	0.14	0.07	0.19	0.15	0.36	0.06	0.10	0.10	0.15	0.06
H: Transportation	0.18	0.09	0.33	0.00	0.15	0.06	0.66	0.00	0.03	0.06	0.00	0.00
I: Accommodation and food services	0.18	0.03	0.23	0.00	0.20	0.02	0.23	0.01	0.11	0.04	0.04	0.00
J: Information and communications	0.60	0.01	0.65	0.00	0.71	0.01	0.91	0.01	0.44	0.00	0.54	0.00
K: Financial and insurance	0.61	0.01	0.58	0.00	0.69	0.01	0.93	0.03	0.56	0.00	0.17	0.00
L: Real estate	0.78	0.00	0.52	0.00	0.67	0.00			0.43	0.00	0.00	0.00
M: Professional	0.56	0.01	0.63	0.01	0.61	0.02	0.79	0.03	1.00	0.00	1.00	0.00
N: Admin and support services	0.26	0.01	0.30	0.00	0.23	0.01	0.36	0.02	0.05	0.00	0.25	0.01
O: Public administration and defence	0.37	0.06	0.58	0.03	0.23	0.32	0.63	0.10	0.17	0.09	0.49	0.03
P: Education	0.80	0.05	0.85	0.12	0.70	0.07	0.90	0.36	0.65	0.05	0.82	0.08
Q: Human health and social work	0.22	0.02	0.22	0.05	0.16	0.03	0.29	0.14	0.19	0.01	0.23	0.02
R: Arts	0.39	0.00	0.51	0.00	0.33	0.00	0.98	0.00	0.58	0.00	0.90	0.00
S: Other service	0.24	0.03	0.25	0.01	0.17	0.02	0.19	0.02	0.05	0.01	0.13	0.02
T: Activities of households as employers	0.14	0.00	0.19	0.01	0.06	0.01	0.01	0.01	–	–	0.00	0.01
U: Activities of extraterritorial organizations and bodies					0.44	0.01	0.55	0.01				

Table 4.1c. TWI by industry and gender, fragile and conflict-affected countries: Palestine.

Industry	Men		Women	
	TWI	Share of emp.	TWI	Share of emp.
A: Agriculture, forestry and fishing	0.03	0.08	0.03	0.08
B: Mining and quarrying	0.09	0.00		
C: Manufacturing	0.09	0.13	0.12	0.08
D: Electricity, gas, steam and air conditioning supply	0.34	0.00	0.87	0.00
E: Water supply; sewage, waste management and remediation activities	0.09	0.00		
F: Construction	0.05	0.24	0.51	0.01
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	0.13	0.20	0.20	0.09
H: Transportation and storage	0.04	0.06	0.26	0.00
I: Accommodation and food service activities	0.06	0.04	0.19	0.02
J: Information and communication	0.59	0.01	0.69	0.01
K: Financial and insurance activities	0.62	0.01	0.81	0.02
L: Real estate activities	0.47	0.00	0.94	0.00
M: Professional, scientific and technical activities	0.63	0.01	0.68	0.02
N: Administrative and support service activities	0.19	0.01	0.26	0.01
O: Public administration and defence; compulsory social security	0.35	0.08	0.63	0.07
P: Education	0.76	0.05	0.90	0.40
Q: Human health and social work activities	0.17	0.03	0.27	0.11
R: Arts, entertainment and recreation	0.23	0.01	0.40	0.01
S: Other service activities	0.19	0.02	0.25	0.06
T: Activities of households as employers	0.23	0.00	0.84	0.00
U: Activities of extraterritorial organizations and bodies	0.36	0.01	0.52	0.01

Source: Author's calculations based on labour market surveys and the methodology described in the text.

4.4 Teleworkability by formality status and age group

Figure 4.3 shows TWI by formality status, as defined by coverage by contracts and social security. For all countries except Algeria, we had data on whether the workers had a contract and whether they had social security benefits. Both were used to define formal employment for

