First Out, Last In amid COVID-19:
Employment Vulnerability of Youths in Arab Countries

Vladimir Hlasny and Shireen AlAzzawi*

* Hlasny: Economic affairs officer, UN ESCWA, Beirut, Lebanon; AlAzzawi: Lecturer, Santa Clara University, Santa Clara CA, USA.

Abstract

This study estimates the impacts of the COVID crisis and of government responses to it on the trends in workers' outcomes in Arab countries, particularly focusing on youths' and women's vulnerable employment. Using microdata from ERF COVID-19 MENA Monitors for five countries (Egypt, Jordan, Morocco, Sudan, Tunisia), we estimate multinomial logistic models of employment statuses, separately by gender. We confirm that the stringency of the COVID regime affected negatively employment and labor participation of most groups of workers, and particularly youths, even if youths were not disadvantaged pre-COVID. For all groups of workers (especially Egyptian, Jordanian and Tunisian men), higher education was associated with a better employment status. Education conferred consistently high positive returns in terms of formal wage employment and of being economically active. Workers' pre-COVID employment status also affected eventual outcomes of both genders under COVID, implying strong state-dependence in employment outcomes. Those made unemployed under COVID came predominantly from among those without formal employment pre-pandemic. Under COVID, men's employment prospects stagnated in early 2021 in most countries, but partially recovered in summer. Women witnessed more of a stagnation throughout 2021 by being largely excluded from work opportunities.

I. Introduction

The COVID pandemic has hit workers in the Middle East and North Africa (MENA) region economies hard. Workers in these countries were already facing precarious working conditions in

labor markets that had failed to create enough decent jobs to absorb new labor market entrants for decades. The public employment sector has been shrinking due to economic reform programs in place since the 1990s, and the formal private sector has failed to fill the void, in part due to competition from the informal sector.

Over 60% of all workers in the region are in informal employment, while youth face even more vulnerability in employment. Over 85% of youths are estimated to hold informal jobs (ILO 2020a,b).[1] Vulnerability of employment can be said to be the most critical condition facing MENA youth (Fehling et al. 2015), with such jobs lacking job security and stability, paid leaves, social and health insurance, and in many cases physical safety. The regional youth unemployment was already the highest in the world even before the pandemic, at over 30% for males and 40% for females. Employers' drive toward cost-cutting and informalization amid COVID is likely to further magnify the problem of informality, and yield a disproportionate impact of the pandemic on youths, women and other at-risk groups.

In response to the onslaught of COVID, MENA countries have implemented a range of measures to mitigate the health impacts. Egypt has implemented relatively lenient responses to COVID in the first half of 2020, and maintained the measures at a consistent level longer, reducing them more gradually (see Figure A1 in the appendix). Consequently, Egypt has retained positive economic growth rates throughout the pandemic, albeit at less than half the pre-2020 projected level (World Bank Economic Outlook, 2021). Jordan started out with a very stringent regime as of the spring of 2020, but did not maintain it long. It was hit with resurgent waves of the pandemic in late 2020 and early 2021, requiring further restrictive measures throughout the first half of 2021. Jordan is thus expected to face lingering socio-economic impacts throughout 2021. Morocco

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[1] The simultaneous oil price shock has also had far reaching implications on both oil exporters and importers through the channel of migrant work opportunities and remittances.

similarly adopted harsh closure policies in the second quarter of 2020, but maintained them for a longer spell of time. It has endured a large negative effect on growth, but labor market indicators have started gradually recovering in the early months of 2021. Following a resurgence of cases, the stringent regime was brought back in the second quarter of 2021 and has only slowly been scaled back since.

In Tunisia, policy responses have failed to contain the pandemic because of their fluctuating levels throughout the year 2020. The policy regime was fairly robust in the first half of 2020, then was loosened significantly in the second half, before being tightened again throughout 2021. It has suffered the largest negative impact on its economy in 2020 lingering well into 2021. Sudan started out with a relatively loose regime in early 2020, kept it through the fall, but quickly reduced the restrictions by the end of the year, as the economic impact of the pandemic exacerbated the preexisting dire socioeconomic conditions following decades of sanctions, war and political unrest (Krafft and Assaad 2021). The restrictions were only brought back temporarily in mid-2021 following an upsurge of cases. Sudan's labor market indicators have seen only a slow recovery in the beginning of the year 2021 (Krafft et al. 2021).

Amid the market lockdowns implemented in tackling COVID across the region, workers without solid attachments to well established firms have faced particularly harsh prospects in terms of employability, job retention, and attainment of decent working conditions. Lockdowns and social-distancing rules exerted a heavy toll on all economic sectors in the MENA including manufacturing and industry, but it was particularly the service sector – where most of the recent secondary and tertiary school graduates and women work – that took the greatest pummeling (ILO 2020c). Employers demoted, furloughed or laid off workers, and those in the informal sector were likely to be the hardest hit given the lack of job protection, and the lack of personal cushions such as savings, access to credit, and family connections. The ILO estimates that over 11 million full

time equivalent (FTE) jobs were lost in the region during 2020 due to declining working hours. FTE job losses of over 23 million were estimated for the second quarter of 2020 alone, when the most severe lockdowns took place (ILO 2020c). According to ILO estimates, over 5 million FTE jobs could be lost over the course of 2021, depending on how severe the course of the pandemic and accompanying lockdowns are in countries (ILO 2021).

In light of the pre-existing structural obstacles in accessing decent jobs (Hlasny & AlAzzawi 2020), a break from service caused by COVID will undoubtedly impair youths' and women's ability to get back on their feet, particularly in terms of future employment prospects. The heaviest burden is expected to fall on workers lacking adequate backing – including job experience and social networks (*wasta*) – that would enable them to get rehired or return onto a secure career track. By the same token, economic recovery anticipated in Q2–Q3 of 2021 may not fully offset the harms inflicted on the youth and female workers during the prior year, as their skill sets deteriorate, and as employers prioritize the more experienced and formally-employed employees.

This study is concerned with the employment prospects of socially marginalized workers amid COVID. The contribution of the study is to analyze the detailed employment distribution among youths versus non-youths and females versus males across phases of the COVID pandemic, using linked data in pooled surveys with recall modules. The testable hypothesis of special interest is that youths and women are more likely to be laid off or demoted at the onset of a crisis such as COVID, and are less likely to be reinstated on the path to recovery. Our study evaluates this hypothesis by focusing on workers' employment status and employment vulnerability, because these outcomes are crucial for workers' career progress and lifetime outcomes and welfare. We use panel microdata from Economic Research Forum (ERF) COVID-19 Household and Enterprise Monitors for Egypt and Jordan (February–July 2021), Morocco and Tunisia (November 2020–July

2021), and Sudan (April 2021) including their recall modules with questions regarding respondents' status at the end of February 2020 at the onset of the pandemic.

The rest of this study is organized as follows. Section II reviews the available evidence of labor market vulnerability in the MENA region to crises. Section III formalizes our testable hypotheses, and introduces our methods and data. Section IV reports our results, and section V concludes with implications for public policy.

II. Prior Evidence on Labor Market Impacts of COVID-9

Studies since the onset of the pandemic have shown that specific groups of workers have been affected much more severely by both lockdowns and the decline in aggregate demand.[2] Workers in "high risk"[3] industries for decline in economic activity as a result of the lockdowns, curfews and social distancing protocols, workers in informal employment whose income may have been wiped out completely due to the containment measures, those whose jobs cannot be performed remotely due to the nature of their occupation and those without access to reliable technology and hence with limited opportunities for teleworking, 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.

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

[3] The ILO developed a sectoral risk classification in their second ILO Monitor (ILO 2020c) of the impact of the Covid-19 pandemic on work worldwide. The classification is based on the ILO's assessment of the impact of the crisis on economic output at the industry level, utilizing data from real-time economic and financial data from a wide variety of sources including: IHS Markit Global Business Outlook and Sector PMI indices; Institute of International Finance; Cboe Volatility Index (VIX); McKinsey; OECD; Brookings; Moody's analytics; EUROSTAT, among others. These indices provided insight into the extent of the shock's impact on firms' production, sales, and expectations and most importantly on the impact on their plans for layoffs and short-term hiring. The classification indicated that roughly 55 million workers in the MENA were employed in industries at medium-high to high risk for severe decline in economic activity including accommodation and food services, real estate, manufacturing, trade activities, transport, and storage and communication.

A number of international agencies, such as the World Bank[4] and UNDP[5], and national statistical offices have already released preliminary results of rapid surveys and assessments that examine the impact of the COVID pandemic on their labour markets, as well as on other indicators of well-being. For example, the World Bank 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 before the pandemic. The assessment for Iraq (World Bank 2020b) focused on poverty and found that implementing a full curfew would have a severe impact on poverty due to changes in labour 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 labour market with almost one fifth of breadwinners losing their jobs since 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). UN ESCWA projected that in the first year of the pandemic, poverty

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[4] The World Bank COVID-19 High-Frequency Monitoring Dashboard contains preliminary results of rapid phone surveys to assess the impact of COVID-19 on households. At the time of this writing the results for Djibouti, Iraq, the Palestinian territories, Lebanon and Tunisia were available.

[5] 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, labour markets, migrant workers, small and medium enterprises and women.

headcount in the 14 middle and low-income MENA countries rose by 11 percent, from 29.2 to 32.4 percent of the population (Abu-Ismail and Hlasny 2020).

III. Methods and data

Tracking the socio-economic status of youths across different phases of a health and economic crisis can provide tremendous insight into the process by which the prevalence of vulnerability is transmitted across the business cycle, and the implications this has for inequality. This may help us propose effective ways to support and protect vulnerable workers during an unprecedented crisis.

1. Estimation strategy

We analyze the static and dynamic impact of the pandemic on vulnerable workers in Egypt, Jordan, Morocco, Sudan and Tunisia statically as well as dynamically, using microdata from the ERF COVID-19 MENA Household Monitors. To the extent that labor market conditions differ across economic sectors, and over the course of the COVID outbreak, our study attempts to estimate the impact of the severity of the pandemic and of policy responses on the employment outcomes of various classes of workers, separately across the five countries.

We start with a descriptive analysis of the impact of the pandemic on employment status, to understand how many, and who, were the workers who lost their jobs or transitioned to a less formal employment status, and linking it to worker and household socio-economic characteristics.

We use the panel dimension of the surveys to examine individuals' transitions between formal and informal/irregular work statuses in different phases of the COVID crisis. Cross-tabulations between workers' current employment status and their past employment status across various

waves of the national surveys, under various regimes of lockdown stringency, yields the transition matrices.

Finally, we estimate multinomial logistic regressions of workers' propensity to attain a particular employment status given their individual and household characteristics (Assaad et al. 2014; Assaad and Krafft 2014), and the degree of stringency of COVID lockdown-type policies (Hale et al. 2021).

We study workers' employment status and employment vulnerability (formality and regularity), because these outcomes are crucial for workers' career progress and lifetime achievements and welfare.

Specifically, we classify as *formally employed* all those who were, over the past 7 days, employed in formal, regular positions with social insurance, or worked in the public sector. We classify as *informal* those workers who are informally employed, or without social insurance, but work in formal establishments. We classify as *irregular* those who report unstable employment conditions, or work outside of formal establishments. We classify as *self-employed/unpaid* all those who were farmers, self-employed business owners, or unpaid family workers. *Unemployed* are those who are not presently employed but are actively searching for work. Finally, we classify as *out of the labor force* (OLF) housewives, retirees, and others not employed and not searching for work.

We do not analyze workers' hours worked, wages or total earnings, because these outcomes may be subject to personal choice, particularly amid the existential tradeoffs individuals make during a health pandemic. These outcomes can also be thought of as more indicative of short-term welfare and have lower bearing on workers' career and lifetime achievements.

2. Multinomial logistic regressions

To investigate the risk factors for workers' vulnerable employment statuses, we estimate multinomial logistic regressions of the status of workers of various ages and of either sex, on their individual and household characteristics. The multinomial logistic regressions estimate the probability that a worker will attain a particular categorical value j of employment type (i.e., formal, informal/irregular, self-employed/unpaid, unemployed) relative to the probability of the baseline option (remaining OLF). This baseline option is chosen as a natural state of recent graduates deciding whether to start job search, and can be thought of as the least-preferred state for the vast majority of working-age individuals, which is helpful for interpreting regression coefficients. The regressions take the values of explanatory variables (x), estimate j-outcome specific coefficients on those explanatory variables (β_j) using the maximum likelihood method, and calculate the probabilities of all possible outcomes.

$$Pr\ (y = j)\ = \frac{exp\ (\beta_j x)}{\sum_{k \in J} exp\ (\beta_k x)} \tag{1}$$

where individual-specific and time subscripts are omitted for clarity of presentation. The outcome with the highest estimated probability of occurring for an observation is classified as the predicted outcome.

Because of the specific focus in our study, we differentiate the outcomes for women and men, and for youths and non-youths. Youths are defined as those 17–29 years of age, while those 30–59 years old are classified as non-youth. Those 60–62 years old among respondents are omitted as not of the prime working age, and as candidates for partial or early retirement. Full-time students and non-nationals are also omitted, as they are deemed not to be competing in the same national labor markets as other workers. Workers' age in February 2020 is imputed as a non-integer value using the time range between 15-February 2020 and actual survey date, and the integer age as of the effective survey date (last 'try date').

Workers' propensity for the alternative employment statuses is made a function of the workers' human capital (potential work experience, *age–16.5* for youths, *age–29* for non-youths – denoted as age–<u>age</u> below; education completion of level *k*), residence near geographic labor markets (urban/rural; cluster of administrative regions *r*), childcare demands on a worker (count of all children as the sum of children under 6 years and of school-age children in the household), vulnerable worker designation (youth indicators), other demographics (marital status and logarithm of household size). At the market level, stringency index of the lockdown-style policies – as well as this index interacted with workers' youth status – proxies for the evolving labor market conditions in regard to all or specifically youth workers.

As the main specification, the model is estimated dynamically controlling for workers' initial pre-COVID employment status as of February 2020 (y_0). (Additional alternative model specifications are described in section IV.3.) Specifically, in equation 1 we estimate:

$$\beta_j x = \beta_0 + \beta_1 stringency + \beta_2 youth + \beta_3 youth \times stringency + \sum_l \beta_l edu_l + \beta_4 \left(age - \underline{age}\right)$$

$$+ \beta_5(kids\ lt6 + schoolkids) + \beta_6 rural + \sum_r \beta_r region_r + \sum_{k \in J} \delta_k 1\left(y_0 = k\right) \qquad (2)$$

where individual-level and time subscripts are again omitted.

The particular vulnerability of youths and women to the stringency regime is gauged by a *youth×stringency* interaction term, and by the comparison of estimates on *stringency* in the men's and women's regressions. According to our main hypotheses, the estimates on the *youth* indicator and on the *youth×stringency* interaction term should be negative. Moreover, the estimates on *stringency* should be lower (more negative) in regressions of females than among males (when the regression specifications are identical for males and females).

Because the indicators of workers' informality/social insurance, irregularity, and work in/out of establishment are unavailable in some survey waves, or some statuses are rare among specific

demographic groups, the dependent variables and sample delineations are adjusted accordingly. Out of consideration for the degrees of freedom, some categories are combined in several countries. Namely, in Sudan, only four distinct statuses are distinguished: wage work (formal or informal), self-employment/unpaid, unemployment, and OLF. Due to the rarity of selected employment statuses among women in Egypt, Jordan and Sudan, only employed, unemployed and OLF are distinguished. Even among men in Egypt and Jordan, in order to include wave 2 (beside wave 4), a simple distinction of those employed, unemployed and OLF is considered. Tables 1–2 show two specifications for Egyptian and Jordanian men – one with detailed disaggregation (in wave 4), and one with coarse disaggregation (in waves 2 and 4).

To assess the significance of each explanatory variable in the model, we test the joint significance of AME estimates across all values of the dependent variable. Residuals in regressions are clustered at the worker level to mitigate the potential effect of their autocorrelation on standard errors.

3. Data

Our analysis of workers' employment vulnerability is based on four waves of the ERF COVID-19 MENA Monitor for Morocco and Tunisia (Oct–Nov. '20, Jan–Mar. '21, Mar–Apr. '21, June–July '21), two waves for Egypt and Jordan (Jan.–Feb. '21, June–July '21), and one wave for Sudan (Mar.–Apr. '21). In terms of the time span of coverage, our data encompass February 2020 ("wave 0"; all five countries), June 2020 ("wave 1"; Egypt), November 2020 ("wave 1"; Morocco, Tunisia), February 2021 ("wave 2"; all but Sudan), and April 2021 ("wave 3"; Morocco, Sudan, Tunisia).

These time periods align with major phases of the COVID pandemic. July-October 2020 (wave 1) covers the apex of the pandemic when most economic sectors faced shutdowns and social

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lockdowns. January–April 2021 (waves 2 and 3) shows the state of affairs in the spring of 2021, when mass vaccinations got under way, and the initial onslaught of COVID eased down. June 2021 shows the period when the easing down continued, before being interrupted by the arrival of the virulent Delta variant.

ERF COVID-19 MENA Monitors are large-sample telephone surveys facilitating representativeness within a certain sample-frame of contactable respondents. They are (unbalanced) panel surveys with a limited module of recall questions to February 2020, allowing us to track the same workers and their employment outcomes over the span of up to 14 months. These surveys include information on workers' employment type, hours worked, income, and the status of self-employed workers' enterprise.[6] For explanatory variables, the surveys cover workers' potential job experience, education, dependents, residence and demographics. Survey data are supplemented with national data on the recent strictness – namely the 60-day moving average of the stringency index in the country – of the COVID lockdown-type policies (Hale et al. 2021).[7]

The regressions are estimated on pooled survey waves, for each country and for men and women separately. Beside the formal waves 1–4 of the surveys, we add wave 0 using recall information about workers' status as of the end of February 2020. This recall information is taken from the first instance when respondents were interviewed (regardless how many following waves they participated in; including refresher-sample individuals). This gives us up to 5 data points for individuals, which allow us to track workers' outcomes from February 2020 to as late as July 2021. In the dynamic model specification, wave-0 employment status is used to define a set of controls for workers' initial status, while employment status in waves 1–4 is used for a dependent variable

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[6] Farmer; Business owner/self-employed; Unpaid family worker on a farm; Unpaid family worker; Wage worker for Government/Public sector; Wage Worker for a private sector/NGO; Unemployed/searching; Inactive.

[7] Survey microdata from the ERF Household Monitor are also supplemented and validated using the ERF Enterprise Monitor, and the COVID-19 follow-up of the World Bank Enterprise Surveys for Jordan, Lebanon and Morocco (employment composition and changes). Additional statistics are reported in the appendix.

in panel-data estimation. In the alternative static model without lagged effects, waves 0–4 are all used for estimation (refer to tables A4-A8 in the appendix).

Workers' characteristics at the end of February 2020 must be imputed using values in following waves as follows: Workers' (non-integer) age is derived from the (integer) age as of the actual survey date (survey try date 1, 2 or 3), using the time span between 15-February 2020 and survey date. Education, and household size, composition and residency are assumed to be unchanged. The COVID policy-stringency index for end-February is taken to be 0 for all countries but Sudan, where the 60-day moving average on 15-February 2020 stood at a still negligible 0.02297/100.

IV. Results

1. Main regression results

Tables 1–5 report on the main dynamic regression specifications estimated on pooled survey waves, separately for the two genders and for individual countries. The estimates in tables 1–5 are for the average marginal effects (AME) of unit increases in the corresponding explanatory variables on the probability of an employment status.[8] The AME of x on the probability of an outcome j for an individual i in period t are computed as: $\partial \pi_{itj}/\partial x_{it} = \pi_{itj}\left(\beta_j - \sum_{r \neq j} \pi_{itr}\beta_r\right)$. Positive AMEs imply an increase in the probability of an employment status due to an increase in x_{it}, while negative AMEs imply a reduction.

For Egyptian workers, we can estimate a detailed model with more disaggregated employment categories (table 1, left side), but this is only possible for one wave (wave 4) and only for men, because the dependent variable does not vary sufficiently among women. Instead, we opt to focus

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[8] Raw regression coefficients, or odds relative to the probability of being OLF (a.k.a. relative risk ratios $\frac{\Pr(j)}{\Pr(baseline)} = e^{\beta}$) for *J-1* options, less the baseline, are available on request.

on a simpler model of employment/unemployment/OLF estimable for three waves (table 1, right side).

Among both Egyptian men and women, the *stringency* and *youth×stringency* indicators have the expected negative effects on employment and labor force participation, confirming that youth workers are particularly adversely affected.[9] For both genders, youths are more likely to be employed than non-youths, and marginally less likely to be OLF. Using more detailed employment categories (right side of table 1), male youths are less likely to hold informal work in establishments than non-youths, and more likely to hold irregular or out-of-establishment work or to remain OLF.

In Jordan, similarly, we focus on a simpler model estimable for two waves, fitting only workers' employment/unemployment/OLF statuses (table 2, right side). As in Egypt, we find that the *stringency* and *youth×stringency* indicators again have the expected negative effects on employment and labor force participation, whereas this cannot be evaluated using the detailed employment classification estimable on a single wave only (table 2, left side). Youths are more likely to be employed, and less likely to be economically inactive. Using the more disaggregated model for summer 2021, we find that male youths are less likely to hold formal jobs than non-youths, and more likely to hold informal work in establishments, or to remain OLF. As in Egypt, young Jordanian women are more likely to be employed than older women, and less likely to remain unemployed.

In Morocco and Tunisia (tables 3–4), increases in the COVID-response stringency have unexpectedly been associated with a higher likelihood of formal employment for both men and women, but have had mixed effects on other employment or inactivity categories. Youths of both

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[9] This cannot be meaningfully evaluated for detailed employment categories for Egypt or Jordan (tables 1–2, left side), because only a single wave is available with limited variation in the stringency index, and we expect a high persistence in workers' employment status during the span of that survey.

genders have fared somewhat better than non-youths pre-COVID (as gauged by the *youth* indicator), but the tightening of the COVID stringency regimes has somewhat harmed their standing in terms of employment status relative to non-youths. Youths could thus be said to have lost under COVID relative to non-youths.

Finally, in Sudan, the effect of the stringency regime cannot be effectively evaluated in the single survey wave (wave 3). We do find that male youths are more likely to hold wage work or be self-employed than non-youths, and less likely to remain unemployed or inactive (no effect among women). This appears to be consistent with the reports of a recent flow of workers toward the agricultural sector where self-employment is more prevalent (ILO and ERF 2021), and the resulting informalization and underemployment of Sudanese youths.

Across all five countries (tables 1–5), workers' initial pre-COVID employment status in February 2020 has the expected strong effect on contemporary outcomes, suggesting strong state-dependence in employment outcomes. This is as strongly the case for women as for men. Being informal, self-employed or unemployed (OLF, respectively) in February 2020 is a strong predictor of being self-employed (OLF) in the following months. Workers who were initially employed non-formally are extremely unlikely to transition to a formal status by summer 2021. Those made unemployed amidst COVID come predominantly from among those who did not hold formal employment in February 2020. The only exception to these trends is the Sudanese male workers, whose employment status appears to have been less time-dependent: OLF workers come predominantly from among formally employed workers, while many formal workers today come from those who were informally employed, self-employed or inactive in February 2020.

Among other explanatory variables, higher education is clearly associated with better employment outcomes in all countries and both genders (most significantly among Egyptian, Jordanian and Tunisian men). Higher education offers consistently high positive significant

returns in terms of formal wage employment and in terms of being economically active, but has limited power at explaining workers' choice over irregular/informal employment out of establishments, or self-employment. On the other hand, potential work experience (i.e., age-age), count of dependents, and residence in rural areas have limited effects on employment status. Finally worth noting, there are clear regional disparities in employment prospects. Across most countries, workers from rural areas are more likely to become self-employed or unpaid family workers, or serve as employers, but these results disappear when country regions are controlled for.

In sum, the evidence across all countries suggests that COVID has affected the overall labor market clearly negatively, inflicting a negative shock on workers of both genders and all ages, and led to a switch from formal and self-employment jobs toward informal/irregular jobs. Comparing the results for men and for women, we conclude that female workers have lower employment prospects than men overall, as well as in the various types of jobs, and typically even have a lower probability of being unemployed, relative to remaining OLF.

2. The propensities of employment outcomes across distinct phases of COVID

Using the AMEs from tables 1–5, figures 1–5 illustrate the estimated probabilities of all employment outcomes for youths versus non-youths, and by sex, over time. The time spans and samples covered in figures are restricted to those appearing in the respective regressions (figures A9–A13 also cover February 2020 as a pre-COVID period.)

Figure 1 shows that in Egypt, young men's prospect of employment stagnated during July–December 2020, picked up in the first half of 2021, only to fall back somewhat in June. The likelihood of being unemployed among youth men thus peaked in June 2021. The year-2021 recovery was less apparent among non-youth men, whose employment prospects picked up only

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marginally in the second quarter of 2021. Women's propensity of exiting the labor force, among both age-cohorts, increased in the fall of 2020, remained high as late as May, and only came down to pre-COVID levels in June 2021. Hence, women's employment outlook amid the COVID regime may have recovered sufficiently only in the second quarter of 2021, making it finally worth for women to join the ranks of the unemployed.

In Jordan (figure 2), similarly, men's employment prospects steadily improved throughout the first half of 2021, with a marked uptick for young males in June. Correspondingly, the likelihood of remaining unemployed dropped in June 2021 (very mildly for non-youth males). By contrast, Jordanian women's employment outlook in the year 2021 is mixed. Among youth women, employment prospects were slipping throughout the first half of 2021, and only improved in June. Among prime-age women, the employment prospects temporarily improved between April and May, before returning to dismal levels by June.

In Morocco (figure 3), young men's probability to attain any employment status appears to have stagnated throughout the first half of 2021, with the only consistent trend being a gradual decline in the probability of self-employment. Among older men, we find the same steady decline in self-employment, but also a decline in irregular employment. These trends were accompanied by a rise in involuntary unemployment since April 2021 (following a slight decline in unemployment and a rise employment irregularity in Q1). Moroccan women have witnessed a similar stagnation of their status, by being largely excluded from work throughout the first half of 2021. For youth women, an increase in their rate of joining the labor market (reduction in the prospect of remaining OLF) starting in April was accompanied by the prospect of involuntary unemployment. A word of caution: Figure 3 shows some fluctuation in employment prospects after May 2021, presumably an artifact of data sparseness in between survey waves 3 and 4.

In Tunisia, like in Morocco, we see a pattern of broad stagnation of employment prospects throughout the first half of 2021, for both sexes and both age cohorts. For young men, we only discern a weak rise in irregularity, going along with a decline in self-employment. Older men can be said to have witnessed a slight decline in the prospect of unemployment, but it is unclear whether they transitioned toward decent employment or OLF. Tunisian young women saw a small reduction in their prospect of formal employment in the second quarter of the year, and a corresponding increase in informality. No patterns are clear in the prospects of older women during the first half of 2021. As in Morocco, we should note that Figure 4 at large again shows some fluctuation in employment prospects during May–June 2021, on account of data sparseness in between survey waves 3 and 4.

For completeness, the March–April 2021 employment prospects in Sudan are presented in figure 5. Because of the short time window – a single wave with survey dates spanning barely two months – we should restrict ourselves to interpreting the levels but not the trends in employment outcomes. Among men, wage employment is the dominant employment category ((similar between both age cohorts), while self-employment makes up a trivial share. Among women, wage employment is on par with unemployment and OLF status (or exceeds them marginally among youth females), while self-employment again makes up a near-zero share.

3. Robustness tests

The dynamic multinomial logistic model applied here has many theoretical and empirical merits, but some limitations and potential pitfalls should be acknowledged. This section discusses the potential issues and, where available, reports the results of tests and alternative estimations.

Most saliently, while the majority of explanatory variables in tables 1–5 are significant when evaluated jointly across the columns, meaning that the variables belong in the model, but many of the AMEs in individual columns are insignificant of their own, meaning that the corresponding variables may have positive or negative effects on particular outcomes. Some variables show mixed/non-monotonic patterns across the monotonically-related employment outcomes. There are several explanations for the weak results. One, the inclusion of both youths and non-youths – and other groupings across demographic divides, such as workers with dependents and those without – in the same models confounds the differential impacts on prime-age workers (as child-carers and caretakers) and recent graduates (as, say, loosely attached workers or marriage-market aspirants). The main specifications in tables 1–5 were thus supplemented by models disaggregated along important demographic lines. The regressions were run separately for youth and non-youth, as well as for those starting in formal, informal, or inactive employment statuses (Tansel and Ozdemir 2019). Interaction terms of education/experience with the demographic indicator (e.g., youth) were also evaluated.

Two, the lack of controls for panel dynamics, such as worker fixed effects, introduces small possible biases due to sample selection and attrition. While we have considered individual-level fixed-effect specifications, their viability is affected by the limited time dimension of data. Three, the joint use of youth status, potential work experience, and near-monotonically growing COVID stringency in regressions leads to some collinearity among covariates, which affects the reliability and efficiency of relevant coefficients. This is particularly clear in the case of Sudan, where some regression coefficients and standard errors attain unreasonable values. Alternative sets of covariates and sample compositions were considered, as follows. Linear and quadratic time trends proxying for non-stringency related secular developments; the counts of children under 6 years, and school-age children separately; potential experience squared; marital status;

log household size. Among the workers' additional family backgrounds – and the workers' associated responsibilities under the COVID crisis – several results stand out. Workers with children under 6 years of age are as likely as or more likely to be economically active than others, while those with school-age children are significantly less likely to be so. This holds across the majority of employment categories, and workers with school-aged children are also less likely to search for work if not currently employed.

Regarding structural properties, the dynamic models in tables 1–5 have several notable limitations. One, they exclude wave 0 from the analysis, and their estimates (as in 'x×y covariances') are thus based on lower sample sizes. Two, the lagged dependent variables among regressors assume great explanatory power at the expense of other time-invariant or slow-motion underlying factors such as education, which may be causally more responsible for employment outcomes. An alternative static specification without lagged dependent variables, using February 2020 as an additional survey wave, is thus estimated in the appendix. Tables A4–A8 and figures A9–A13 report the model's results.

Three, a critical assumption for the validity of the multinomial logistic model is independence of irrelevant alternatives (IIA) – the ratio of the probabilities of any two statuses should be independent of the set of possible options. Clear violations of this assumption can be identified using the Hausman tests (Hausman and McFadden 1984). In our case, these tests fail to reject the IIA assumption in all country gender-group regressions, implying that the estimates are not clearly systematically affected by the exclusion of any one of the outcomes from the analysis.

Given the different availability of employment statuses across survey waves, supplementary regressions also considered alternative sets of dependent variables, namely: 1) informal/irregular without regard for whether in/out of establishment; 2) only 3 categories: wage employment, unemployment, and OLF; 2) COVID-induced status changes: permanently lost job, temporarily

lost job, hours change, pay change, no impact. In particular, a logistic model of downward mobility in employment status or in earnings was estimated taking the form $\partial_{t+n,t} = \beta_0 + \beta_1 I + \beta_3 H + \beta_4 R + e$ where $\partial_{t+n,t}$ is an indicator of downward mobility across employment statuses between period *t* and period *t+n*. The covariates included Individual, Household and Regional conditions in the initial period. Once again, individual-level fixed effects were considered to mitigate any biases and heteroskedasticity in estimation due to latent heterogeneity across workers. The results of these supplementary estimations are available on request.

V. Conclusions

This study has aimed to bring attention to the impacts of the COVID crisis and of government responses to it on the trend in employment outcomes of MENA workers, particularly focusing on the vulnerability of employment among youths and women. Our initial results confirm some well known facts about the MENA labor markets in relation to the prevalence of informal and irregular employment, underemployment among youths, and low economic participation of women. We confirm that the stringency of the COVID regime has had the expected negative effect on employment and labor force participation in all countries where this could be evaluated, and that youth workers and women were particularly adversely affected amid COVID. Sketching the employment prospects of workers across the 18 months of the pandemic, we find that men's employment prospects stagnated in the early 2021 in most countries, but partially recovered in summer 2021. Women have witnessed more of a stagnation of their status throughout the first half of 2021 by being largely excluded from work opportunities. While our results are typically weak statistically, they are valuable as a yardstick for policy advocacy, and for more advanced, disaggregated analyses as more data become available.

Our analysis also points toward several important factors behind workers' employment vulnerability amid COVID. Human capital takes the central stage at driving workers' employment prospects. Workers' distance from labor markets in the countries' key cities is also critical, and suggests that transportation and housing policies could be critical components of the efforts to promote effective matching and inclusivity in countries' labor markets. The regionality of employment impacts is also a sign that local policy measures may matter for workers' outcomes. Another element in explaining workers' economic participation is the role of workers' dependents. While the presence of pre-school children does not have a clear effect on workers' employment, school-aged children significantly reduce it. These findings, as well as the findings for gender and youth-status, offer lessons how employment vulnerability in MENA economies should be addressed, and how our analysis could be extended. Once the analysis is repeated using additional data, controls and disaggregations, the results will lead to enhanced policy recommendations regarding the vital forms of support systems that can help mitigate the impact of shocks on vulnerable workers.

Our results suggest that the crisis has added to the fragmentation in the regional labor markets and exacerbated existing inequalities. When an economic sector goes through mass layoffs, those dismissed face an uphill battle transitioning to other sectors or finding vacancies to which they could be adequately matched. The impacts differ clearly by sex. During the pandemic, economic participation in the MENA shrank, as it did in many parts of the world, as those demoted or fired have become discouraged from job-searching. Women with school-aged children were forced to limit their labor market engagement as schools and daycare centers shut (CAPMAS 2020, NPR 2020). Lack of employment protection of informal workers, and weak anti-discriminatory provisions and enforcement have perpetuated the precarious working conditions of youths and women from vulnerable backgrounds. As workers vied for the

shrinking stock of jobs in their best-matching narrow market segments, and others were systematically overlooked because they did not fit the narrow industry fold, significant human resources were wasted and discouraged from growing.

While our analysis does not estimate this explicitly, we can surmise that the countries' expansion of their pre-existing social-protection programs during the pandemic is contributing to the alleviation of workers' suffering, and the recovery in employment opportunities. In fact, social protection programs provided an important safety net in the MENA even before the onset of the COVID pandemic. In Tunisia, the PNAFN cash transfers, Takaful and Karama in Egypt, and UNHCR cash transfers to Syrian refugees in Jordan helped to alleviate poverty, and helped workers weather periodic storms and remain employable. During the pandemic, countries expanded their pre-existing programs, for instance greater compensation through the RAMED health insurance program in Morocco, expanded eligibility in Egypt's Takaful, and introduction of new benefits to laid off formal workers in Morocco and support to irregular workers in Egypt (Krafft et al. 2021).

The upshot from the available evidence is that the recovery from COVID has already begun, and in some cases, for some workers, has nearly offset the negative employment shocks of the preceding 18 months. With the lessons learnt and the continued support from social-protection and employment-promotion schemes, MENA countries can aspire to not only beat the pandemic but also move beyond the notoriously precarious, fragmented and inequitable state of regional labor markets.

References

Agénor, Pierre-Richard, and Karim El Aynaoui (2003) Labor market policies and unemployment in Morocco: a quantitative analysis. Policy Research Working Paper 3091, Washington: World Bank.

Agénor, Pierre-Richard, Henning Tarp Jensen, Mustapha Nabli, and Tarik Yousef (2004) Labor market reforms, growth, and unemployment in labor-exporting countries in the Middle East and North Africa. Social Protection Working Paper 3328, Washington: World Bank.

AlAzzawi, S., and V. Hlasny (2020) Vulnerable employment of Egyptian, Jordanian, and Tunisian youth: trends and determinants. UNU–Wider Working Paper 2020-166. Helsinki: United Nations University–Wider.

AlAzzawi, Shireen (2021) Lives versus livelihoods: who can work from home in MENA? ERF Working Paper 1471, April.

Assaad, Ragui (1997) The effects of public sector hiring and compensation policies on the Egyptian labor market. World Bank Economic Review 11(1):85-118.

Assaad, Ragui (2014) Making sense of Arab labor markets: the enduring legacy of dualism. IZA Journal of Labor & Development 3(1):1-25.

Assaad, Ragui, and Caroline Krafft (2014). Youth transitions in Egypt: school, work, and family formation in an era of changing opportunities. Silatech Working Paper No. 14-1. Doha: Silatech.

Assaad, Ragui, and Caroline Krafft (2015) The structure and evolution of employment in Egypt: 1998-2012. In R. Assaad & C. Krafft (Eds.), The Egyptian Labor Market in an Era of Revolution (pp. 27-51). Oxford: Oxford University Press.

Assaad, Ragui, Caroline Krafft, and Djavad Salehi-Isfahani (2018) Does the type of higher education affect labor market outcomes? evidence from Egypt and Jordan. *Higher Education*, *75*(6), 945-995. https://doi.org/10.1007/s10734-017-0179-0

Barsoum, G., and D. Abdalla (2020) Still the employer of choice: evolution of public sector employment in Egypt. ERF working paper 1386.

CAPMAS (2020) Corona virus effects on Egyptian households, until May 2020.

Danquah, M., S. Schotte, and K. Sen (2019) Informal work in Sub-Saharan Africa: dead end or stepping stones? WIDER Working Paper 2019/107. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2019/743-9

Delaporte, Isaure, and Werner Peña (2020) Working from home under COVID-19: who is affected? Evidence from Latin American and Caribbean countries, CEPR COVID Economics 14.

Dingel, Jonathan I., and Brent Nieman (2020) How many jobs can be done at home? Journal of Public Economics 189.

Abu-Ismail, Khalid, and Vladimir Hlasny (2020) Wealth inequality, and closing the poverty gap in Arab countries: The case for a solidarity wealth tax, United Nations Economic and Social Commission for Western Asia, Technical Paper 9, June.

Fehling, M., Z.M. Jarrah, M.E. Tiernan, S. Albezreh, M.J. VanRooyen, A. Alhokair, and B.D. Nelson (2015) Youth in crisis in the Middle East and North Africa: a systematic literature review and focused landscape analysis, Eastern Mediterranean Health Journal 21(12):916-930.

Hale, Thomas, Noam Angrist, Rafael Goldszmidt, Beatriz Kira, Anna Petherick, Toby Phillips, Samuel Webster, Emily Cameron-Blake, Laura Hallas, Saptarshi Majumdar, and Helen Tatlow (2021) A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). Nature Human Behaviour, www.bsg.ox.ac.uk/research/research-projects/covid-19-government-response-tracker.

Hatayama, Maho, Mariana Viollaz, and Hernan Winkler (2020) Jobs' amenability to working from home: Evidence from skills surveys for 53 countries, World Bank Policy Research Working Paper No. 9241.

Hausman, Jerry, and Daniel McFadden (1984) Specification tests for the multinomial logit model, Econometrica 52(5):1219–1240.

Hlasny, Vladimir, and Shireen AlAzzawi (2018). Return migration and social mobility in MENA: evidence from labor market panel surveys. Topics in Middle Eastern and African Economies 20(2), September 2018.

Hlasny, Vladimir, and Shireen AlAzzawi (2020) Informality, market fragmentation and low productivity in Egypt, ERF Forum, August 2020.

International Labour Organization (ILO) (2020a) Global Employment Trends for Youth 2020: Africa. Available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_737670.pdf (accessed 25 November 2020).

International Labour Organization (ILO) (2020b) Global Employment Trends for Youth 2020: Arab States. Available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_737672.pdf (accessed 25 November 2020).

International Labour Organization (ILO) (2020c) ILO Monitor: COVID-19 and the world of work. Sixth edition Updated estimates and analysis. Available at: https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms_755910.pdf

International Labour Organization (ILO, 2020d) Preventing exclusion from the labour market: tackling the COVID-19 youth employment crisis. ILO Policy Brief, 27 May.

International Labour Organization (ILO, 2021). ILO Monitor: COVID-19 and the world of work. 7th edition. ILO Briefing note, 25 January.

International Labour Organization, and Economic Research Forum (ILO and ERF, 2021) Regional Report on Jobs and Growth in North Africa 2020, Advancing the Decent Work Agenda in North Africa (ADWA) Report. www.ilo.org/africa/information-resources/publications/WCMS_809435.

Kabbani, Nader, and Ekta Kothari (2005) Youth employment in the MENA region: a situational assessment. Social Protection Discussion Paper 534, September. Washington: World Bank.

Krafft Caroline, and Ragui Assaad (2016) Inequality of Opportunity in the Labor Market for Higher Education Graduates in Egypt and Jordan. In: Diwan I., Galal A. (eds) The Middle East Economies in Times of Transition. International Economic Association Series. Palgrave Macmillan, London.

Krafft, Caroline, Ragui Assaad, and Mohamed Ali Marouani (2021) The Impact of COVID-19 on Middle Eastern and North African Labor Markets: Vulnerable Workers, Small Entrepreneurs, and Farmers Bear the Brunt of the Pandemic in Morocco and Tunisia, ERF Policy Brief 55, February.

Krafft, Caroline, and Ragui Assaad (2021). The Impact of COVID-19 on the Ability of Households to Meet Their Basic Needs in Sudan: Compounding vulnerabilities in a challenging environment. G²LM|LIC Policy Brief No. 42, July.

NPR, 2020 'This Is Too Much': Working Moms Are Reaching The Breaking Point During The Pandemic" https://www.npr.org/2020/09/29/918127776/this-is-too-much-working-moms-are-reaching-the-breaking-point-during-the-pandemic

OAMDI, 2021. COVID-19 MENA Monitor Household Survey: Egypt, Jordan, Morocco, Sudan, Tunisia (CCMMHH), http://www.erfdataportal.com/index.php/catalog. Version 3.0 of the licensed data files; CCMMHH_Nov-2020-Feb-2021. Egypt: Economic Research Forum (ERF).

Pieters, Janneke (2013). Youth Employment in Developing Countries, Background paper prepared under Service Contract DCI-EDUC/2012/310-255, Luxembourg: European Commission.

Saltiel, Fernando (2020) Who can work from home in developing countries, CEPR COVID Economics 7:104-118.

Tansel, Aysit, and Zeynel A. Ozdemir (2019) Transitions across labor market states including formal/informal division in Egypt, Review of Development Economics 23(4):1674–1695.

World Bank (2020). 'Metadata Glossary: Vulnerable Employment, World Bank Databank'. Available at: https://databank.worldbank.org/metadataglossary/world-development-indicators/series/SL.EMP.VULN.ZS (accessed 27 November 2020).