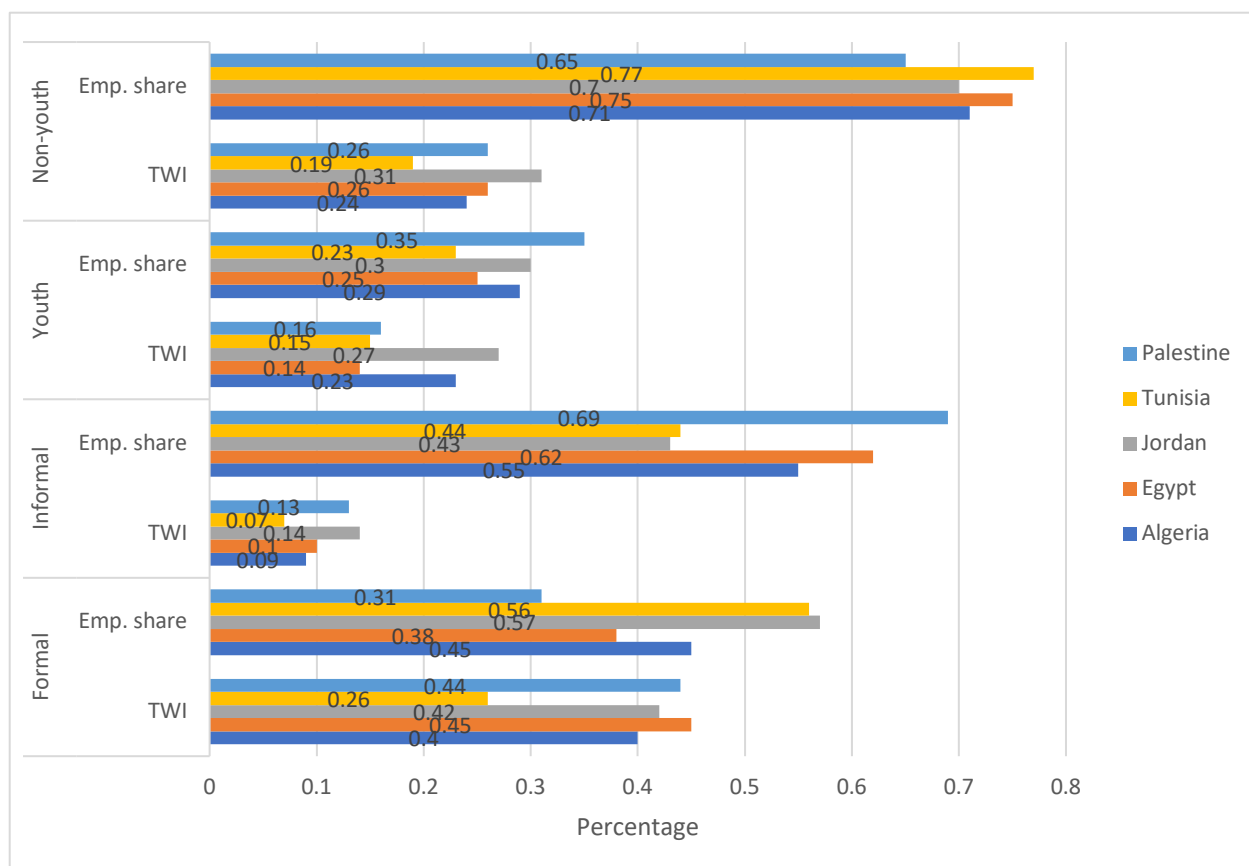
Egypt, Jordan, Palestine and Tunisia.²⁰ For Algeria, we only had data on social security and this was used to define formality. The table shows that teleworkability for formal workers is three to four times higher than for informal workers. The fact that informal workers make up the majority of the workforce in Algeria, Egypt and Palestine and nearly half in Jordan and Tunisia explains the low overall TWIs for all these countries.²¹

We also examined the difference in TWIs between youth (15–29 years of age) and non-youth (30 years of age and above) and found that in Egypt and Palestine, youth were concentrated in occupations with relatively lower TWIs than older adults, while in the other three countries the differences were not significant.

Figure 4.3. Teleworkability by job formality status and age group, by country.

²⁰ In practice, social security was the more important factor in defining formality, since very few workers had social security but no contract, while many had a contract but no social security benefits. This makes the results comparable to those for Algeria.

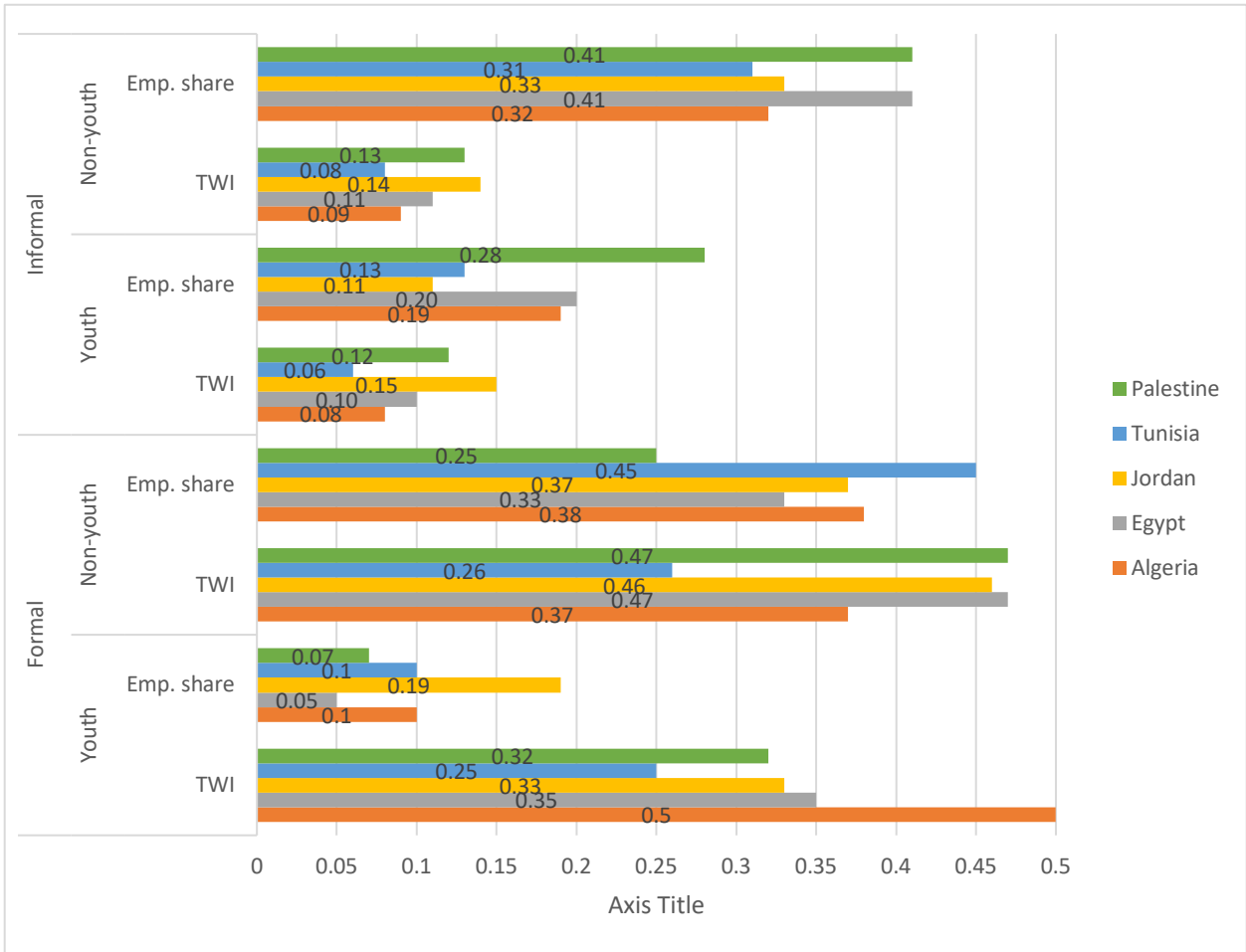
²¹ Irregular wage workers, who make up about 30 percent of all informal workers in Egypt, Jordan and Tunisia, are likely to be particularly vulnerable given the nature of their employment. We found that the share of jobs that would be teleworkable for irregular wage workers is even lower at just 5 percent in Egypt, 7 percent in Jordan and 2.5 percent in Tunisia; compared to 23 percent, 33 percent and 19 percent for regular wage workers, respectively. Thus, the share of teleworkable jobs for irregular wage workers are just one third to one half the shares of teleworkable jobs for all informal workers in these three countries as presented in Figure 4.3. For perspective, irregular wage workers' share of total employment is 15 percent in Egypt and Jordan and 12.5 percent in Tunisia. Data on irregularity of employment was not available for Algeria and Palestine but we expect their teleworkability levels to be similarly low.



Source: Author's calculations based on labour market surveys and the methodology described in the text.

The distinction between formal and informal employment in different age groups is also important (Figure 4.4). Clearly, informal workers are at a disadvantage across the board, whether youth or not. The starker difference appears between formal youth and formal non-youth. In all countries, except Tunisia (where both are low) the gap is 10 to 15 percentage points even within the formal sector which implies that even those youth in the “good” jobs are in occupations that will be severely affected by the lockdowns.

Figure 4.4. Teleworkability for formal and informal workers by age group.



Source: Author’s calculations based on labour market surveys and the methodology described in the text.

5. Regression analysis: teleworkability and worker characteristics

In the analysis above, we examined how differences in occupational distributions within broader categories, such as gender, industry, formality and age group, affect the possibility of teleworking for these groups. There are large differences between these groups and these differences also vary significantly across countries. In practice, a worker may meet several of those “undesirable” characteristics and be at a disadvantage compared to others. For example, a young man working in agriculture in an informal job faces multiple disadvantages in terms of teleworkability. To further understand the observed characteristics that drive the relationships

above, we take our analysis a step further to examine the relationship between worker characteristics and low teleworkability. The TWI two-digit occupational classification is merged with the individual data in the micro surveys to estimate the following simple logistic regression model:

$$y_{ij} = \alpha + \beta X_i + \varepsilon_{ij} \quad (1)$$

Where y_{ij} is a binary variable²² that is one if the TWI for worker i in occupation j , is below the mean TWI for that country;²³ X_i is a vector of explanatory variables, including the worker's gender, age (youth or non-youth), whether they have university education and whether they reside in an urban region (not available for Algeria). We also included a binary variable for the household being in the highest wealth quintile, based on a household wealth index (asset data was not available for Algeria and Palestine, therefore a wealth index could not be calculated), whether the worker is employed in a micro-enterprise (between one and four employees), whether they work in a broad industrial sector (agriculture and mining, manufacturing, and services [omitted]), and finally whether their employment is formal or informal, as defined above. Robust standard errors are reported to account for heteroscedasticity.