Table 1. Multinomial logit regressions on pooled survey waves with lagged dependent variables, Egypt

	Males						Males (Alternative model)			Females		
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Employed	Unempl. looking for work	Out of the labor force	Employed	Unempl. looking for work	Out of the labor force
Stringency	0.054	1.073	2.711**	-0.352	-3.145***	-0.341	-0.095	-0.082	0.177***	-0.060	-1.048***	1.109***
	(0.972)	(1.301)	(1.212)	(1.210)	(1.024)	(0.585)	(0.086)	(0.079)	(0.063)	(0.093)	(0.148)	(0.123)
Youth	-0.722	-1.058	0.981	0.605	-0.196	0.390	0.120	0.021	-0.141**	0.057	-0.016	-0.041
	(1.152)	(1.071)	(1.001)	(1.077)	(0.836)	(0.433)	(0.080)	(0.069)	(0.058)	(0.075)	(0.132)	(0.122)
Youth × stringency	1.206	2.010	-1.760	-1.127	0.335	-0.666	-0.153	-0.060	0.213***	-0.058	-0.004	0.063
	(2.061)	(1.920)	(1.796)	(1.939)	(1.521)	(0.788)	(0.110)	(0.101)	(0.073)	(0.110)	(0.200)	(0.175)
Basic education	-0.012	0.039	-0.028	-0.100	0.071	0.031	-0.053**	0.048*	0.005	-0.023	-0.012	0.035
	(0.050)	(0.051)	(0.052)	(0.064)	(0.081)	(0.055)	(0.027)	(0.026)	(0.017)	(0.026)	(0.050)	(0.050)
Secondary education	0.141***	0.021	-0.013	-0.036	-0.088	-0.026	0.013	-0.016	0.003	0.013	0.035	-0.048*
	(0.035)	(0.035)	(0.043)	(0.059)	(0.059)	(0.039)	(0.018)	(0.017)	(0.012)	(0.020)	(0.030)	(0.029)
Higher education	0.343***	0.068	-0.149***	-0.186***	-0.057	-0.019	0.059**	-0.033	-0.026	0.030	0.021	-0.051
	(0.065)	(0.052)	(0.037)	(0.061)	(0.070)	(0.061)	(0.023)	(0.021)	(0.017)	(0.023)	(0.034)	(0.035)
Age–min(age)							-0.000	-0.000	0.000	0.000	-0.007***	0.006***
							(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Children (count)							-0.002	0.001	0.001	0.005	0.000	-0.005
							(0.006)	(0.005)	(0.005)	(0.006)	(0.009)	(0.010)
Rural resid.							0.009	-0.019	0.010	0.025	-0.009	-0.017
							(0.017)	(0.015)	(0.011)	(0.019)	(0.026)	(0.025)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Informal, Feb '20	-0.497***	0.080*	0.214***	0.163***	0.002	0.039*	-0.091***	0.068***	0.023***			
	(0.067)	(0.044)	(0.032)	(0.050)	(0.059)	(0.020)	(0.014)	(0.013)	(0.006)			
Self-empl./ unpaid, Feb '20	-0.611***	-0.057*	0.016	0.560***	0.039	0.053**	-0.080***	0.057***	0.024***			
	(0.066)	(0.033)	(0.022)	(0.062)	(0.066)	(0.027)	(0.019)	(0.017)	(0.008)			
Unemployed, Feb '20	-0.666***	-0.034	-0.018	0.253***	0.447***	0.018	-0.670***	0.564***	0.106***	-0.819***	0.743***	0.076
	(0.060)	(0.042)	(0.018)	(0.088)	(0.098)	(0.022)	(0.042)	(0.050)	(0.034)	(0.025)	(0.059)	(0.057)
OLF, Feb '20	-0.502***	-0.026	0.019	0.106	0.090	0.314***	-0.697***	0.120***	0.577***	-0.777***	0.102***	0.675***
	(0.097)	(0.041)	(0.029)	(0.080)	(0.103)	(0.091)	(0.037)	(0.029)	(0.042)	(0.025)	(0.025)	(0.019)
Obs. (worker clusters)	658 (658)						3,506 (3,018)			1,932 (1,655)		
Chi-squared (deg.freedom)	5,206.35*** (65)						662.02*** (32)			570.69*** (28)		
Pseudo R-squared	0.285						0.330			0.415		

Source: Authors' calculations based on ERF COVID-19 Household Monitor, Egypt wave 4 for detailed empl. categories; waves 1,2, 4 for simple empl. categories.
Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors – women's clustered at worker level – in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 2. Multinomial logit regressions on pooled survey waves with lagged dependent variables, Jordan

	Males						Males (Alternative model)			Females		
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Employed	Unempl. looking for work	Out of the labor force	Employed	Unempl. looking for work	Out of the labor force
Stringency	1.214**	0.423**	1.326*	-0.643	-1.532**	-0.788	-0.505***	0.336*	0.169	-0.082	-0.481*	0.563**
	(0.596)	(0.190)	(0.731)	(0.555)	(0.660)	(0.566)	(0.187)	(0.204)	(0.190)	(0.104)	(0.275)	(0.259)
Youth	-0.548	0.594**	-0.085	-0.486	-0.002	0.527	0.027	0.017	-0.044	0.265	-0.244	-0.021
	(0.747)	(0.239)	(0.673)	(0.624)	(0.722)	(0.484)	(0.241)	(0.252)	(0.210)	(0.166)	(0.278)	(0.278)
Youth × stringency	0.833	-0.914**	0.217	0.759	-0.122	-0.772	-0.072	-0.015	0.088	-0.389	0.392	-0.004
	(1.223)	(0.402)	(1.074)	(1.027)	(1.183)	(0.800)	(0.340)	(0.357)	(0.303)	(0.239)	(0.411)	(0.409)
Basic education	0.209***	0.030	-0.147*	0.041	-0.018	-0.115**	0.040	0.039	-0.079*	-0.010	-0.033	0.043
	(0.074)	(0.021)	(0.081)	(0.050)	(0.076)	(0.046)	(0.052)	(0.053)	(0.041)	(0.059)	(0.082)	(0.080)
Secondary education	0.259***	0.048**	-0.189**	0.027	0.006	-0.151***	0.066	0.018	-0.084**	0.014	0.006	-0.020
	(0.073)	(0.019)	(0.081)	(0.054)	(0.081)	(0.052)	(0.054)	(0.054)	(0.043)	(0.060)	(0.081)	(0.078)
Higher education	0.323***	0.032*	-0.163*	0.021	-0.030	-0.182***	0.090*	0.028	-0.118***	0.038	0.136	-0.174**
	(0.076)	(0.018)	(0.085)	(0.047)	(0.081)	(0.051)	(0.054)	(0.056)	(0.044)	(0.056)	(0.084)	(0.079)
Age–min(age)	-0.004	-0.002*	0.002	0.001	-0.002	0.005**	-0.005***	0.002	0.003	-0.002	-0.007***	0.009***
	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Children (count)	0.010	-0.000	0.005	0.011	-0.015	-0.011	0.011	-0.004	-0.007	0.006	-0.014	0.008
	(0.011)	(0.006)	(0.010)	(0.009)	(0.013)	(0.012)	(0.007)	(0.008)	(0.008)	(0.006)	(0.011)	(0.011)
Rural resid.	0.022	0.015	0.039	0.009	0.136**	-0.221***	0.047	0.064**	-0.111***	-0.046	0.097**	-0.051
	(0.038)	(0.017)	(0.037)	(0.041)	(0.055)	(0.085)	(0.034)	(0.033)	(0.038)	(0.029)	(0.044)	(0.044)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Informal, Feb '20	-0.571***	0.081***	0.211***	0.134***	0.142***	0.003	-0.108***	0.116***	-0.008	-0.179**	0.218***	-0.039
	(0.057)	(0.031)	(0.050)	(0.037)	(0.044)	(0.003)	(0.031)	(0.028)	(0.012)	(0.071)	(0.057)	(0.045)
Self-empl./ unpaid, Feb '20	-0.712***	-0.017	0.019	0.423***	0.247***	0.039	-0.109***	0.056*	0.053**	-0.452***	0.219**	0.233***
	(0.052)	(0.021)	(0.057)	(0.075)	(0.073)	(0.024)	(0.041)	(0.030)	(0.025)	(0.105)	(0.095)	(0.082)
Unemployed, Feb '20	-0.672***	-0.021	0.037	0.048	0.515***	0.093**	-0.593***	0.411***	0.182***	-0.662***	0.391***	0.271***
	(0.057)	(0.020)	(0.054)	(0.042)	(0.078)	(0.040)	(0.050)	(0.059)	(0.044)	(0.071)	(0.077)	(0.084)
OLF, Feb '20	-0.616***	-0.022	0.039	0.053	0.099**	0.447***	-0.664***	0.245***	0.419***	-0.774***	0.315***	0.459***
	(0.066)	(0.019)	(0.050)	(0.041)	(0.049)	(0.054)	(0.041)	(0.038)	(0.048)	(0.042)	(0.032)	(0.040)
Obs. (worker clusters)	635 (635)						1,936 (1,427)			1,659 (1,200)		
Chi-squared (deg.freedom)	2,232*** (75)						431.06*** (30)			350.35*** (30)		
Pseudo R-squared	0.361						0.273			0.282		

Source: Authors' calculations based on ERF COVID-19 Household Monitor, Egypt wave 4 for detailed empl. categories; waves 2, 4 for simple empl. categories.
Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors – women's clustered at worker level – in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Multinomial logit regressions on pooled survey waves with lagged dependent variables, Morocco

	Males						Females					
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	0.450	-0.082	1.373**	0.365	-1.974***	-0.132	0.506**	0.093	0.346	0.366	-0.761	-0.550
	(0.287)	(0.113)	(0.553)	(0.567)	(0.661)	(0.591)	(0.255)	(0.112)	(0.268)	(0.285)	(0.684)	(0.618)
Youth	0.308	-0.019	1.333**	-0.766	-1.095	0.239	0.273	0.017	0.105	0.769	0.469	-1.633**
	(0.338)	(0.105)	(0.648)	(0.818)	(0.740)	(0.691)	(0.211)	(0.134)	(0.225)	(0.499)	(0.839)	(0.758)
Youth × stringency	-0.447	0.020	-1.805**	1.082	1.450	-0.300	-0.325	-0.008	-0.149	-1.064	-0.608	2.154**
	(0.458)	(0.146)	(0.868)	(1.116)	(1.013)	(0.958)	(0.280)	(0.178)	(0.305)	(0.690)	(1.145)	(1.040)
Basic education	0.012	0.007	0.013	-0.031	0.045	-0.046	0.014	0.007	-0.018	0.016	0.003	-0.022
	(0.024)	(0.012)	(0.043)	(0.047)	(0.052)	(0.033)	(0.019)	(0.011)	(0.015)	(0.027)	(0.053)	(0.049)
Secondary education	0.042	0.036	-0.059	-0.013	-0.024	0.018	0.017	-0.002	-0.028	-0.035*	0.083	-0.035
	(0.033)	(0.023)	(0.036)	(0.064)	(0.046)	(0.045)	(0.025)	(0.010)	(0.017)	(0.020)	(0.059)	(0.056)
Higher education	0.229**	0.088	-0.056	-0.244***	-0.027	0.010	0.081*	0.004	0.050	-0.060**	0.047	-0.123*
	(0.099)	(0.055)	(0.045)	(0.044)	(0.063)	(0.050)	(0.044)	(0.019)	(0.034)	(0.025)	(0.069)	(0.064)
Age–min(age)	0.000	0.000	-0.002	0.002	-0.004	0.003	0.002	0.001	-0.001	0.003*	-0.009***	0.005
	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Children (count)	0.005	-0.001	-0.003	0.021	-0.010	-0.012	0.006*	-0.004*	-0.002	0.012**	-0.035**	0.024*
	(0.006)	(0.002)	(0.009)	(0.014)	(0.014)	(0.011)	(0.004)	(0.002)	(0.005)	(0.005)	(0.015)	(0.014)
Rural resid.	0.000	0.012	-0.042	0.050	-0.074*	0.054	0.048**	0.007	-0.028	-0.021	0.080*	-0.086**
	(0.018)	(0.010)	(0.036)	(0.040)	(0.045)	(0.035)	(0.023)	(0.008)	(0.022)	(0.021)	(0.045)	(0.042)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Informal, Feb '20	-0.406***	0.006	0.209***	0.174***	0.009	0.008	-0.354**	0.153*	0.043	0.070	0.131	-0.043
	(0.079)	(0.016)	(0.065)	(0.064)	(0.063)	(0.043)	(0.170)	(0.087)	(0.070)	(0.054)	(0.122)	(0.143)
Self-empl./ unpaid, Feb '20	-0.505***	-0.027	0.104**	0.334***	0.076	0.017	-0.333*	-0.004	0.013	0.357***	0.077	-0.111
	(0.083)	(0.016)	(0.045)	(0.063)	(0.066)	(0.039)	(0.178)	(0.060)	(0.057)	(0.122)	(0.142)	(0.152)
Unemployed, Feb '20	-0.502***	-0.006	0.114*	0.086	0.240***	0.068	-0.398**	0.003	-0.052	0.047	0.510***	-0.109
	(0.083)	(0.022)	(0.060)	(0.065)	(0.083)	(0.047)	(0.190)	(0.056)	(0.051)	(0.046)	(0.136)	(0.154)
OLF, Feb '20	-0.519***	-0.029	0.034	0.184**	0.097	0.233***	-0.406**	-0.038	-0.065	0.012	0.033	0.464***
	(0.084)	(0.018)	(0.032)	(0.089)	(0.082)	(0.087)	(0.199)	(0.053)	(0.054)	(0.016)	(0.116)	(0.139)
Obs. (worker clusters)	2,355 (1,548)						1,563 (1,041)					
Chi-squared (deg.freedom)	528.75*** (95)						3,352.92*** (95)					
Pseudo R-squared	0.169						0.371					

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Morocco waves 2, 3 and 4. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Multinomial logit regressions on pooled survey waves with lagged dependent variables, Tunisia

|	Males						Females					
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	0.372	0.283	-0.126	-0.430	0.261	-0.361	0.064	-0.456*	0.357	0.087	-0.095	0.042
	(0.391)	(0.269)	(0.465)	(0.429)	(0.538)	(0.350)	(0.254)	(0.277)	(0.235)	(0.121)	(0.627)	(0.549)
Youth	0.038	0.008	0.604	0.311	-0.294	-0.665	-0.241	0.074	0.180	0.014	0.462	-0.489
	(0.490)	(0.223)	(0.524)	(0.374)	(0.659)	(0.468)	(0.350)	(0.346)	(0.273)	(0.140)	(0.868)	(0.937)
Youth × stringency	-0.150	-0.012	-0.778	-0.454	0.448	0.946	0.355	-0.088	-0.273	-0.048	-0.509	0.562
	(0.726)	(0.330)	(0.771)	(0.563)	(0.970)	(0.690)	(0.520)	(0.515)	(0.412)	(0.198)	(1.283)	(1.384)
Basic education	0.033	-0.005	-0.060	0.067	-0.037	0.003	0.022	-0.053**	0.020	-0.009	0.017	0.002
	(0.040)	(0.014)	(0.049)	(0.048)	(0.046)	(0.018)	(0.026)	(0.026)	(0.024)	(0.011)	(0.064)	(0.064)
Secondary education	0.110***	0.007	-0.106**	0.072**	-0.093**	0.010	0.067**	-0.051*	-0.004	0.054**	-0.036	-0.030
	(0.035)	(0.017)	(0.042)	(0.030)	(0.039)	(0.020)	(0.026)	(0.028)	(0.018)	(0.023)	(0.054)	(0.054)
Higher education	0.184***	0.070**	-0.165***	0.046	-0.129***	-0.006	0.087***	-0.030	-0.011	0.009	0.043	-0.098
	(0.050)	(0.034)	(0.042)	(0.038)	(0.046)	(0.025)	(0.025)	(0.027)	(0.016)	(0.018)	(0.064)	(0.064)
Age–min(age)	0.002	-0.001	-0.004*	0.003*	-0.002	0.001	0.000	-0.003*	0.000	-0.000	-0.004	0.006*
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Children (count)	0.004	0.000	0.011	0.016	-0.022**	-0.009	0.001	-0.000	0.000	-0.001	0.029**	-0.028*
	(0.011)	(0.005)	(0.010)	(0.010)	(0.011)	(0.007)	(0.006)	(0.004)	(0.005)	(0.003)	(0.015)	(0.015)
Rural resid.	-0.024	0.016	0.004	0.041*	0.006	-0.043**	-0.023	-0.014	0.025	0.001	0.118***	-0.106**
	(0.033)	(0.016)	(0.034)	(0.024)	(0.030)	(0.021)	(0.022)	(0.019)	(0.015)	(0.012)	(0.044)	(0.043)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Informal, Feb '20	-0.472***	0.006	0.281***	0.010	0.171***	0.003	-0.271***	0.095*	0.120***	0.020	-0.014	0.050
	(0.050)	(0.018)	(0.042)	(0.024)	(0.036)	(0.016)	(0.079)	(0.056)	(0.043)	(0.027)	(0.082)	(0.042)
Self-empl./ unpaid, Feb '20	-0.679***	-0.017	0.052	0.457***	0.192***	-0.005	-0.554***	-0.036	-0.039	0.312***	0.176	0.141*
	(0.043)	(0.019)	(0.046)	(0.050)	(0.045)	(0.015)	(0.070)	(0.052)	(0.029)	(0.058)	(0.142)	(0.081)
Unemployed, Feb '20	-0.564***	-0.016	0.080	0.065	0.382***	0.053	-0.532***	-0.070	-0.025	0.002	0.487***	0.137*
	(0.064)	(0.019)	(0.058)	(0.044)	(0.050)	(0.034)	(0.069)	(0.043)	(0.030)	(0.018)	(0.100)	(0.074)
OLF, Feb '20	-0.705***	-0.016	0.024	0.123*	0.371***	0.203***	-0.541***	-0.065	-0.022	0.001	0.179**	0.449***
	(0.042)	(0.025)	(0.045)	(0.069)	(0.075)	(0.056)	(0.069)	(0.043)	(0.028)	(0.014)	(0.077)	(0.038)
Obs. (worker clusters)	2,563 (1,172)						1,891 (909)					
Chi-squared (deg.freedom)	629.32*** (90)						817.78*** (90)					
Pseudo R-squared	0.262						0.264					

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Tunisia waves 2, 3 and 4. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Multinomial logit regressions on pooled survey waves with lagged dependent variables, Sudan

	Males				Females		
	Wage work	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Employed	Unempl. looking for work	Out of the labor force
Stringency	2.006	0.222	-2.561	0.333	0.109	-0.014	0.558
	(2.626)	(0.402)	(2.845)	(0.907)	(1.122)	(0.018)	(0.863)
Youth	0.692	0.018	-0.569	-0.141	0.007	0.002	-0.036
	(0.704)	(0.102)	(0.739)	(0.280)	(0.068)	(0.003)	(0.063)
Youth × stringency	-3.357	-0.056	2.628	0.785			
	(3.075)	(0.443)	(3.245)	(1.225)			
Basic education	0.090	-0.071*	0.024	-0.043	-0.111	0.000	-0.014
	(0.103)	(0.037)	(0.087)	(0.069)	(0.095)	(0.006)	(0.121)
Secondary education	0.099	-0.045	0.026	-0.080	-0.028	-0.005	-0.083
	(0.086)	(0.035)	(0.077)	(0.051)	(0.103)	(0.004)	(0.106)
Higher education	0.051	-0.042	0.103	-0.112**	0.097	-0.003	-0.276***
	(0.097)	(0.036)	(0.089)	(0.053)	(0.098)	(0.003)	(0.090)
Age–min(age)	-0.005	-0.002*	0.006	0.001			
	(0.005)	(0.001)	(0.004)	(0.002)			
Children (count)	-0.007	0.007	-0.002	0.002	-0.003	-0.000	-0.045**
	(0.017)	(0.005)	(0.016)	(0.008)	(0.016)	(0.001)	(0.018)
Rural resid.	-0.063	-0.004	0.064	0.004	-0.082	-0.020	-0.095
	(0.073)	(0.015)	(0.069)	(0.034)	(0.069)	(0.014)	(0.068)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Informal, Feb '20	0.278*	0.007	0.243**	-0.528***			
	(0.163)	(0.011)	(0.123)	(0.146)			
Self-empl./ unpaid, Feb '20	0.321**	0.008	0.168**	-0.497***			
	(0.139)	(0.012)	(0.085)	(0.145)			
Unemployed, Feb '20	0.185	0.047**	0.362***	-0.594***	-0.246*	0.004	0.004
	(0.154)	(0.021)	(0.111)	(0.144)	(0.140)	(0.003)	(0.121)
OLF, Feb '20	0.328**	0.069**	0.175*	-0.572***	-0.219*	0.000	0.167
	(0.149)	(0.031)	(0.101)	(0.146)	(0.130)	(0.000)	(0.120)
Obs. (worker clusters)	1,102 (1,102)				912 (912)		
Chi-squared (deg.freedom)	4,713*** (66)				469.30*** (21)		
Pseudo R-squared	0.125				0.097		

Source: Authors' calculations based on ERF COVID-19 Household Monitor, Sudan wave 3. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

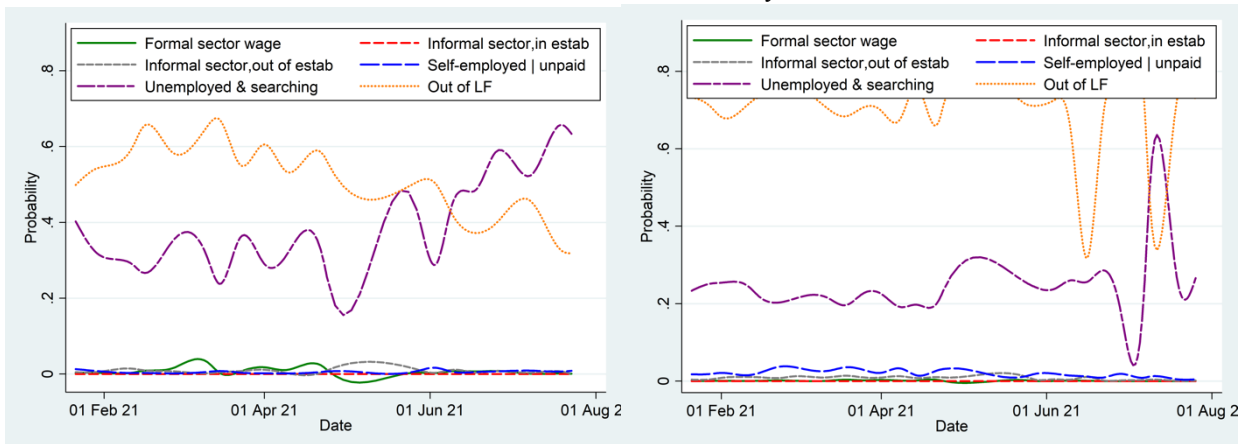Figure 1. Predicted probability of employment type by date, age-group and sex, Egypt

i. Youth men
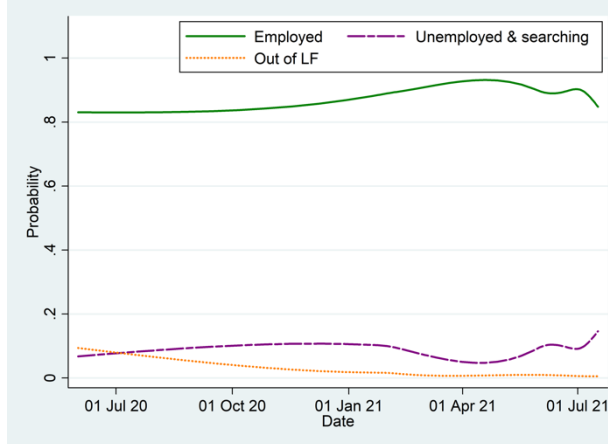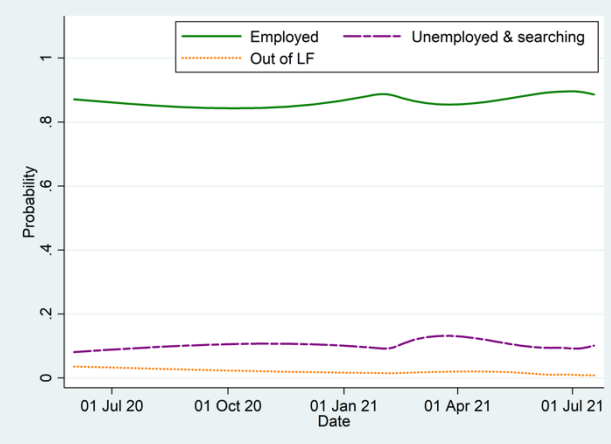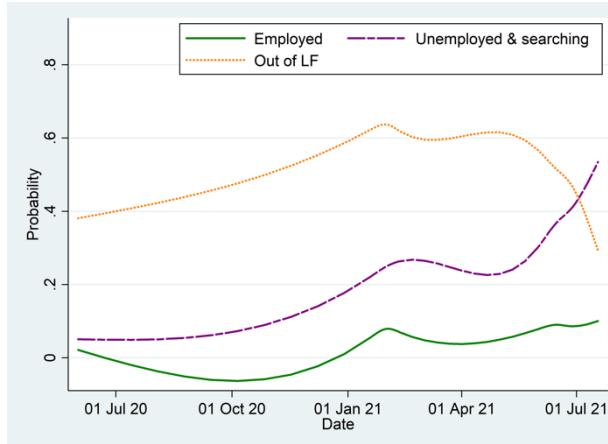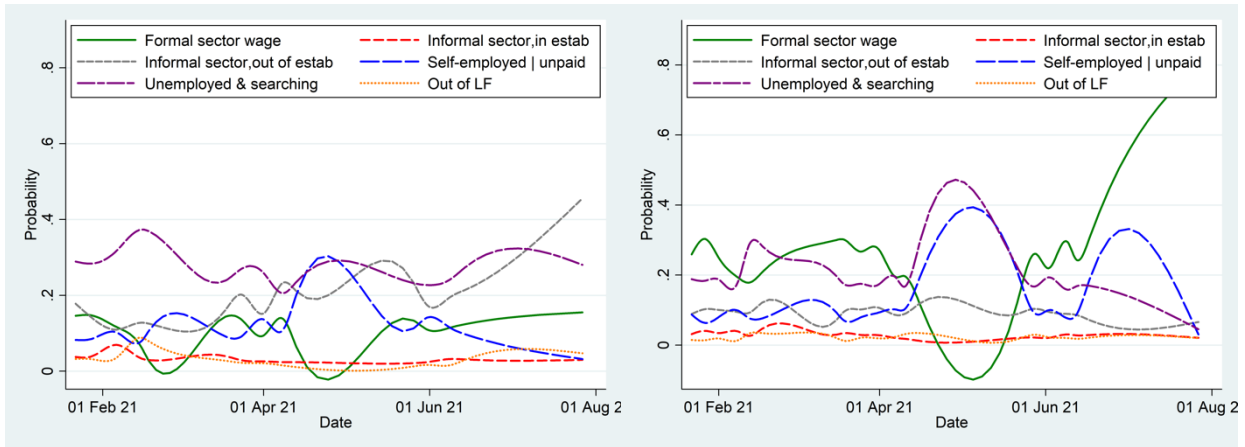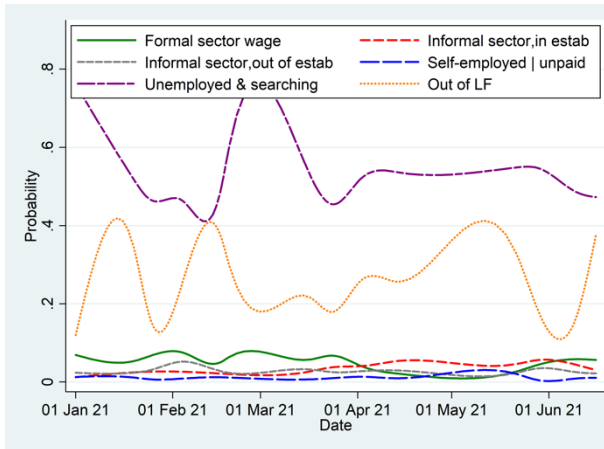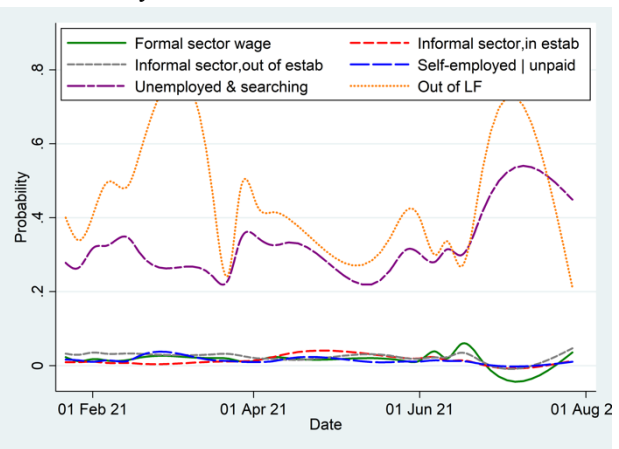
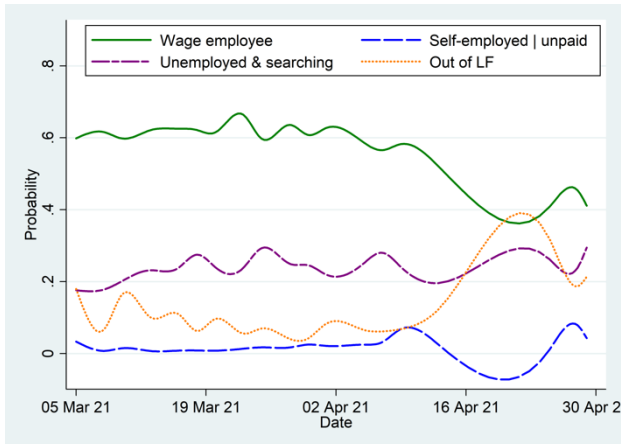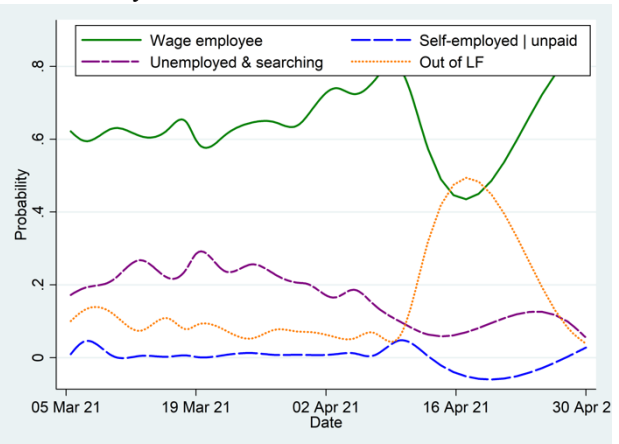ii. Non-youth men

iii. Youth women
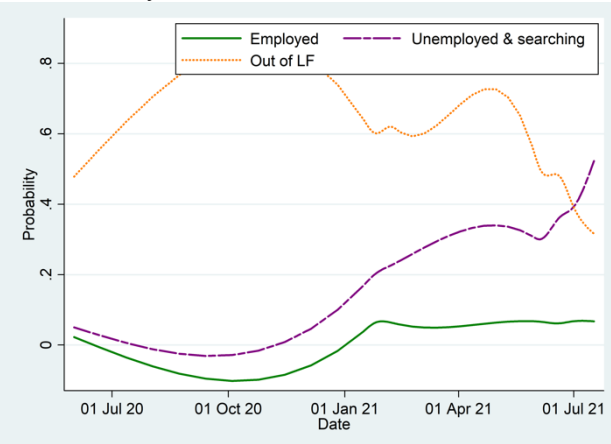
iv. Non-youth women

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Egypt waves 1, 2, 4.

Figure 2. Predicted probability of employment type by date, age-group and sex, Jordan

i. Youth men
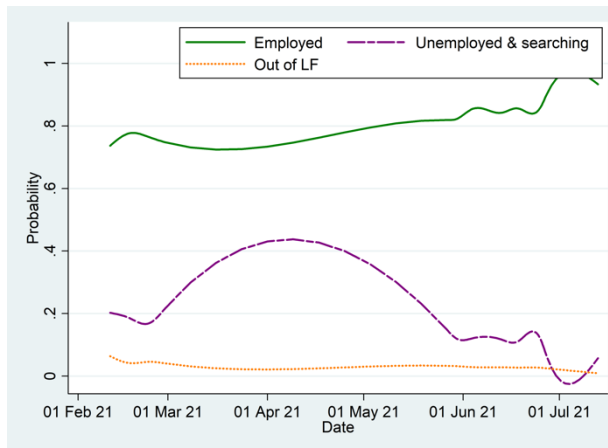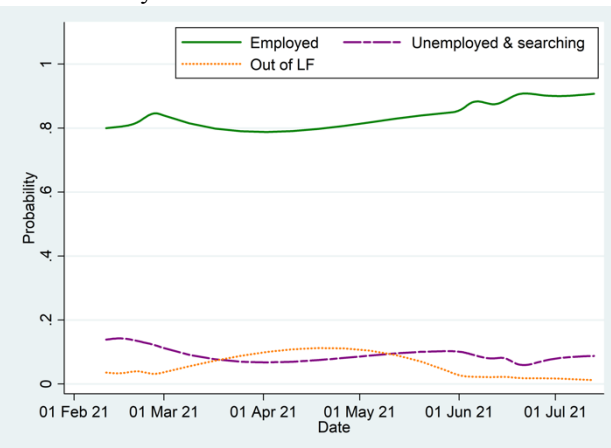
ii. Non-youth men

iii. Youth women
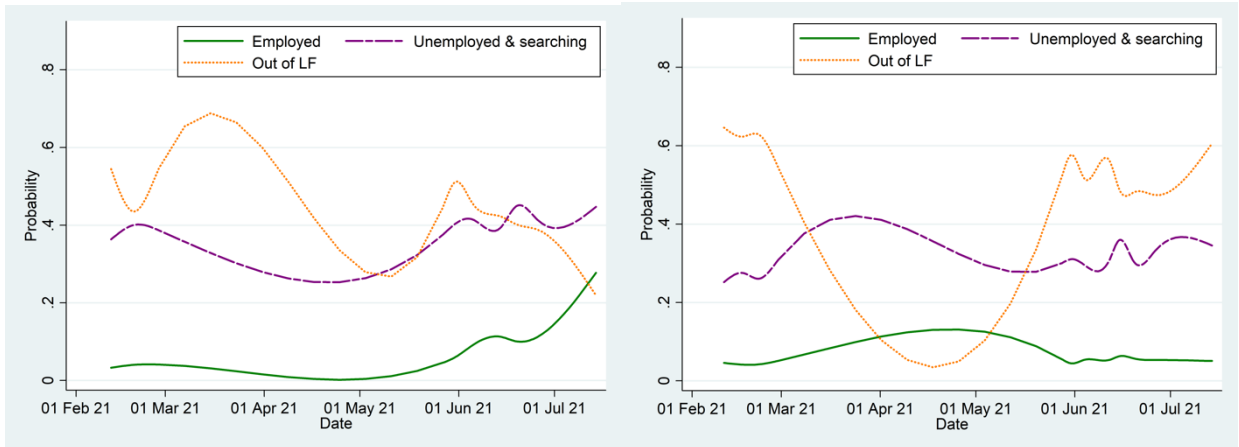
iv. Non-youth women

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Jordan waves 2, 4.

Figure 3. Predicted probability of employment type by date, age-group and sex, Morocco
i. Youth men   ii. Non-youth men
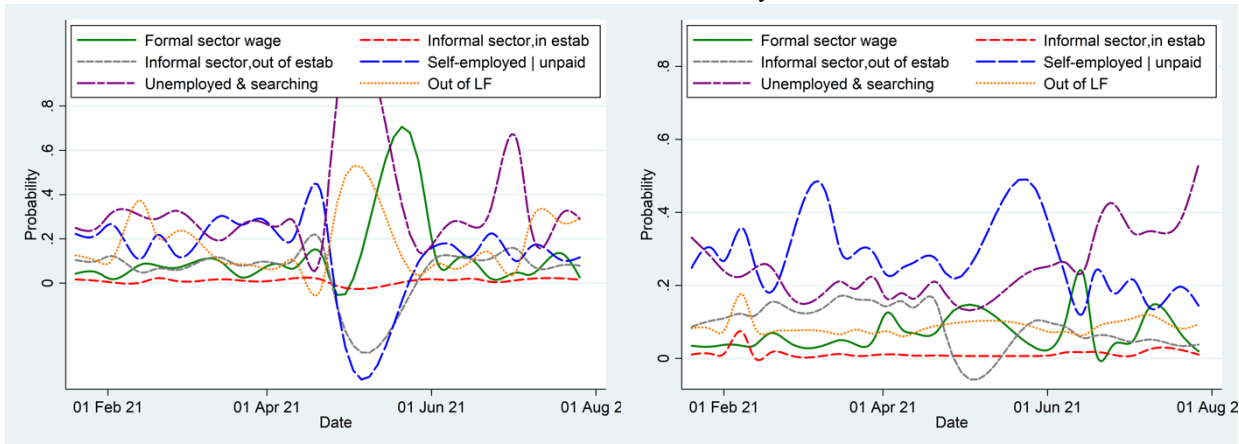
iii. Youth women   iv. Non-youth women

Source: Authors' calculations based on ERF COVID-19 Household Monitors, waves 2, 3, 4.

Figure 4. Predicted probability of employment type by date, age-group and sex, Tunisia
i. Youth men   ii. Non-youth men

iii. Youth women   iv. Non-youth women

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Tunisia waves 2–4.

Figure 5. Predicted probability of employment type by date, age-group and sex, Sudan
i. Youth men   ii. Non-youth men

iii. Youth women   iv. Non-youth women
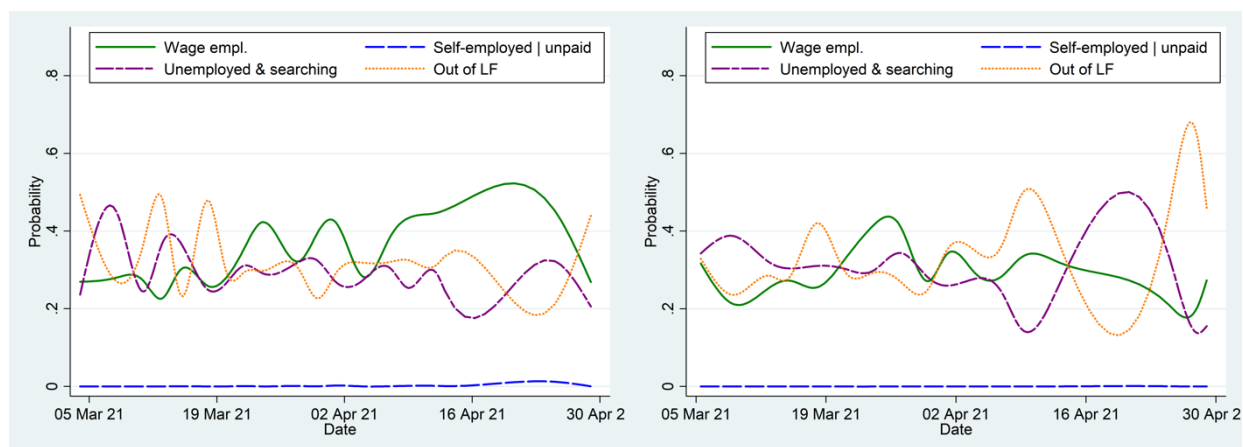
Source: Authors' calculations based on ERF COVID-19 Household Monitors, wave 3.
Note: The figures for Sudan are shown for completeness, but are not entirely meaningful, as they cover an ephemeral span of time – less than two months during the fieldwork of wave 3.

Appendix

Table A1. Labor market status distribution, by country, waves 1–4 (%)

Country	Employed	Unemployed	Out of the labor force
Egypt	60.6%	11.1%	28.4%
Jordan	40.8%	18.7%	40.6%
Morocco	49.8%	14.8%	35.4%
Sudan	38.6%	16.0%	45.4%
Tunisia	60.7%	12.1%	27.2%

Note: Past week status, search required for unemployment. No correction is made for different sizes of cohorts across waves.

Table A2. Main job/activity distribution at end-February 2020, by country, waves 1–3 (%)

	Farmer	Business owner/ self-empl.	Unpaid family worker, farm	Unpaid family worker, other	Wage worker, govmnt.	Wage worker, private/ NGO	Un-employed looking for work	House wife	Full time student	Retired	Other OLF	Total (#)
Egypt	1.6	12.9	0.1	0.1	12.3	38.3	6.7	17.5	4.1	2.2	4.4	7,846
Jordan	0.5	6.8	0.1	0.1	11.7	27.7	8.2	31.3	5.9	5.1	2.6	5,098
Morocco	4.0	16.5	1.3	0.7	5.6	26.3	11.5	21.2	7.6	1.9	3.4	12,228
Sudan	3.7	17.0	0.4	0.4	5.0	7.4	20.6	11.7	19.3	0.3	14.4	4,800
Tunisia	3.1	14.3	0.3	0.2	10.9	32.6	7.0	15.5	7.8	3.7	4.4	12,268

Note: No correction is made for multiple responses by individuals appearing in multiple waves.

Table A3. The stringency index, 60-day moving average, by country and survey wave

	Wave 0	Wave 1	Wave 2	Wave 3	Wave 4
Jordan	0.000 (0.000)	--	0.735 (0.022)	--	0.605 (0.033)
Morocco	0.000 (0.000)	0.631 (0.006)	0.743 (0.021)	0.768 (0.001)	0.693 (0.027)
Sudan	0.023 (0.000)	--	--	0.237 (0.031)	--

Tunisia	0.000 (0.000)	0.512 (0.098)	0.707 (0.005)	0.658 (0.026)	0.657 (0.017)
Egypt	0.000 (0.000)	0.846 (0.000)	0.611 (0.008)	--	0.543 (0.029)

Source: Oxford COVID Policy Tracker, https://github.com/OxCGRT/covid-policy-tracker.