The results confirm that being male, young (except for Tunisia), working in an establishment with four employees or fewer, working in agriculture and mining or manufacturing and employed informally are all associated with low teleworkability. In contrast, having a university degree, being in the top wealth quintile and living in urban areas are associated with a higher TWI. These results imply that the impact of the pandemic will be most severe for those who were already most vulnerable in the labour market. Their inability to work remotely will exacerbate existing vulnerabilities associated with age, sector of employment, formality status,

²²We also estimated a simple OLS regression using TWI as a continuous variable and the results were qualitatively almost identical. We chose to report the results based on the binary low teleworkability variable instead to avoid misinterpretation since the measure cannot necessarily be interpreted linearly. Using the binary variable provides a benchmark and allows us to answer the question: "what are the characteristics of workers least likely to have a teleworkable job?"

²³ A similar analysis was performed, defining y_{ij} relative to the median instead of the mean. The results were similar in terms of signs but the results based on the mean had a higher significance. In the interests of brevity, only the results based on the mean are reported. The other results are available upon request.

whether self-employed, as well as rising unemployment for both youth and women, and further aggravate inequality in multiple dimensions.²⁴

Table 5.1 Logistic regression results of worker characteristics and low teleworkability.

	Algeria	Egypt	Jordan	Tunisia	Palestine
Male	1.802***	0.989***	1.308***	0.614***	1.707***
	(0.059)	(0.094)	(0.178)	(0.205)	(0.048)
Youth	0.173***	0.649***	0.705***	0.365	0.572***
	(0.049)	(0.093)	(0.149)	(0.259)	(0.046)
University education and above	-1.885***	-1.919***	-2.294***	-2.478***	-2.640***
	(0.056)	(0.080)	(0.151)	(0.275)	(0.041)
Urban		-0.139*	-0.483***	-0.300*	-0.145***
		(0.074)	(0.140)	(0.165)	(0.044)
Highest wealth quintile		-0.454***	-0.545***	-1.398***	
		(0.088)	(0.147)	(0.201)	
Micro enterprise	0.607***	0.629***	1.083***	1.377***	1.006***
	(0.042)	(0.079)	(0.283)	(0.232)	(0.055)
Agriculture and mining	2.006***	2.216***	0.669**	1.650***	2.515***
	(0.093)	(0.172)	(0.304)	(0.391)	(0.203)
Manufacturing	1.100***	0.613***	0.179	1.168***	0.795***
	(0.090)	(0.105)	(0.409)	(0.395)	(0.082)
Informal	0.950***	1.450***	0.912***	1.152***	0.807***
	(0.045)	(0.074)	(0.201)	(0.238)	(0.047)
Constant	-1.094***	-0.383***	0.185	1.160***	-0.100
	(0.058)	(0.105)	(0.197)	(0.237)	(0.062)
Observations	20,338	15,525	5,377	3,408	28,395
Pseudo R-squared	0.34	0.394	0.351	0.371	0.450

Source: Author's calculations based on labour market surveys and the methodology described in the text. Note the dependent variable is a binary variable that is one if the TWI for worker i in occupation j is below the mean TWI for that country. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

²⁴ As further robustness checks, additional specifications of the model were examined. In one specification, all wealth quintiles were included in the regression (lowest quintile was the omitted category). The results were qualitatively identical, with the probability of low teleworkability falling the higher the wealth quintile. The coefficients on the wealth quintiles for Jordan were however no longer statistically significant. A second specification also included all education categories (with illiterate being the omitted category). Once again, the results were qualitatively identical, with the probability of low teleworkability falling the higher the education level. These results are available upon request.

6. Teleworkability and the digital divide: feasibility of working from home in practice

Using data on access to a computer and internet connection (only available for Egypt, Jordan and Tunisia), we examine the impact of the digital divide on the distinction between the compatibility of work with teleworking and actually being able to work remotely. Compatibility with remote working does not automatically translate into actually being able to work from home, given the digital divide that is prevalent in most countries in the region. The lack of a reliable internet connection or access to a personal computer or another device that can be used to work from home can prevent even the most eligible jobs from being successfully performed at home. The surveys we have used have asked questions such as “Do you have access to the internet at home?”, “Does your family have an internet connection?”, “Does your family own a wireless internet router?”, “Does your family own a desktop computer/notebook/ laptop/ tablet? If so, how many?” This information was used to determine the share of workers with a TWI above the mean (or median) who also own a computer/laptop/tablet and have a home internet connection. The results are shown in Table 6.1 and imply that only a very small share of workers who could potentially work remotely (those whose TWI is above the mean) actually have the tools to do so in practice: just 5 percent in Egypt (7 percent for TWI above the median), 7 percent in Jordan (10 percent for TWI above the median) and 5 percent in Tunisia (7 percent for TWI above the median). Thus, while in each country some workers have jobs compatible with remote work, only a very small fraction have the tools to do so. While this result may seem to render the telework potential discussed in the previous sections unlikely in practice, there is a silver lining. The fact that the lack of access to technology is the problem in MENA countries studied here is potentially a positive result: this constraint is very much surmountable since it is a matter of investing in the right tools and infrastructure, which is much easier than trying to create a structural change in the occupational distribution of the economy as a whole. As mentioned above, even for the USA, Dingel and Nieman (2020) found that only 37 percent of jobs were teleworkable. This suggests that workers in the region can work remotely if the digital divide is overcome, especially in the short run, through for example device distribution programs and improvements to internet access and reductions in cost.