Table A4. Multinomial logit regressions on pooled survey waves, static models, Egypt

	Males						Females					
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	-0.042	-0.266***	-0.096*	0.115***	0.219***	0.070**	-0.047	-0.037	-0.054*	-0.024	0.440***	-0.278***
	(0.048)	(0.077)	(0.050)	(0.044)	(0.028)	(0.034)	(0.042)	(0.038)	(0.028)	(0.023)	(0.049)	(0.068)
Youth	-0.216***	0.055***	0.098***	-0.025	0.051***	0.038***	-0.113***	0.010	0.004	-0.011	0.072**	0.039
	(0.024)	(0.018)	(0.018)	(0.021)	(0.013)	(0.014)	(0.022)	(0.010)	(0.007)	(0.013)	(0.031)	(0.036)
Youth × stringency	-0.042	0.098	-0.057	0.056	-0.059*	0.004	0.007	0.021	0.040	-0.010	-0.045	-0.013
	(0.118)	(0.109)	(0.082)	(0.074)	(0.035)	(0.042)	(0.087)	(0.058)	(0.045)	(0.048)	(0.069)	(0.113)
Basic education	0.081**	-0.040	-0.029	-0.015	0.007	-0.004	-0.003	0.016	-0.003	0.007	0.058	-0.075
	(0.033)	(0.032)	(0.033)	(0.036)	(0.022)	(0.022)	(0.016)	(0.010)	(0.011)	(0.020)	(0.047)	(0.052)
Secondary education	0.144***	-0.045*	-0.048*	-0.036	-0.021	0.006	0.040**	0.031***	0.005	0.003	0.048*	-0.128***
	(0.025)	(0.024)	(0.026)	(0.025)	(0.014)	(0.019)	(0.016)	(0.010)	(0.010)	(0.015)	(0.026)	(0.034)
Higher education	0.360***	-0.082***	-0.131***	-0.102***	-0.038**	-0.007	0.198***	0.069***	0.013	0.004	0.067**	-0.350***
	(0.030)	(0.027)	(0.027)	(0.027)	(0.015)	(0.018)	(0.029)	(0.017)	(0.012)	(0.014)	(0.032)	(0.041)
Children (count)	0.003	-0.066***	0.051***	0.020***	0.004	-0.012**	-0.024***	0.001	0.005**	-0.004	-0.011	0.033***
	(0.007)	(0.008)	(0.005)	(0.006)	(0.004)	(0.005)	(0.007)	(0.003)	(0.002)	(0.004)	(0.008)	(0.010)
Rural resid.	-0.025	-0.016	-0.026	0.060***	0.007	-0.001	-0.012	-0.015	-0.005	0.031**	-0.009	0.010
	(0.025)	(0.021)	(0.022)	(0.023)	(0.012)	(0.013)	(0.021)	(0.013)	(0.008)	(0.014)	(0.025)	(0.034)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Obs. (worker clusters)	3,598 (2,986)						2,187 (1,623)					
Chi-squared (deg.freedom)	651.02*** (55)						396.27*** (55)					
Pseudo R-squared	0.101						0.142					

Source: Authors' calculations based on ERF COVID-19 Household Monitor, Egypt waves 0 and 4. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A5. Multinomial logit regressions on pooled survey waves, static models, Jordan

	Males						Females					
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	-0.178***	-0.175***	0.009	0.005	0.255***	0.083**	-0.061**	-0.027	-0.033**	0.008	0.576***	-0.463***
	(0.058)	(0.062)	(0.046)	(0.033)	(0.044)	(0.037)	(0.027)	(0.021)	(0.015)	(0.008)	(0.063)	(0.058)
Youth	-0.109***	0.032	0.077***	-0.045*	0.105***	-0.060*	-0.090***	0.008	-0.001	-0.007	0.189***	-0.100**
	(0.037)	(0.021)	(0.028)	(0.024)	(0.030)	(0.035)	(0.022)	(0.008)	(0.005)	(0.004)	(0.048)	(0.043)
Youth × stringency	0.002	0.102	-0.034	0.016	-0.170***	0.085	-0.082	0.024	0.036	0.018	-0.203**	0.206**
	(0.097)	(0.073)	(0.068)	(0.066)	(0.062)	(0.067)	(0.068)	(0.032)	(0.025)	(0.014)	(0.090)	(0.092)
Basic education	0.269***	-0.001	-0.114*	-0.051	-0.107*	0.004	-0.005	0.013**	-0.011	0.005	-0.036	0.034
	(0.058)	(0.038)	(0.065)	(0.047)	(0.058)	(0.043)	(0.026)	(0.006)	(0.011)	(0.004)	(0.065)	(0.072)
Secondary education	0.311***	0.008	-0.174***	-0.057	-0.107*	0.020	0.009	0.014***	0.002	0.011**	-0.001	-0.036
	(0.054)	(0.039)	(0.065)	(0.047)	(0.057)	(0.042)	(0.026)	(0.005)	(0.012)	(0.005)	(0.063)	(0.071)
Higher education	0.502***	0.007	-0.196***	-0.102**	-0.167***	-0.044	0.230***	0.038***	0.014	0.010*	0.065	-0.357***
	(0.053)	(0.040)	(0.065)	(0.045)	(0.057)	(0.039)	(0.034)	(0.009)	(0.012)	(0.005)	(0.064)	(0.072)
Children (count)	0.001	-0.002	0.000	0.003	-0.013	0.011	-0.003	-0.001	-0.001	-0.000	-0.025**	0.029***
	(0.011)	(0.006)	(0.008)	(0.007)	(0.008)	(0.008)	(0.006)	(0.003)	(0.001)	(0.002)	(0.010)	(0.010)
Rural resid.	0.084*	-0.024	0.036	0.002	0.077***	-0.174***	0.005	-0.022	0.000	-0.002	-0.006	0.025
	(0.051)	(0.023)	(0.029)	(0.029)	(0.029)	(0.060)	(0.033)	(0.015)	(0.010)	(0.005)	(0.036)	(0.042)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Obs. (worker clusters)	1,931 (1,349)						1,868 (1,171)					
Chi-squared (deg.freedom)	289.44*** (50)						9,872.42*** (50)					
Pseudo R-squared	0.086						0.189					

Source: Authors' calculations based on ERF COVID-19 Household Monitor, Egypt waves 0 and 4. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A6. Multinomial logit regressions on pooled survey waves, static models, Morocco

	Males						Females					
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	-0.082***	-0.029*	-0.056	-0.088**	0.146***	0.109**	-0.113*	-0.012	-0.072*	-0.034	0.246***	-0.016
	(0.028)	(0.017)	(0.041)	(0.043)	(0.040)	(0.048)	(0.064)	(0.012)	(0.038)	(0.023)	(0.066)	(0.066)
Youth	-0.045*	-0.010	0.093***	-0.097**	-0.008	0.066	-0.023	-0.008	0.019	-0.103*	0.077	0.037
	(0.027)	(0.009)	(0.034)	(0.040)	(0.040)	(0.045)	(0.022)	(0.011)	(0.018)	(0.062)	(0.057)	(0.066)
Youth × stringency	-0.017	0.009	-0.144**	0.144*	0.038	-0.031	0.119*	0.014	-0.046	0.065	-0.059	-0.092
	(0.053)	(0.023)	(0.064)	(0.079)	(0.060)	(0.050)	(0.065)	(0.023)	(0.035)	(0.043)	(0.091)	(0.087)
Basic education	0.039	0.007	-0.009	-0.010	0.017	-0.044*	0.007	0.023	0.057*	0.061	0.048	-0.196***
	(0.029)	(0.011)	(0.029)	(0.036)	(0.032)	(0.024)	(0.023)	(0.027)	(0.034)	(0.043)	(0.051)	(0.058)
Secondary education	0.213***	0.029	-0.020	-0.137***	-0.066**	-0.020	0.096	0.047	0.031	-0.003	0.108*	-0.278***
	(0.054)	(0.019)	(0.032)	(0.037)	(0.031)	(0.025)	(0.064)	(0.053)	(0.027)	(0.038)	(0.064)	(0.057)
Higher education	0.365***	0.063**	-0.095***	-0.265***	-0.068*	0.001	0.332***	0.073	0.087	-0.034*	0.024	-0.481***
	(0.072)	(0.032)	(0.031)	(0.038)	(0.040)	(0.028)	(0.120)	(0.058)	(0.074)	(0.020)	(0.071)	(0.055)
Children (count)	0.009	0.003	-0.025***	0.008	0.003	0.003	-0.002	-0.004	0.004	0.002	-0.036**	0.036**
	(0.008)	(0.003)	(0.009)	(0.009)	(0.009)	(0.006)	(0.007)	(0.003)	(0.006)	(0.006)	(0.015)	(0.014)
Rural resid.	-0.054**	-0.023	-0.004	0.069**	-0.004	0.016	0.000	0.022*	-0.066*	-0.027	0.136***	-0.065
	(0.026)	(0.015)	(0.026)	(0.030)	(0.031)	(0.021)	(0.033)	(0.012)	(0.037)	(0.027)	(0.050)	(0.056)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Obs. (worker clusters)	4,294 (1,754)						3,149 (1,291)					
Chi-squared (deg.freedom)	503.04*** (70)						528.81*** (70)					
Pseudo R-squared	0.070						0.133					

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Morocco waves 0, 2, 3 and 4. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A7. Multinomial logit regressions on pooled survey waves, static models, Tunisia

	Males						Females					
	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Formal +social ins.	Informal regular in estab.	Informal irregular/ out of estab	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	-0.095***	0.012	-0.088***	-0.077**	0.273***	-0.025	-0.051**	0.004	-0.026	-0.029*	0.500***	-0.398***
	(0.033)	(0.020)	(0.032)	(0.033)	(0.046)	(0.028)	(0.021)	(0.019)	(0.016)	(0.015)	(0.051)	(0.045)
Youth	-0.229***	0.042***	0.098**	-0.030	0.130***	-0.012	-0.040	0.047***	0.018	0.017	0.166***	-0.208***
	(0.045)	(0.015)	(0.040)	(0.034)	(0.050)	(0.023)	(0.030)	(0.018)	(0.017)	(0.021)	(0.065)	(0.054)
Youth × stringency	-0.000	-0.064**	0.049	0.062	-0.070	0.025	0.028	-0.020	-0.012	-0.020	-0.045	0.070
	(0.079)	(0.032)	(0.072)	(0.067)	(0.068)	(0.043)	(0.060)	(0.029)	(0.030)	(0.036)	(0.102)	(0.090)
Basic education	-0.010	-0.001	-0.063	0.067*	-0.020	0.026	0.051*	-0.016	0.017	-0.010	-0.009	-0.034
	(0.044)	(0.010)	(0.041)	(0.039)	(0.038)	(0.023)	(0.027)	(0.018)	(0.020)	(0.019)	(0.050)	(0.059)
Secondary education	0.150***	0.028**	-0.123***	0.048	-0.087***	-0.016	0.076***	-0.013	0.017	0.015	0.005	-0.100**
	(0.039)	(0.013)	(0.035)	(0.030)	(0.031)	(0.017)	(0.026)	(0.018)	(0.019)	(0.020)	(0.049)	(0.049)
Higher education	0.355***	0.061***	-0.188***	-0.064**	-0.133***	-0.031*	0.284***	0.015	0.008	-0.023*	0.018	-0.302***
	(0.048)	(0.020)	(0.036)	(0.028)	(0.033)	(0.017)	(0.039)	(0.021)	(0.015)	(0.014)	(0.050)	(0.046)
Children (count)	0.000	0.002	0.024**	0.000	-0.013	-0.014**	-0.002	-0.003	-0.000	-0.002	0.019	-0.012
	(0.012)	(0.004)	(0.010)	(0.009)	(0.009)	(0.007)	(0.009)	(0.005)	(0.005)	(0.005)	(0.012)	(0.013)
Rural resid.	-0.012	0.005	0.010	-0.003	0.019	-0.018	-0.029	-0.009	0.025*	0.008	0.059*	-0.053
	(0.046)	(0.014)	(0.033)	(0.027)	(0.028)	(0.020)	(0.025)	(0.017)	(0.014)	(0.015)	(0.036)	(0.039)
Regions	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***	Y***
Obs. (worker clusters)	5,260 (2,979)						3,201 (1,720)					
Chi-squared (deg.freedom)	372.47*** (65)						469.01*** (65)					
Pseudo R-squared	0.088						0.138					

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Tunisia waves 0, 2, 3 and 4. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A8. Multinomial logit regressions on pooled survey waves, static models, Sudan

	Males				Females			
	Wage work	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force	Wage work	Self-empl./ unpaid work	Unempl. looking for work	Out of the labor force
Stringency	1.702***	-2.540***	0.700***	0.138	0.240	-0.233	0.967***	-0.973***
	(0.243)	(0.248)	(0.241)	(0.169)	(0.259)	(0.183)	(0.304)	(0.307)
Youth	-0.020	-0.051	0.054	0.018	-0.326***	0.010	0.151*	0.165**
	(0.078)	(0.041)	(0.070)	(0.047)	(0.089)	(0.014)	(0.083)	(0.077)
Youth × stringency	-0.150	0.584	-0.314	-0.120	1.205***	0.043	-0.442	-0.806*
	(0.429)	(0.408)	(0.368)	(0.323)	(0.389)	(0.113)	(0.408)	(0.417)
Basic education	0.070	-0.083*	0.042	-0.029	-0.074	-0.049	0.059	0.064
	(0.068)	(0.046)	(0.070)	(0.047)	(0.053)	(0.039)	(0.076)	(0.087)
Secondary education	0.093**	-0.042	-0.011	-0.040	0.069	-0.051	0.022	-0.039
	(0.046)	(0.039)	(0.050)	(0.043)	(0.049)	(0.039)	(0.066)	(0.084)
Higher education	0.113**	-0.145***	0.115*	-0.083**	0.171***	-0.047	0.143**	-0.267***
	(0.051)	(0.047)	(0.069)	(0.038)	(0.051)	(0.038)	(0.067)	(0.080)
Children (count)	-0.006	0.016*	-0.015	0.005	-0.012	-0.001	0.020	-0.007
	(0.009)	(0.008)	(0.012)	(0.007)	(0.011)	(0.002)	(0.013)	(0.014)
Rural resid.	-0.119***	0.044	0.062	0.013	0.021	0.008	0.024	-0.053
	(0.040)	(0.034)	(0.051)	(0.031)	(0.039)	(0.013)	(0.051)	(0.056)
Regions	Y***	Y***	Y***	Y***	Y***		Y***	Y***
Obs. (worker clusters)	2,183 (1,143)				1,664 (912)			
Chi-squared (deg.freedom)	261.80*** (51)				1,162.39*** (51)			
Pseudo R-squared	0.221				0.187			

Source: Authors' calculations based on ERF COVID-19 Household Monitor, Sudan waves 0 and 3. Notes: AMEs shown. Samples weighted by individual-level weights. Heteroskedasticity-robust standard errors clustered at worker level in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Figure A1. Stringency index, 60-day moving average, by country and date
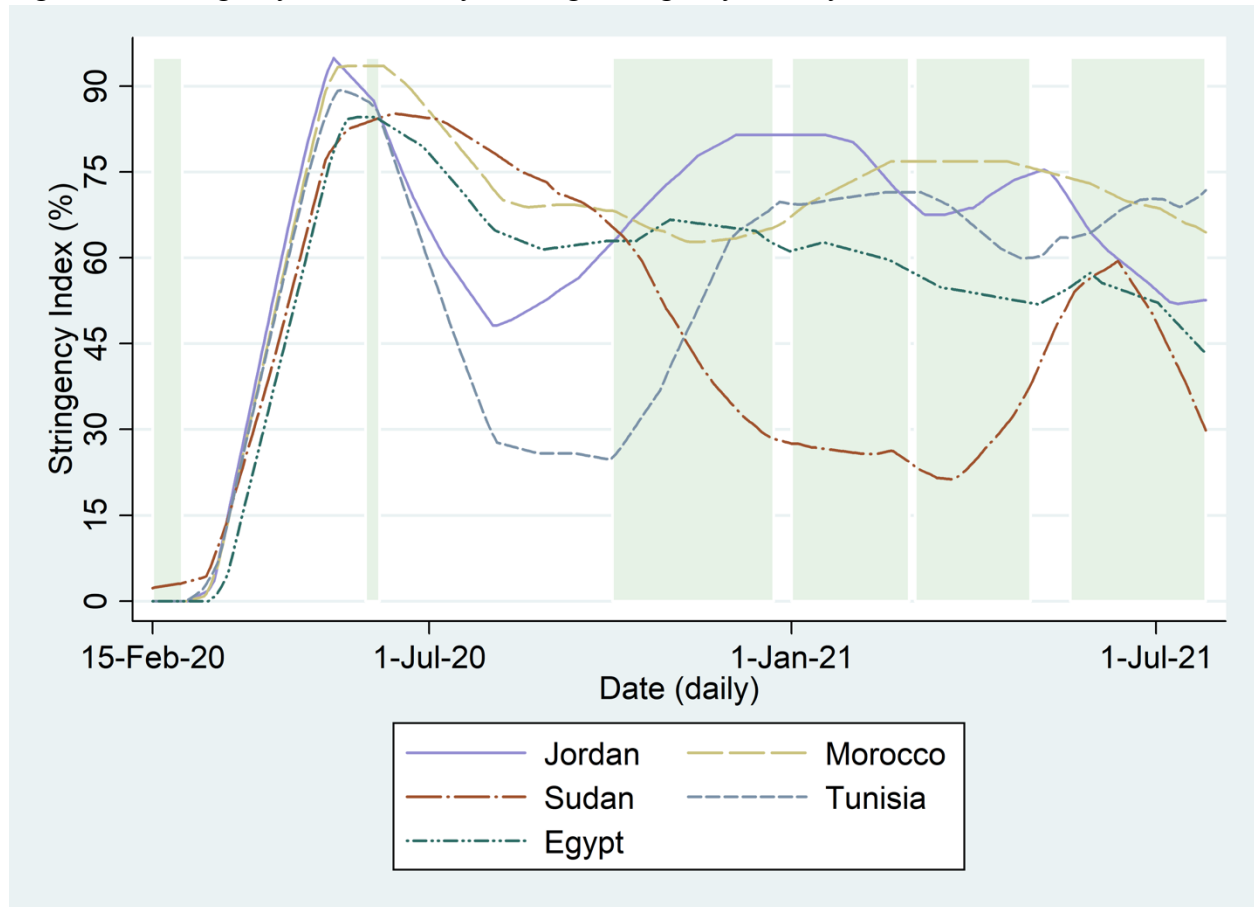
Note: Shaded areas show survey periods. Wave 0 occurred during end-Feb 2020; Wave 1 during June 2020 and during October–November 2020; Wave 2 during January–February 2021; Wave 3 during March–April 2021; Wave 4 during May–July 2021.

Figure A2. Employment status by age group, sex and country–wave
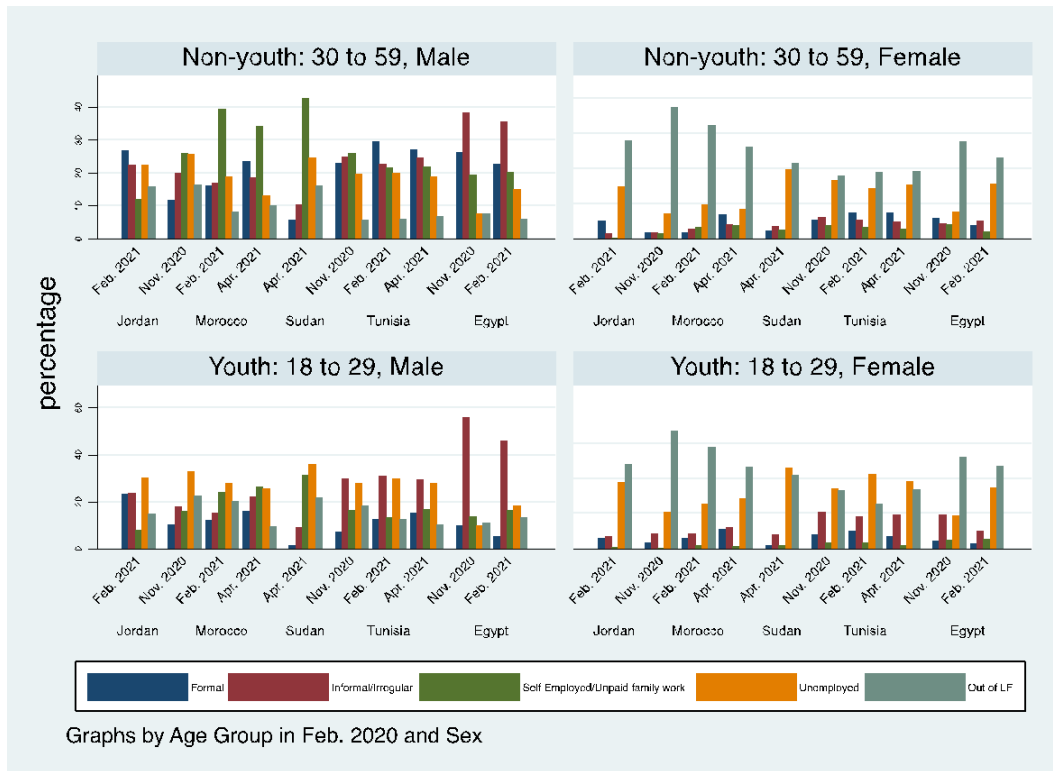
Figure A3. Change in employment status by age group, sex and country–wave
i. Temporary layoff/suspension