Table 6.1. Share of high TWI workers who have home access to a computer and an internet connection.

	Egypt	Jordan	Tunisia	Total
TWI	0.20	0.29	0.17	0.20
TWI>mean and own a computer and internet connection	0.05	0.07	0.05	0.05
TWI>median and own a computer and internet connection	0.07	0.10	0.09	0.07

Source: Author’s calculations based on labour market surveys and the methodology described in the text.

7. Robustness check: region-specific teleworkability index

As a robustness check, and to ensure that we are basing our analysis on a region-specific understanding of the tasks required for each occupation, we develop our own classification using survey questions from the Egypt labour market panel survey.²⁵ The survey includes 18 questions that can be used to infer the task content of occupations, similar to questions used by other researchers such as Dingel and Nieman (2020) and Saltiel (2020) to determine the potential to work from home (Table 7.1). The index was constructed using data from the responses to these questions at the individual level.

One drawback of the questions in the Egypt labor market panel survey compared to the O*NET survey or those of the OECD Programme for the International Assessment of Adult Competencies (PIAAC), on which the other researchers based their studies, is that the Egyptian survey only asks about work requirements and exposures to risk, not frequency. It does not ask workers how often they might have to carry heavy objects or how often they are exposed to extreme heat. As such, there is no way to determine whether various aspects of the job are common or rare. To accurately gauge the degree to which a job can be performed from home, we ideally need to know whether these activities are performed on a daily or weekly basis, not just occasionally. As such, we calculated several different iterations of the index, ranging from more to less restrictive, depending on how many criteria were included.

²⁵ The surveys for Jordan and Tunisia only included a subset of the questions that could be used to construct the index and even where the questions were included, only very few observations had responses to these questions, with the majority missing. We therefore had to rely exclusively on the labour market panel survey for Egypt for the construction of the index.

As mentioned earlier, the survey has information on current work location. All workers whose response was “own home” were included in all the indices discussed below as being able to work from home. These made up 3 percent of the sample (TWI-ELMPS1). We then added several other criteria based on similar studies (Dingel and Nieman (2020) and Saltiel (2020)), data availability, and our judgement as to what may or may not make a job conducive to working from home. Table 7.1 includes the detailed questions used in each successive index. Jobs that require computer skills or where the respondent answered that they use a computer in their work, whether connected to the internet or not, were considered to also be teleworkable, and adding those in addition to the “own home” work location, brought the share of teleworkable jobs up to 19.2 percent (TWI-ELMPS2). We then proceeded to add all other criteria that could make a job more likely to be performed remotely, such as not supervising others, not working in tourism, not carrying heavy items, etc. (in addition to the first three criteria). This brought the total share of teleworkable jobs to 24.6 percent (ELMPS-TWI3). Since the onset of the pandemic, the nature of many jobs has changed dramatically. For example, many jobs that require dealing with the public are now performed at home. This may be particularly true for jobs that also require computer skills or where the respondent uses a computer at work, such as in administrative work or public services. For TWI-ELMPS4 we therefore included all the questions except not dealing with the public. This raised the share of jobs that can be performed remotely 31.4 percent.

For the next set of indices, we investigated the share of jobs that may not necessarily require computer skills or the use of a computer at work, but may still be done remotely such as craft-related jobs for example, by including all criteria other than those relating to computer skills or use. The share of jobs that can be performed remotely falls to just 10 percent (TWI-ELMPS5). When not dealing with the public is eliminated (TWI-ELMPS6) the share rises to 19 percent. We then went on to progressively eliminate criteria. Eliminating any of criteria 3,4,5, 7 or 8, did not change the share significantly from 19 percent (not shown to save on space). When any of criteria 9 to 17 are eliminated the share rises slightly with each (not shown to save on space). When all of these are removed it rises to 26 percent (TWI-ELMPS7). We interpret this to indicate that fewer non-computer related jobs may be performed remotely, but this share rises when fewer restrictions are included as expected.

We conclude that for jobs that require computer skills or the use of a computer at work the share of jobs that can be performed remotely ranges from 19 to 31 percent. For jobs that do

not require computer skills or the use of a computer at work, the share of jobs that can be performed remotely ranges from 19 to 26 percent. These shares are similar to the TWI index based on the Dingel and Nieman(2020) classification. Without more detailed information on the daily activities of workers, rather than just whether some activity is ever part of the job, it is hard to narrow the classification down further without making unjustifiable assumptions.

Table 7.1. Questions used to calculate TWI indexes for the Egyptian labour market panel survey.

	TWI-ELMPS1	TWI-ELMPS2	TWI-ELMPS3	TWI-ELMPS4	TWI-ELMPS5	TWI-ELMPS6	TWI-ELMPS7
Is your current place of work "own home"? =1 if yes	X	X	X	X	X	X	X
1. Does your job require computer skills?		X	X	X			
2. Do you use a computer in your work, whether connected to the internet or not?		X	X	X			
3. Does your job <i>not require</i> supervising others?			X	X	X	X	X
4. Does your job <i>not require</i> physical fitness?			X	X	X	X	X
5. Is your work <i>not related</i> to tourism (e.g. providing goods and services for tourists)?			X	X	X	X	X
6. Do you <i>not</i> deal with the general public in your job?			X		X		
7. Do you <i>not</i> carry heavy stuff at your work?			X	X	X	X	X
8. Do you <i>not</i> operate any heavy machines at your work?			X	X	X	X	X
Are you <i>not</i> exposed to any of these?							
9. Dust and flames?			X	X	X	X	
10. Fire or fuel?			X	X	X	X	
11. Loud noise and vibrations?			X	X	X	X	
12. High risk equipment?			X	X	X	X	
13. Extreme heat/extreme cold?			X	X	X	X	
14. Work underground?			X	X	X	X	
15. Working in sea/river?			X	X	X	X	
16. Working in a dark place?			X	X	X	X	
17. Bending for a long time?			X	X	X	X	
Jobs that can be performed remotely (percentage)	2.9	19.2	24.6	31.4	10.1	19.1	26.4

Source: Author's calculations based on the Egyptian labour market panel survey for 2018 and the methodology described in the text.

As a further robustness check we used the TWI indices based on these questions from the ELMP and applied their calculated teleworkability share to the data from Jordan, Palestine and Tunisia to demonstrate how this region-specific index can be used widely. We first calculated a weighted average of each 6-digit ISIC occupation's TWI_ELMPs to obtain the corresponding 2-digit mean TW_ELMOs, using the employment share of each 6-digit ISIC occupation in each 2-digit ISIC occupation. This gives a mean TWI_ELMPs for each 2-digit ISIC occupation which we then applied to the occupational distributions of workers in Jordan, Palestine and Tunisia using their respective surveys. The results are in Table 7.2. We only report the mean TWI_ELMPs3 and TWI_ELMPs6 for brevity, but the rest of the results are available upon request. For comparison we also list the teleworkability index for each country based on the Dingel and Nieman classification obtained in section 4.1. As for Egypt, for jobs that do not

require computer skills or the use of a computer at work, the share of jobs that can be performed remotely is lower than those that do require these skills and tools. Compared to the TWI_ELMP3 indices, the TWI based on Dingel and Nieman seems to do a relatively good job of approximating the share of jobs that can be performed remotely for Jordan and Palestine, but it is slightly lower than the TWI_ELMP3 for jobs that do not require the computer skills or the use of a computer at work.

Table 7.2. TWI_ELMP applied to other countries in MENA.

Country	TWI_ELMP3	TWI_ELMP6	TWI (based Dingel and Nieman)
JORDAN	0.26	0.35	0.29
PALESTINE	0.22	0.27	0.23
TUNISIA	0.18	0.21	0.17

The Egyptian labour market panel survey also includes a question that can help us to understand the degree of personal proximity required for each occupation. Jobs that may have a low TWI may still be safe to perform if they require low personal proximity. The question “Does your job require supervising others?” is used to gauge this aspect.

Table 7.3 below shows that about 12 percent of all jobs require close personal proximity in the form of supervising others. We split this first by occupation in the top panel and then by industry. Managers, technicians and professionals are among the occupations that require the greatest personal proximity. In terms of industry, jobs in arts and entertainment, electricity and gas, and information and communications are among those with the highest need for personal proximity. However, it is important to note the limitation of this measure, since many jobs that require supervision by others can still be performed from home (e.g. where tasks can be easily shared by email) and several jobs that do not require supervision may still require close personal proximity (e.g. workers on a production line are not all supervisors).

Table 7.3. Personal proximity by occupation and industry.

	Does your job require you to supervise others?
Occupation of current job	Yes
Managers	45.5
Professionals	19.0
Technicians and assoc	23.1
Clerical support work	14.8
Service and sales wor	9.3
Skilled agricultural,	8.3
Craft and related tra	9.0
Plant and machine ope	4.2
Elementary occupations	3.1
Economic activity	
A: Agriculture; forestry & fishing	8.3
B: Mining & quarrying	13.5
C: Manufacturing	13.8
D: Electricity; gas	22.9
E: Water supply; sewage; waste management	9.1
F: Construction	10.5
G: Wholesale & retail trade	10.9
H: Transportation	5.6
I: Accommodation & food serv.	16.7
J: Information & comm.	20.4
K: Financial & insurance	17.4
L: Real estate	3.5
M: Professional	16.9
N: Admin & support serv.	15.1
O: Public admin. & defense	14.8
P: Education	16.7
Q: Human health & social work	13.0
R: Arts	25.6
S: Other service	10.1
T: Activities of households as employers	3.9
U: Activities of extraterritorial orgs	13.8
Total	11.8

Source: Author's calculations based on the Egyptian labour market panel survey for 2018 and the methodology described in the text.