ii. Permanent layoff/suspension

44

Past 60 days: permanent layoff/suspension

Graphs by Age Group in Feb. 2020 and Sex

iii. Changed hours

Past 60 days: changed hours

Graphs by Age Group in Feb. 2020 and Sex

iv. Changed pay

45
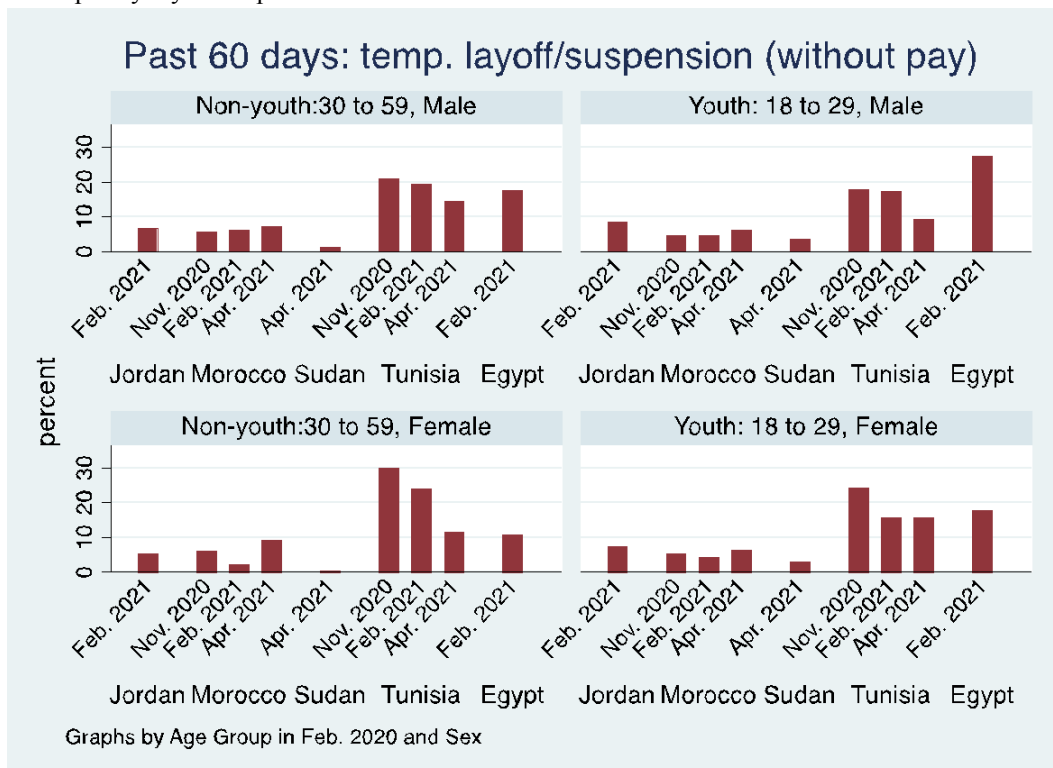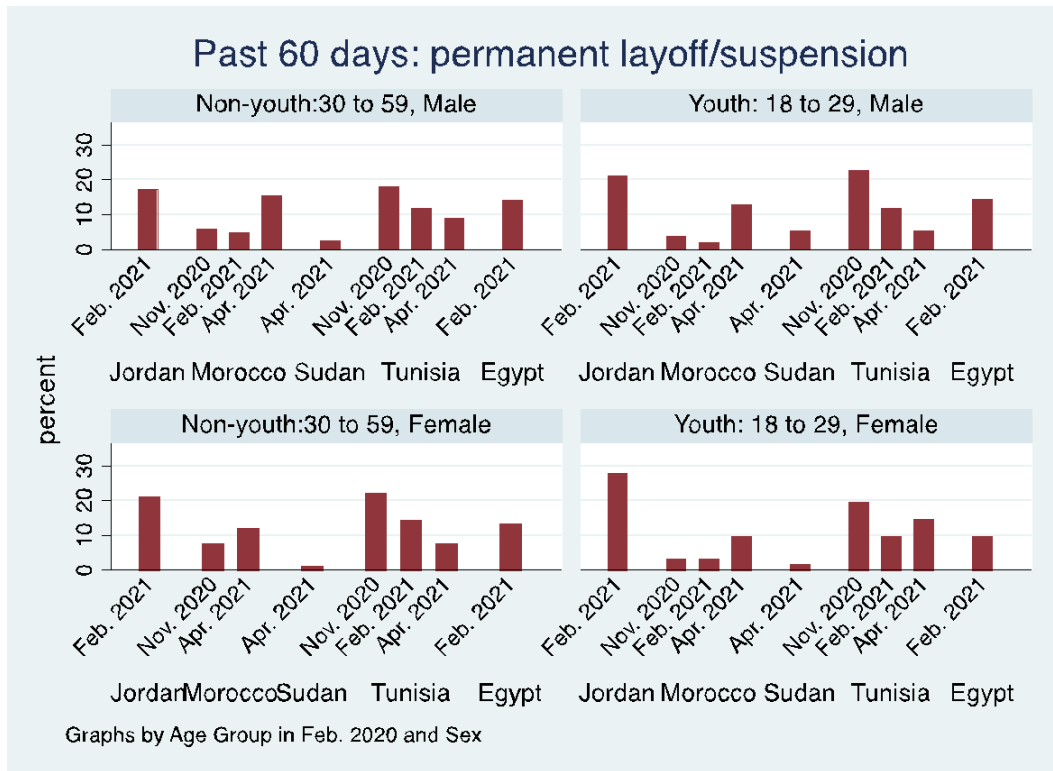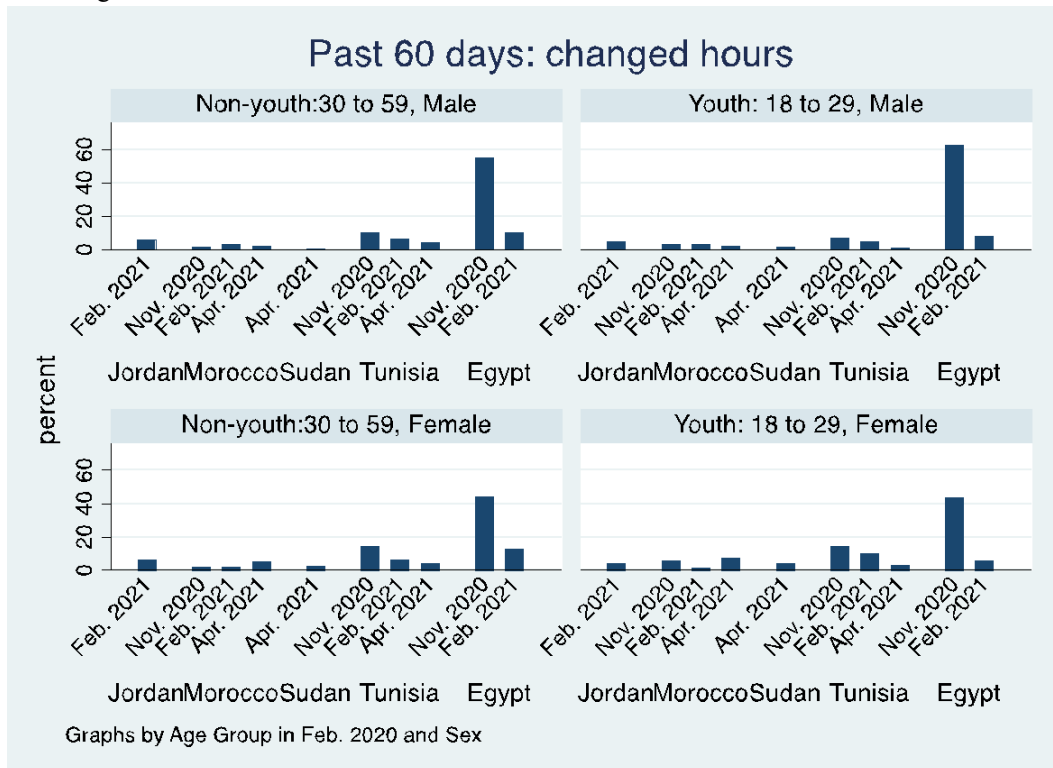
Past 60 days: changed pay

v. Delay in wage payment
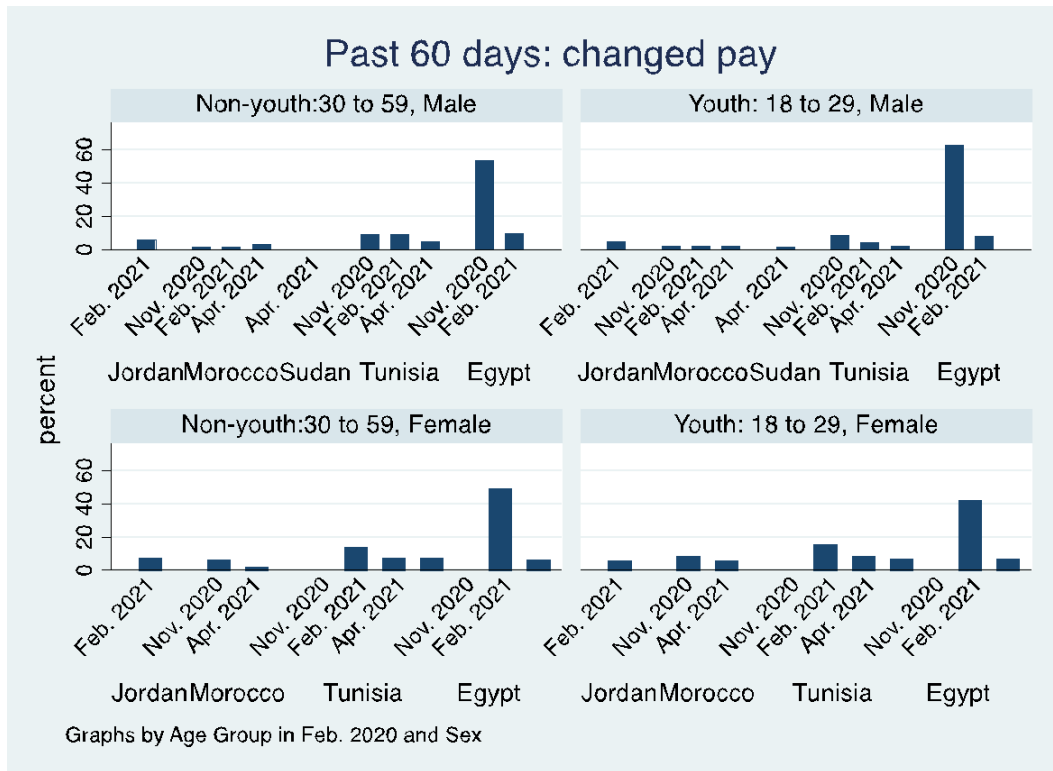
Past 60 days: delay in wage payment
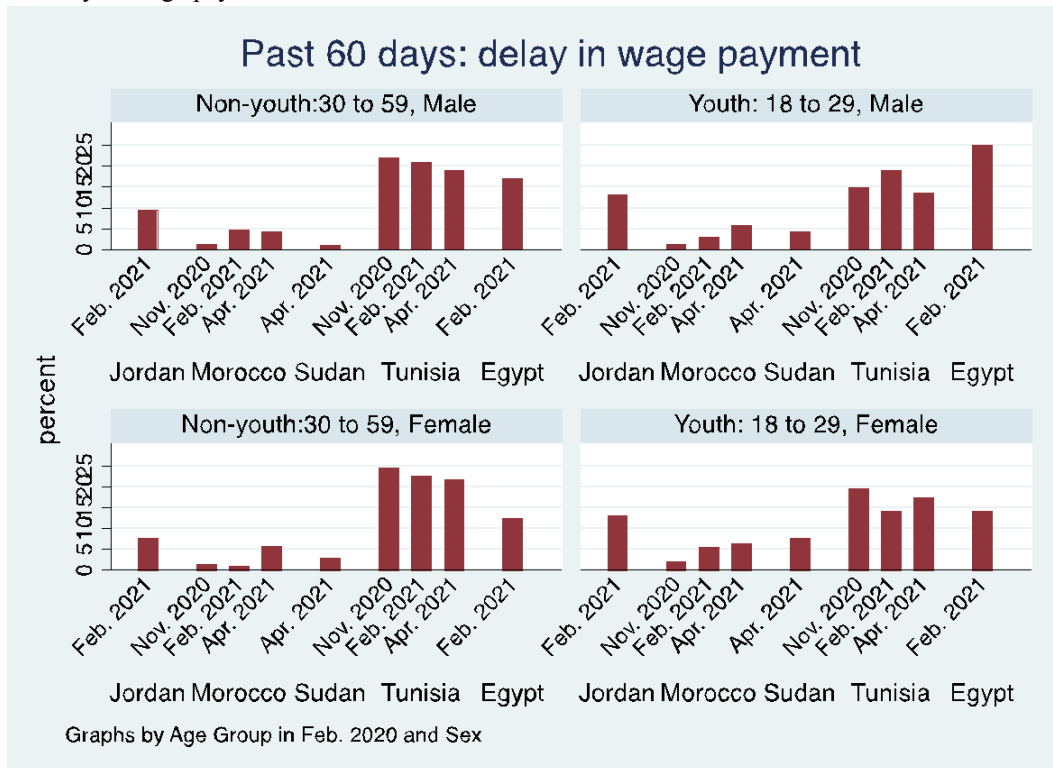
vi. Getting hired

vi. No change
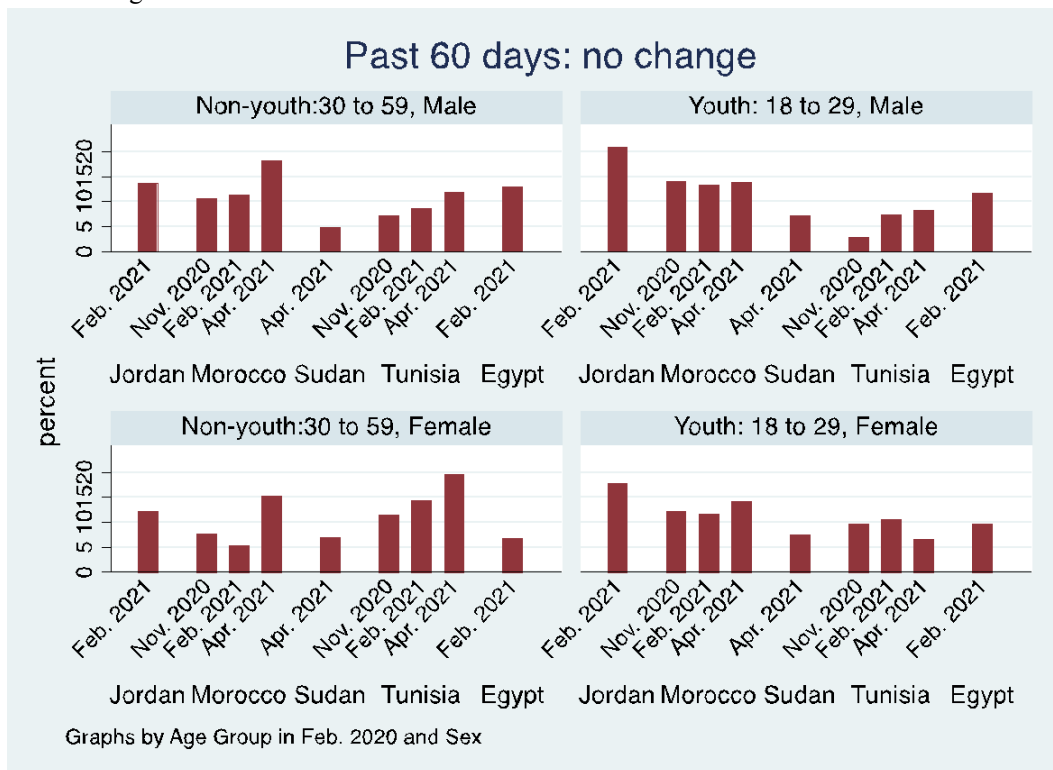
Figure A4. Employment-sector transitions, male non-student youth

Emp. Status Transition Feb. 2020 to Feb. 2021, Youth Males

Emp. Status Transition Feb. 2020 to Feb. 2021, Non-youth Males
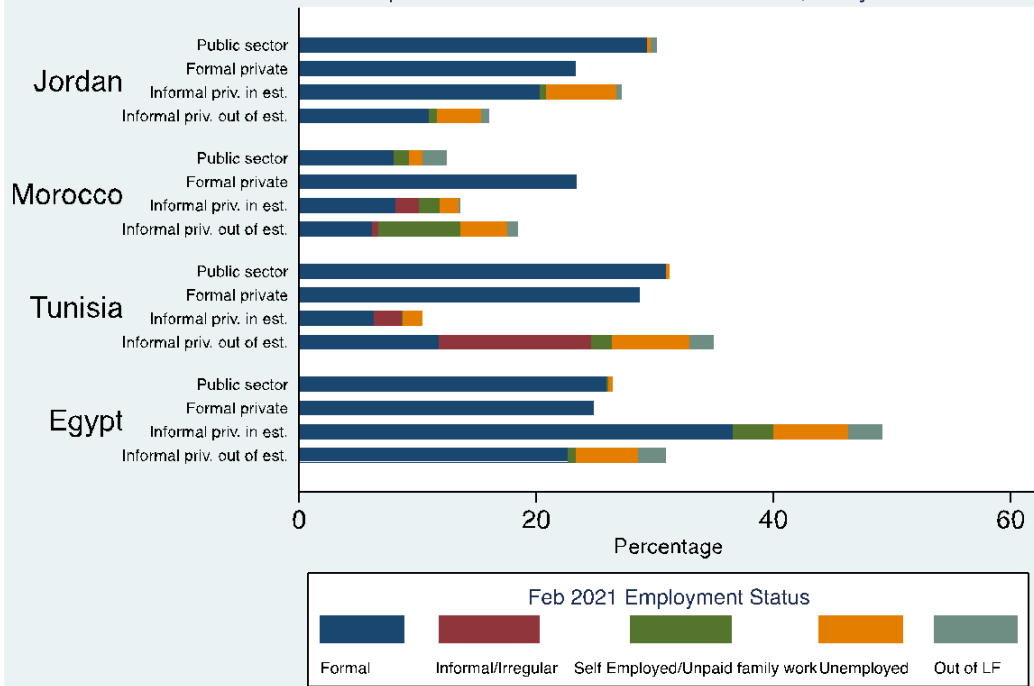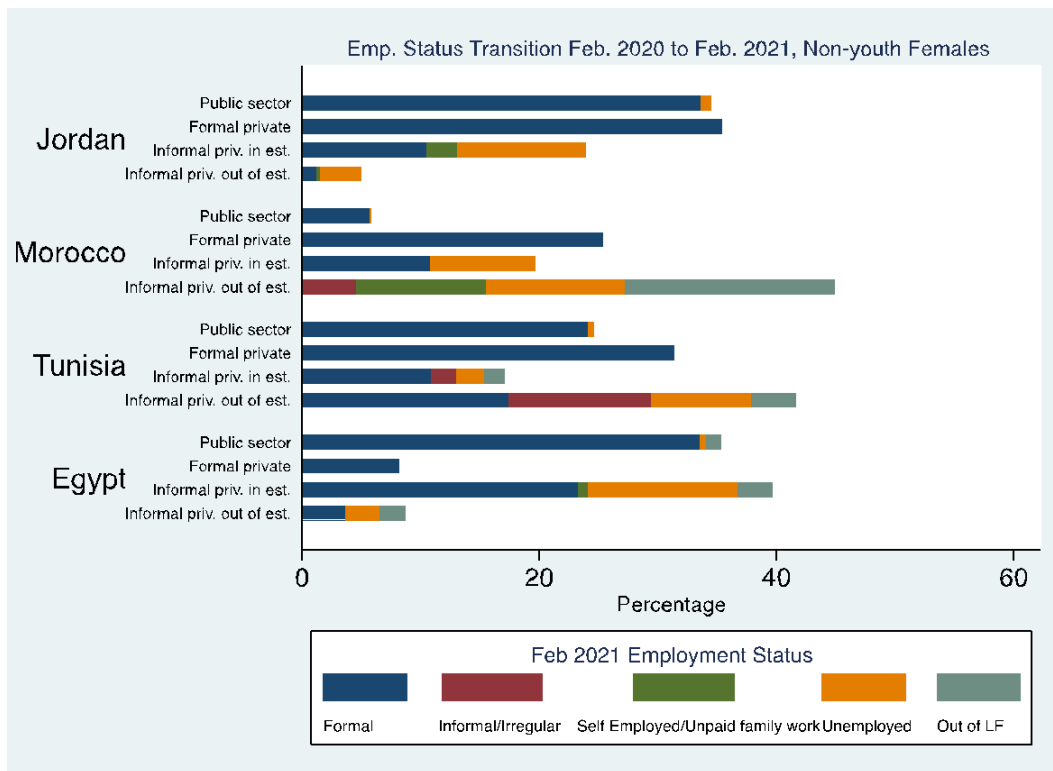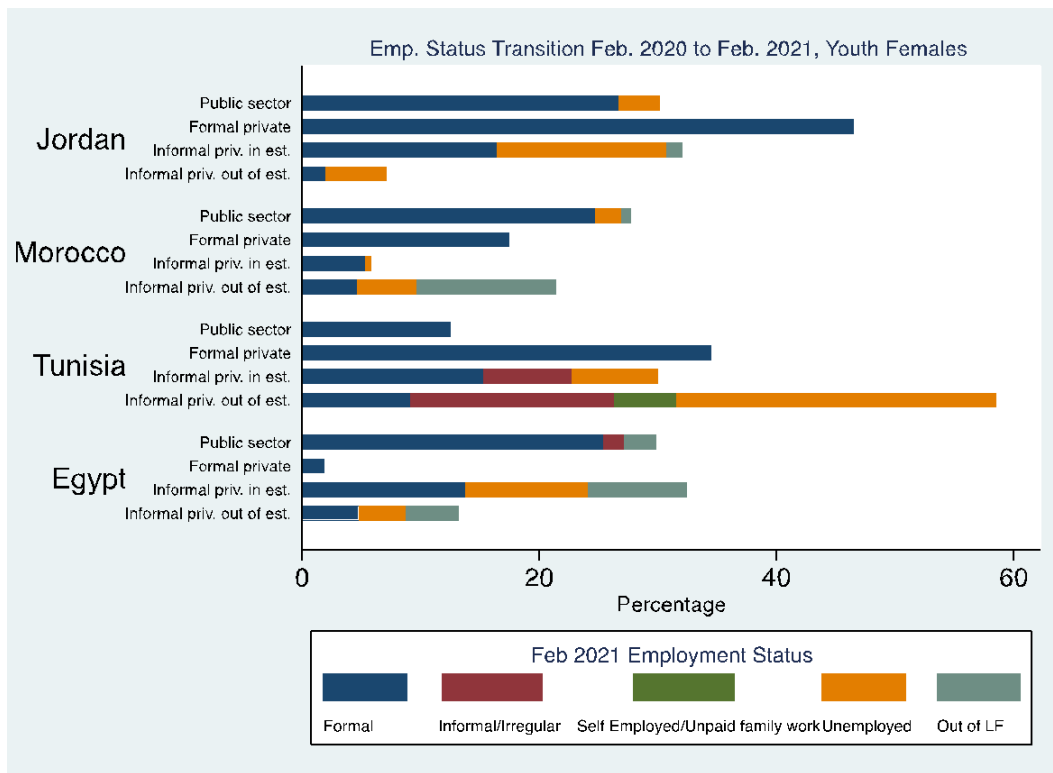
Emp. Status Transition Feb. 2020 to Feb. 2021, Youth Females

Emp. Status Transition Feb. 2020 to Feb. 2021, Non-youth Females

Source: Authors' calculations based on ERF COVID-19 Household Monitors, waves 1–3.