8. Summary, conclusions and policy recommendations

This study has examined the potential labour market impacts of the COVID-19 pandemic on MENA labour markets. We examined the extent to which jobs can be performed remotely in each country, given the lockdowns implemented in most countries that are likely to be recurring

given the virulence of the virus. We constructed a teleworkability index based on the daily tasks and activities of workers for each occupation. We found that overall, few jobs can be performed from home, ranging from 17 percent in Tunisia to 29 percent in Jordan. In most countries, industries with the lowest teleworkability indices had the highest concentration of workers. Women, public-sector, white-collar and formal workers were found to have a relative advantage. Workers who are most likely to suffer from lockdowns are those who are young (15–29 years of age), employed in the informal sector, male, rural, employed in microenterprises, work in agriculture or manufacturing, do not have university education and come from lower wealth quintiles, since their jobs tend to be least compatible with telework. We also investigated the impact of the digital divide and the fact that despite it being theoretically possible to perform a job remotely, this may prove to be infeasible in practice due to a lack of access to tools such as a computer and internet connection. We found that even for workers whose jobs were compatible with teleworking (above the median or mean index in each country), only a very small fraction have the necessary tools, such as a computer and home internet connection, to make this feasible in practice. Finally, we constructed a region-specific teleworkability index based on occupational characteristics in the ELMPS and found that the share of jobs is much lower for occupations that do not require computer skills but that overall the TWI based on the Dingel and Nieman classification does a reasonable job of approximating the share of jobs that be performed remotely in MENA countries.

The COVID-19 pandemic has been called the “great unequalizer”, particularly for its unequal impact on the labour market. This paper has shown that workers who are young, male, resident in rural areas, employed informally, work in agriculture and manufacturing and come from a lower wealth quintile are particularly vulnerable both to impacts to aggregate demand and supply. These workers are concentrated in the occupations that are least likely to be compatible with teleworking, meaning that the supply-side impact will also increase their vulnerability, either to losing their jobs or to the higher health risks involved in continuing to work in close physical proximity to others.

Policymakers will need to carefully address the labour market challenges facing MENA countries in different stages of development. The typical policy recommendations of encouraging more formalization and job creation are still valid but the urgency of the pandemic and its impact on the world of work (likely to continue well beyond the current crisis) has created additional

pressing recommendations. In the short term, minimizing job losses and protecting the health and well-being of workers is a clear priority. This will require both government support that should prioritize industries that employ blue-collar workers, young people, workers without a university education or workers employed informally. This support should be conditional on retaining staff, with at least partial payroll preservation, to ensure that the intended beneficiaries – the workers – are indeed supported. This will require the implementation of monitoring and evaluation programmes to ensure compliance. To bridge the digital divide in the short term governments can sponsor digital device distribution programs (such as tablets for school children which was already implemented in several countries) as well as subsidize or defer payments for internet access to facilitate remote work in practice.

The challenges inherent to providing meaningful support programmes for informal businesses mean it may be more practical to provide direct cash transfers to informal workers, as has already been the case in some countries (e.g. Egypt, Jordan, Morocco and Tunisia). More generally, all workers who lose their jobs due to the pandemic or those at high risk can be supported through direct and indirect social assistance programmes, including waivers or deferred payments for basic services like electricity, water and internet, as well as rent (perhaps also with a moratorium on evictions). This can be complemented by debt forgiveness and renegotiation programmes for existing debt with entities such as microfinance and banking institutions. The adequate provision of this kind of social assistance is a challenge, both financially and logistically, and will likely require considerable investment in social protection infrastructure.

In the medium to long term, these policy options can be expanded to incorporate policies that would directly raise demand for labor, which several studies have shown is the most pressing labor market problem facing the region.²⁶ Reforms must promote job creation in the private sector and decent working conditions. This must be implemented within a broader effort to increase competition²⁷ and diversification especially into high-productivity industries, and to

²⁶ See for example Diwan and Haidar(2017); Assaad, Krafft, Rahman, and Selwaness (2019) ; Assaad, Krafft, and Yassin (2020), among others).

²⁷ Several recent studies have shown that politically connected firms in the region that tend to capture the lion's share of the profits as well as preferential access to capital, resources and regulatory privileges are less productive and create few jobs, while crowding out smaller more efficient firms (El-Haddad (2020), Diwan, Keefer, and Schiffbauer (2015), Diwan and Haidar (2017)).

reduce reliance on low value-added industries like construction²⁸ that only create temporary employment and are highly vulnerable to economic shocks. Investing in strong telecommunications infrastructure and closing the digital divide across geographic, gender and socio-economic strata can significantly improve the potential to work remotely. It is equally important to create new opportunities, which should particularly target young people and women. The pandemic has highlighted the importance of digital skills and the need for more targeted investment in technical skills to match the demand for labour in such circumstances. Policymakers must support, incentivize, and carefully design (Blattman and Ralston, 2015) the development of skills by vulnerable workers in high growth areas, particularly the digital and green economies.