Figure A5a. Experience of Feb. 2020 Wage Workers in past 60 days from Nov. 2020 (Wave 1-overall)
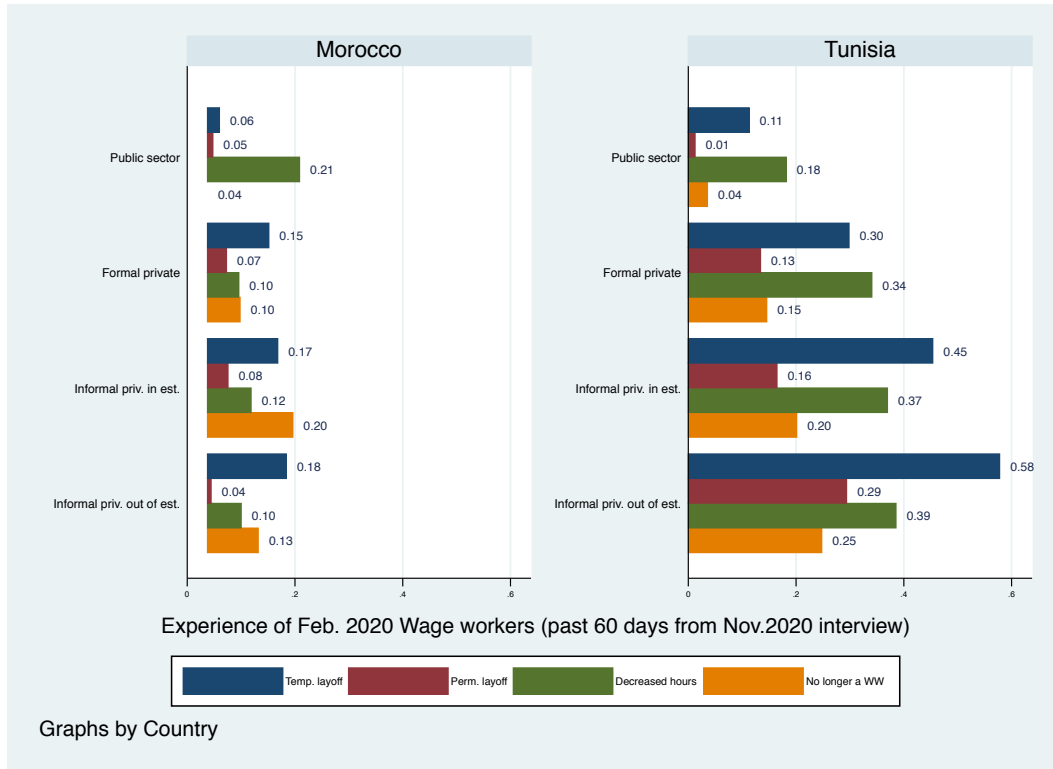
Figure A5b. Experience of Feb. 2020 Wage Workers in past 60 days from Feb. 2021 (Wave 2-overall)

Morocco

	Temp. layoff	Perm. layoff	Decreased hours	No longer a WW
Public sector	0.17	0.01	0.09	0.26
Formal private	0.12	0.03	0.11	0.14
Informal priv. in est.	0.10	0.03	0.05	0.38
Informal priv. out of est.	0.19	0.04	0.07	0.60

Tunisia

	Temp. layoff	Perm. layoff	Decreased hours	No longer a WW
Public sector	0.08	0.00	0.15	0.05
Formal private	0.32	0.10	0.17	0.26
Informal priv. in est.	0.39	0.13	0.24	0.22
Informal priv. out of est.	0.47	0.15	0.18	0.33

Experience of Feb. 2020 Wage workers (past 60 days from Feb.2021 interview)

Temp. layoff Perm. layoff Decreased hours No longer a WW

Graphs by Country

Jordan

	Temp. layoff	Perm. layoff	Decreased hours	No longer a WW
Public sector	0.03	0.02	0.19	0.04
Formal private	0.07	0.15	0.14	0.21
Informal priv. in est.	0.15	0.16	0.20	0.26
Informal priv. out of est.	0.24	0.23	0.22	0.22

Egypt

	Temp. layoff	Perm. layoff	Decreased hours	No longer a WW
Public sector	0.06	0.03	0.30	0.04
Formal private	0.22	0.09	0.20	0.10
Informal priv. in est.	0.37	0.13	0.26	0.20
Informal priv. out of est.	0.43	0.14	0.30	0.09

Experience of Feb. 2020 Wage workers (past 60 days from Feb.2021 interview)