The Covid crisis poses a challenge like no other but can also provide a valuable opportunity to build back better by encouraging higher-quality education matched to labour market demand, investing in digitalization in terms of both skills and infrastructure, providing incentives for job creation and formalization, and gearing national and regional educational policies towards innovation, high-tech, high value-added industries that have continued to fare well while other sectors have suffered. It is crucial to prioritize maximizing opportunities for young women and men within this new paradigm.

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²⁸ See for example Morsy, Levy and Sanchez (2015).

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Appendix

Table A1a TWI by Industry, oil-exporting countries: Algeria.

Industry	TWI	Share of emp.
A: Agriculture, forestry and fishing	0.01	0.14
B: Mining and quarrying	0.26	0.01
C: Manufacturing	0.12	0.06
D: Electricity, gas and water supply	0.27	0.01
F: Construction	0.03	0.26
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	0.25	0.18
H: Hotels and restaurants	0.11	0.02
I: Transportation and storage	0.07	0.08
K: Financial and insurance activities	0.70	0.01
L: Real estate activities	0.55	0.01
O: Public administration and defence; compulsory social security	0.58	0.06
P: Education	0.83	0.11
Q: Human health and social work activities	0.30	0.03
S: Other service activities	0.37	0.03
T: Activities of households as employers	0.09	0.00
U: Activities of extraterritorial organizations and bodies	0.28	0.00

Table Alb TWI by Industry, oil-importing middle-income countries: Egypt, Jordan and Tunisia.

Industry	Egypt		Jordan		Tunisia	
	TWI	Share of emp.	TWI	Share of emp.	TWI	Share of emp.
A: Agriculture, forestry and fishing	0.05	0.37	0.05	0.06	0.04	0.40
B: Mining and quarrying	0.32	0.00	0.18	0.01	0.14	0.01
C: Manufacturing	0.16	0.09	0.18	0.09	0.09	0.11
D: Electricity, gas, steam and air conditioning supply	0.40	0.00	0.53	0.00	0.31	0.00
E: Water supply; sewage, waste management and remediation activities	0.25	0.01	0.28	0.00	0.03	0.00
F: Construction	0.08	0.11	0.08	0.06	0.03	0.14
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	0.14	0.13	0.21	0.14	0.11	0.09
H: Transportation and storage	0.18	0.06	0.15	0.05	0.03	0.04
I: Accommodation and food service activities	0.19	0.02	0.20	0.02	0.11	0.03
J: Information and communication	0.61	0.00	0.76	0.01	0.48	0.00
K: Financial and insurance activities	0.60	0.00	0.78	0.01	0.46	0.00
L: Real estate activities	0.75	0.00	0.67	0.00	0.29	0.00
M: Professional, scientific and technical activities	0.57	0.01	0.65	0.02	1.00	0.00
N: Administrative and support service activities	0.26	0.01	0.27	0.01	0.15	0.00
O: Public administration and defence; compulsory social security	0.41	0.05	0.25	0.28	0.23	0.07
P: Education	0.83	0.07	0.80	0.12	0.73	0.06
Q: Human health and social work activities	0.22	0.03	0.22	0.05	0.20	0.02
R: Arts, entertainment and recreation	0.41	0.00	0.39	0.00	0.72	0.00
S: Other service activities	0.24	0.02	0.17	0.02	0.09	0.02
T: Activities of households as employers	0.16	0.01	0.05	0.01	0.00	0.00
U: Activities of extraterritorial organizations and bodies	---	---	0.46	0.01	---	---

Table A1c TWI by Industry, Fragile and Conflict-Affected Country: Palestine.

Industry	TWI	Share of emp.
A: Agriculture, forestry and fishing	0.03	0.08
B: Mining and quarrying	0.09	0.00
C: Manufacturing	0.09	0.12
D: Electricity, gas, steam and air conditioning supply	0.39	0.00
E: Water supply; sewage, waste management and remediation activities	0.09	0.00
F: Construction	0.05	0.20
G: Wholesale and retail trade; repair of motor vehicles and motorcycles	0.14	0.18
H: Transportation and storage	0.04	0.05
I: Accommodation and food service activities	0.07	0.04
J: Information and communication	0.62	0.01
K: Financial and insurance activities	0.69	0.01
L: Real estate activities	0.49	0.00
M: Professional, scientific and technical activities	0.65	0.01
N: Administrative and support service activities	0.21	0.01
O: Public administration and defence; compulsory social security	0.40	0.08
P: Education	0.85	0.12
Q: Human health and social work activities	0.22	0.04
R: Arts, entertainment and recreation	0.27	0.01
S: Other service activities	0.21	0.03
T: Activities of households as employers	0.73	0.00
U: Activities of extraterritorial organizations and bodies	0.41	0.01

Source: Author's calculations based on labour market surveys and the methodology described in the text. Notes: '---' implies there were no observations.