Temp. layoff Perm. layoff Decreased hours No longer a WW

Graphs by Country

Figure A5c. Experience of Feb. 2020 Wage Workers in past 60 days from Apr. 2021 (Wave 3 overall)
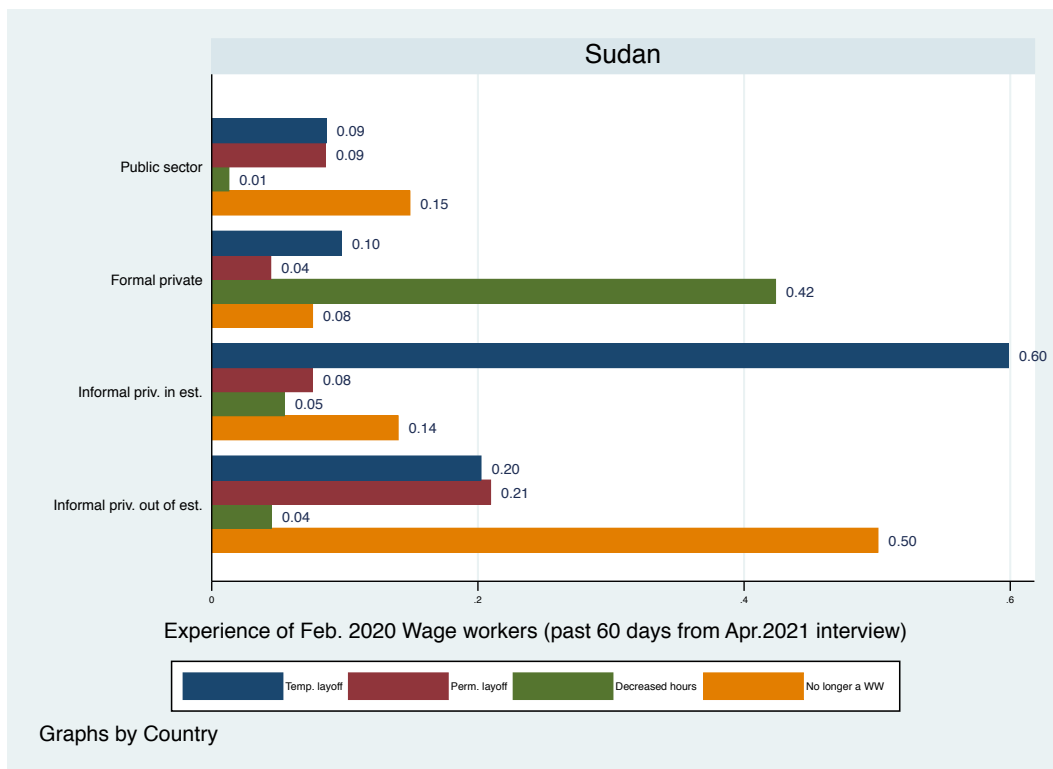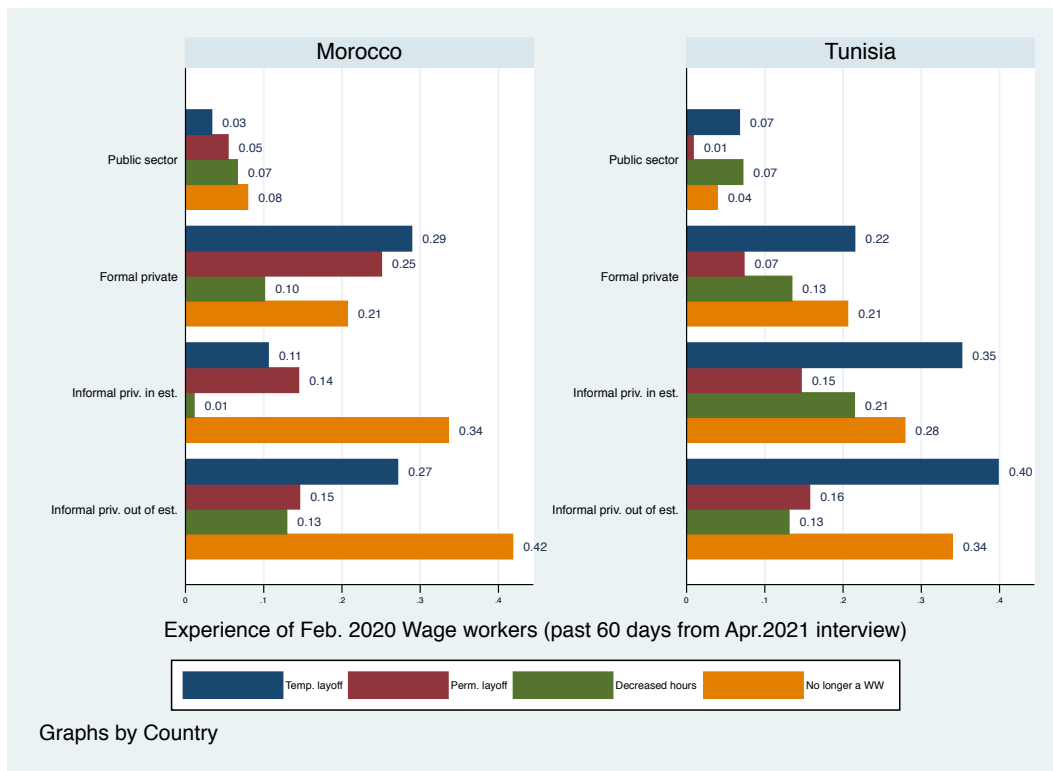
Figure A5d. Experience of Feb. 2020 Wage Workers in past 60 days from June 2021(Wave 4)
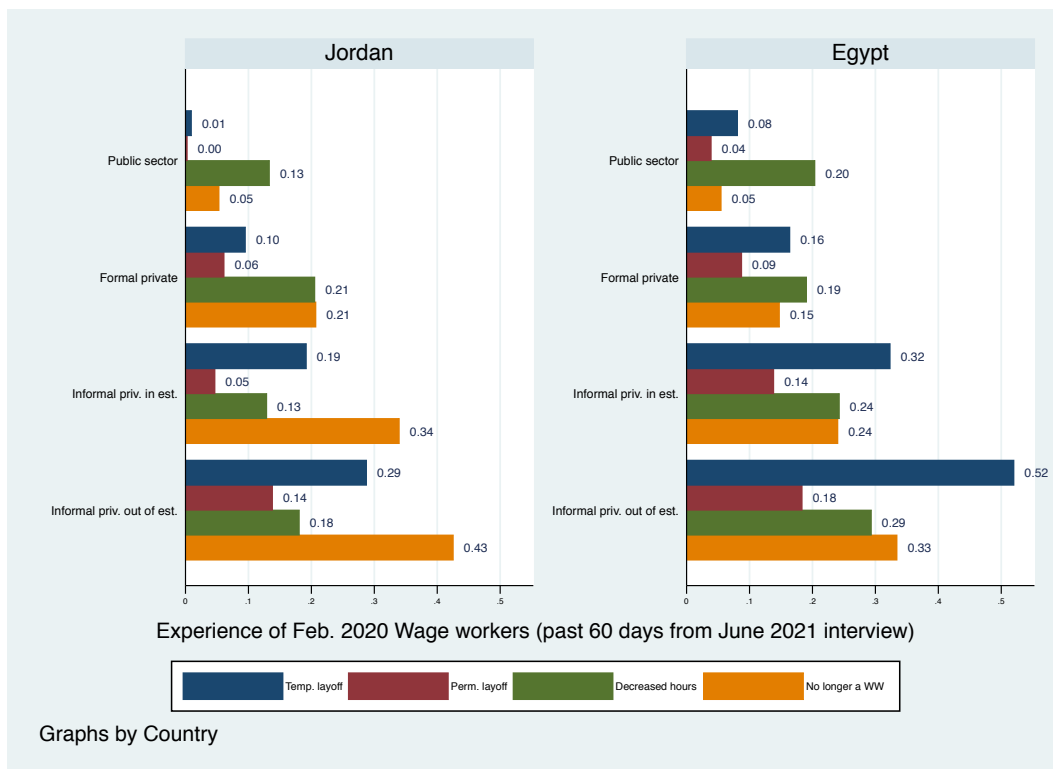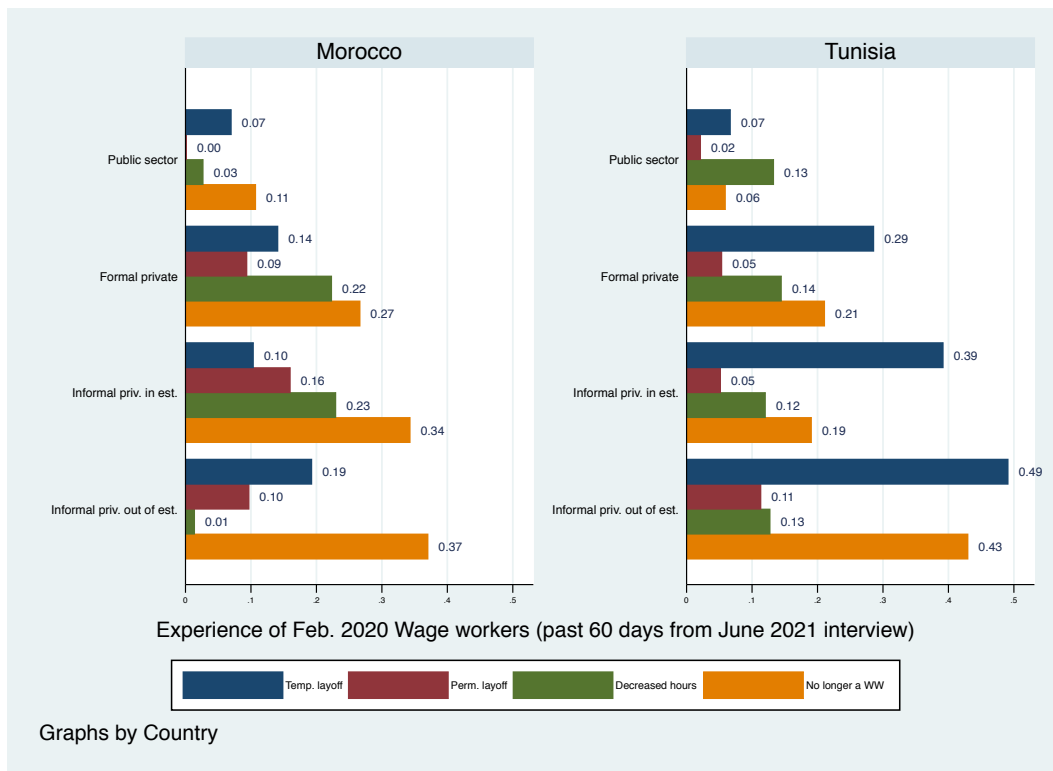
Figure A6a. Experience of Feb. 2020 Wage Workers in past 60 days from Nov. 2020 (Wave 1-age and gender)
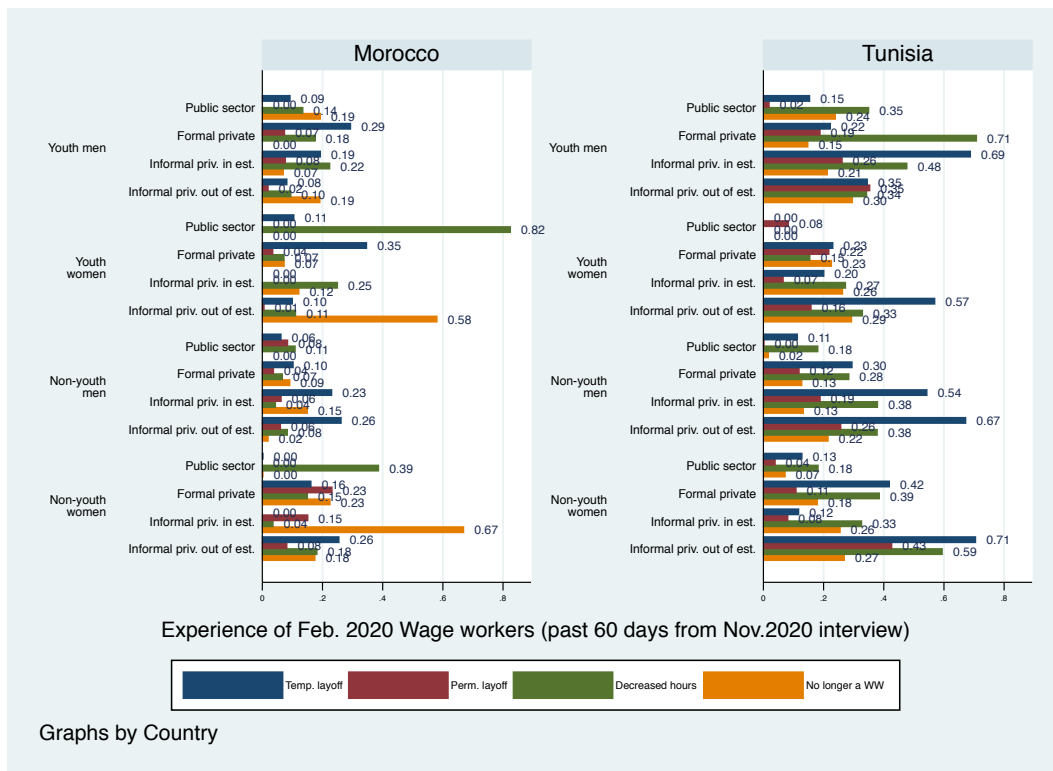
Figure A6b. Experience of Feb. 2020 Wage Workers in past 60 days from Feb. 2021(Wave 2)
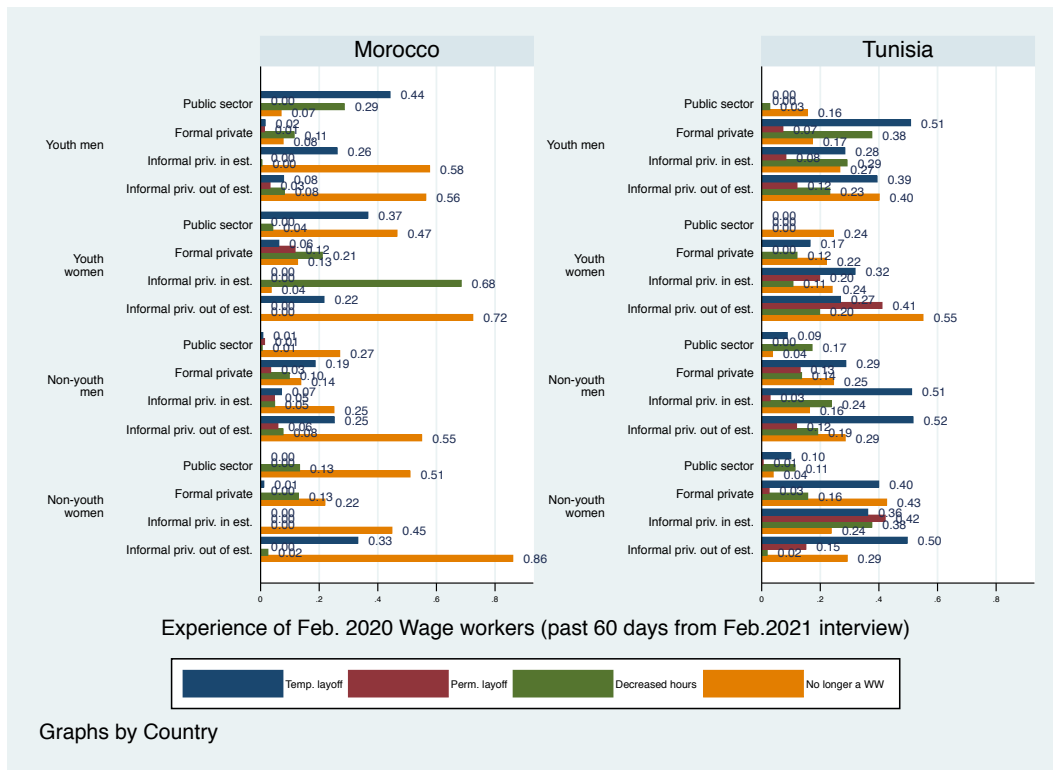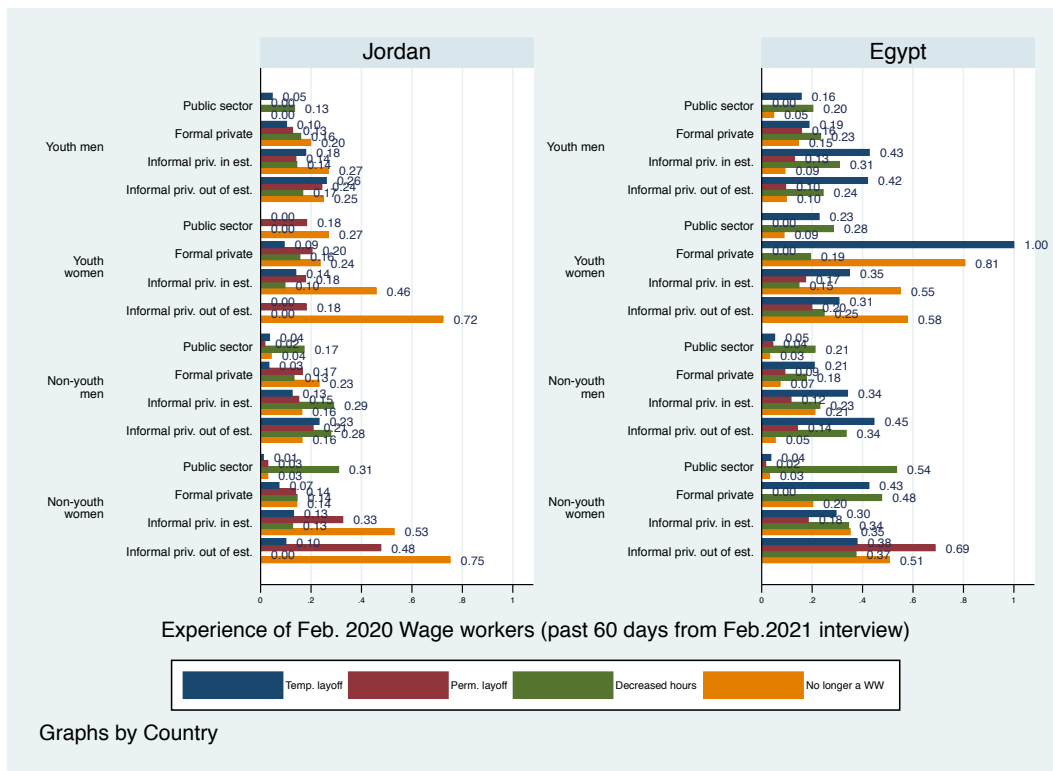
Figure A6c. Experience of Feb. 2020 Wage Workers in past 60 days from Apr. 2021(Wave 3)
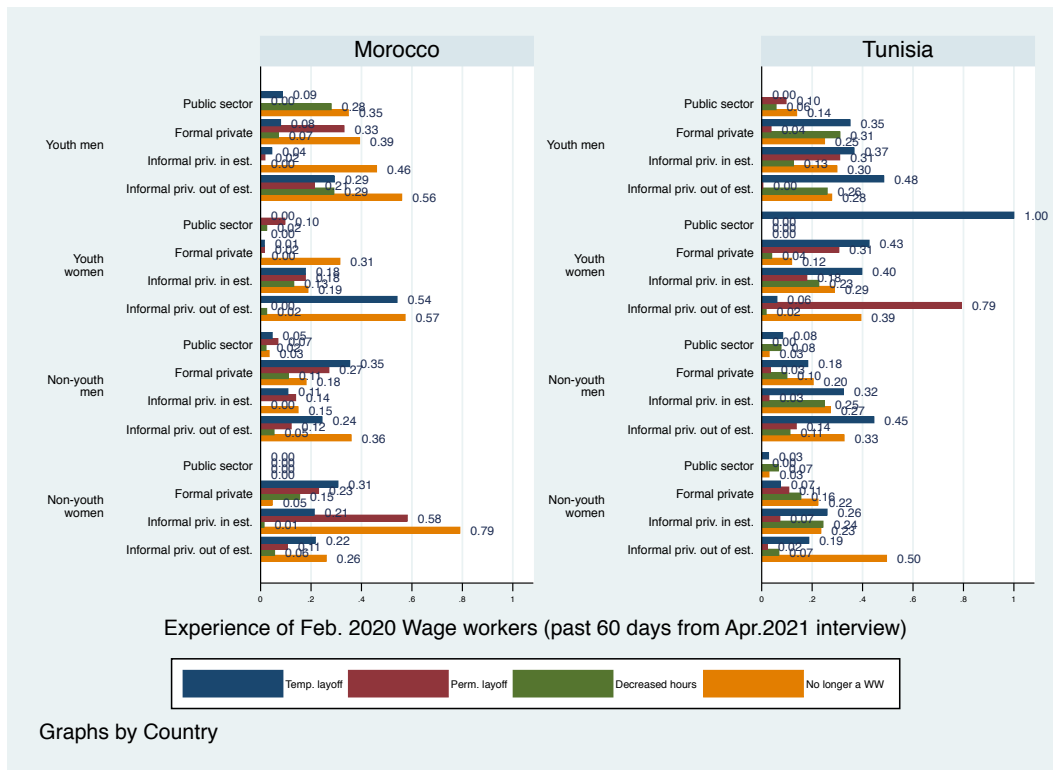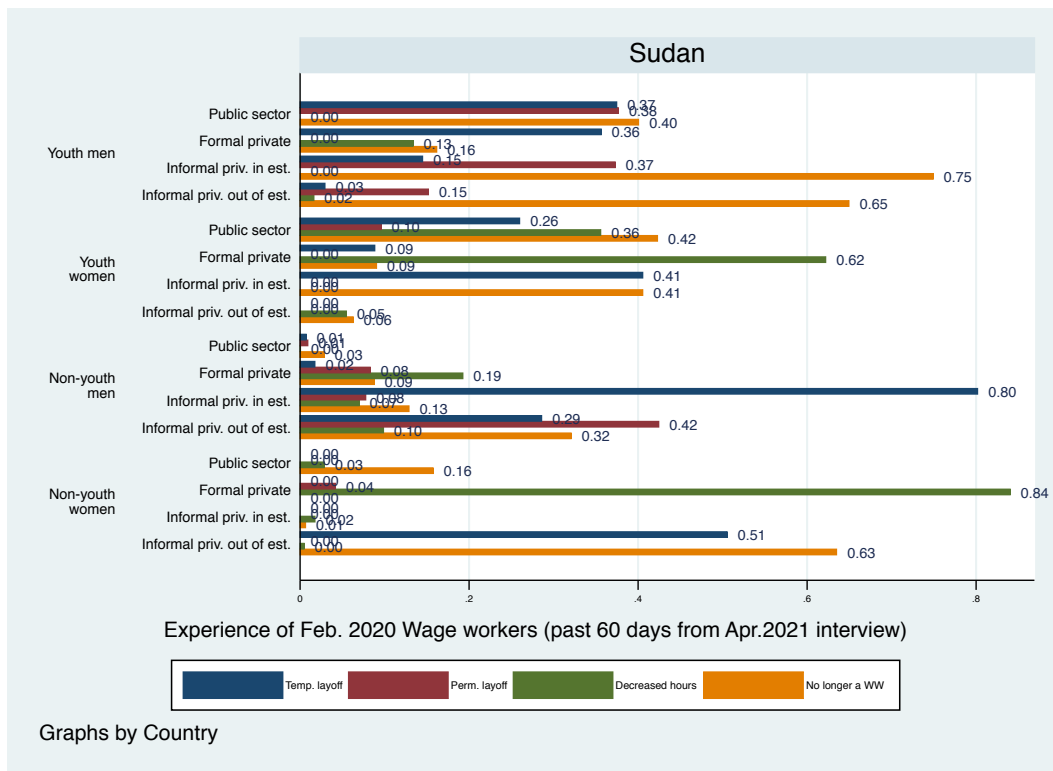
Figure A6d. Experience of Feb. 2020 Wage Workers in past 60 days from June 2021(Wave 4)
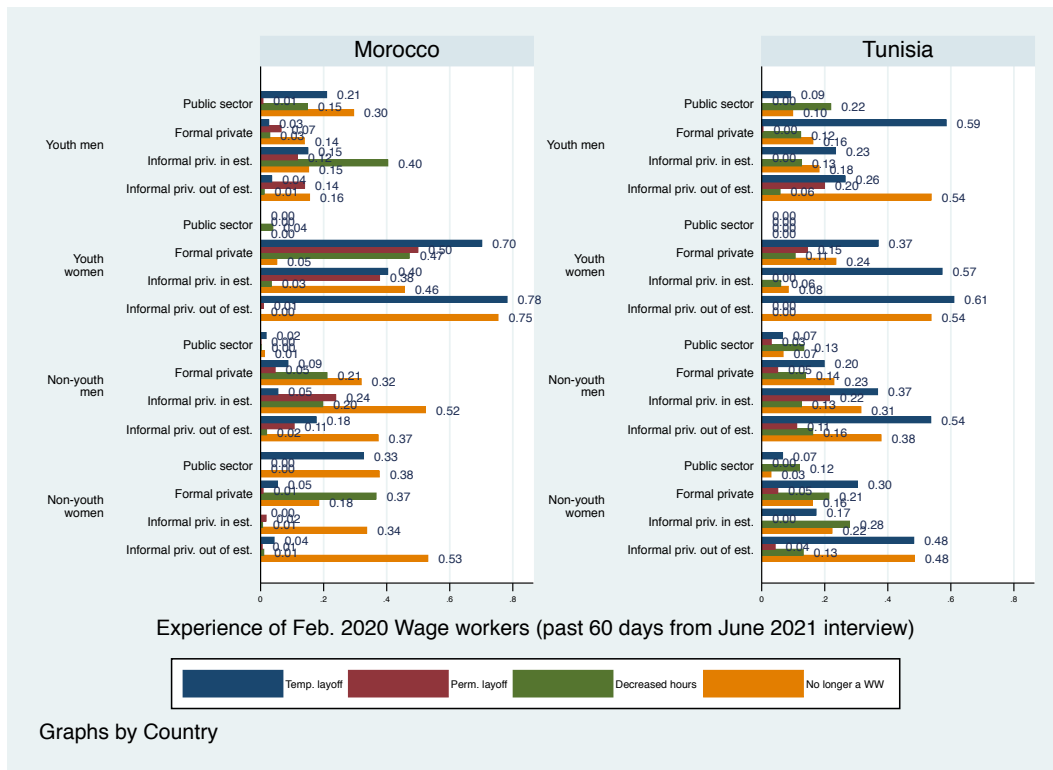
Figure A7a. Employment Status transitions from Feb 2020 to Feb 2021, Jordan, by age and gender
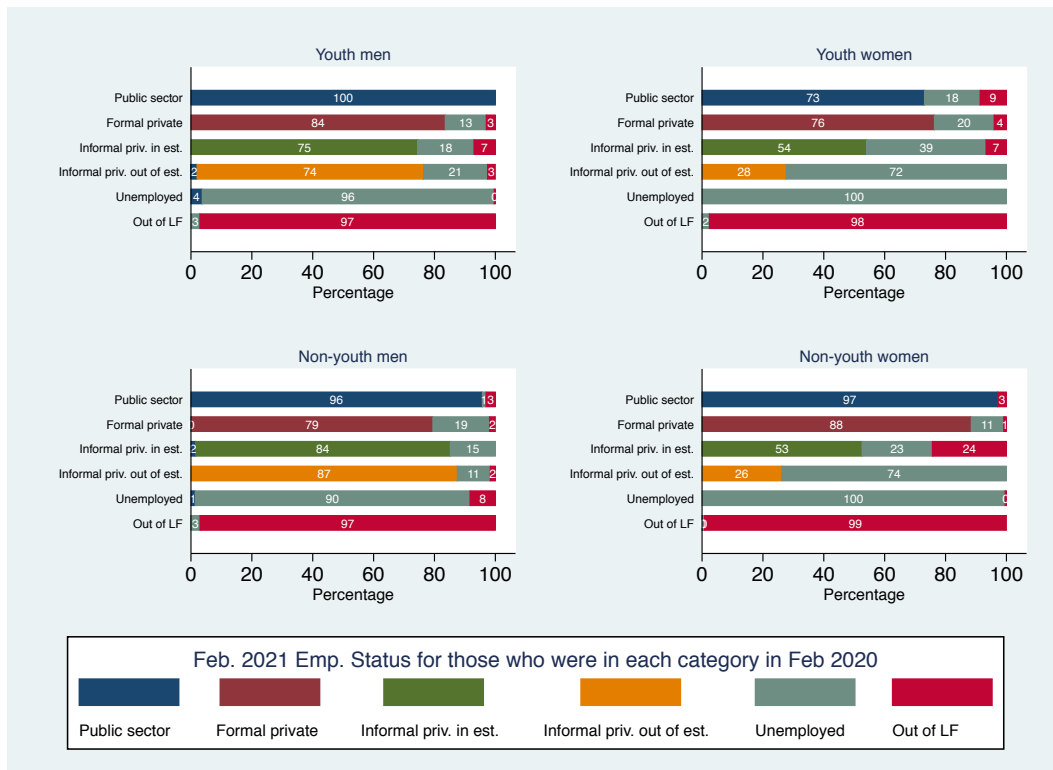
Figure A7b. Employment Status transitions from Feb 2020 to Feb 2021, Morocco, by age and gender
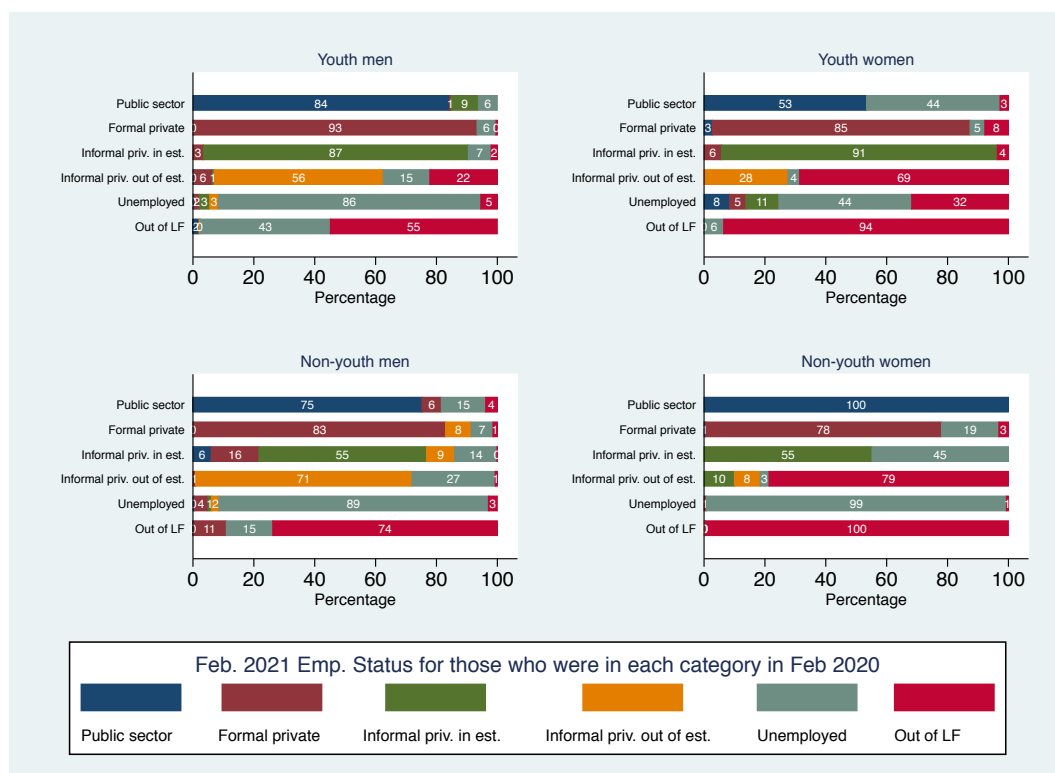
Figure A7c. Employment Status transitions from Feb 2020 to Feb 2021, Tunisia, by age and gender
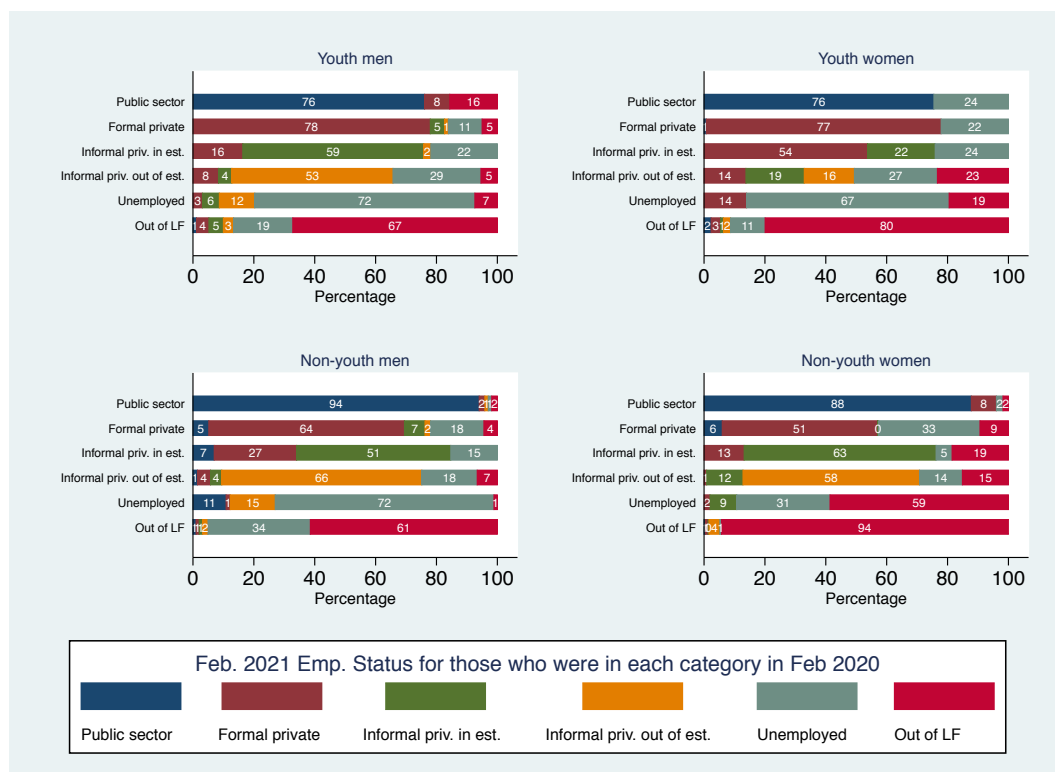
Figure A7d. Employment Status transitions from Feb 2020 to Feb 2021, Egypt, by age and gender
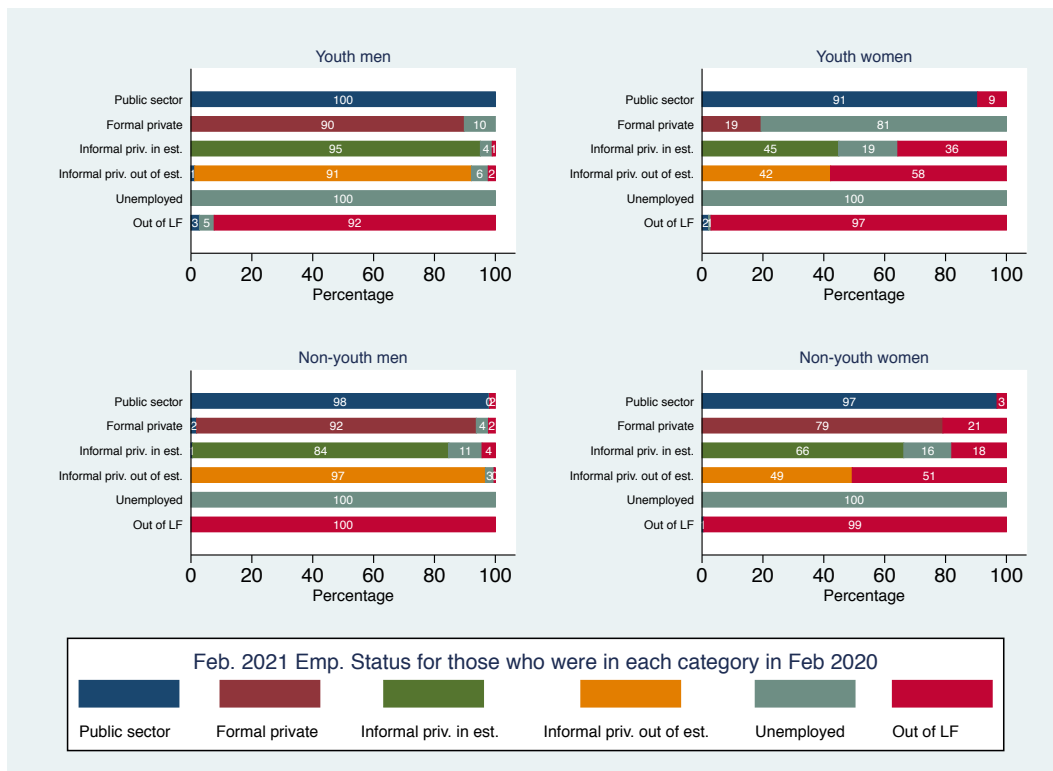
Figure A8a. Employment Status transitions from Feb 2020 to June 2021, Jordan, by age and gender
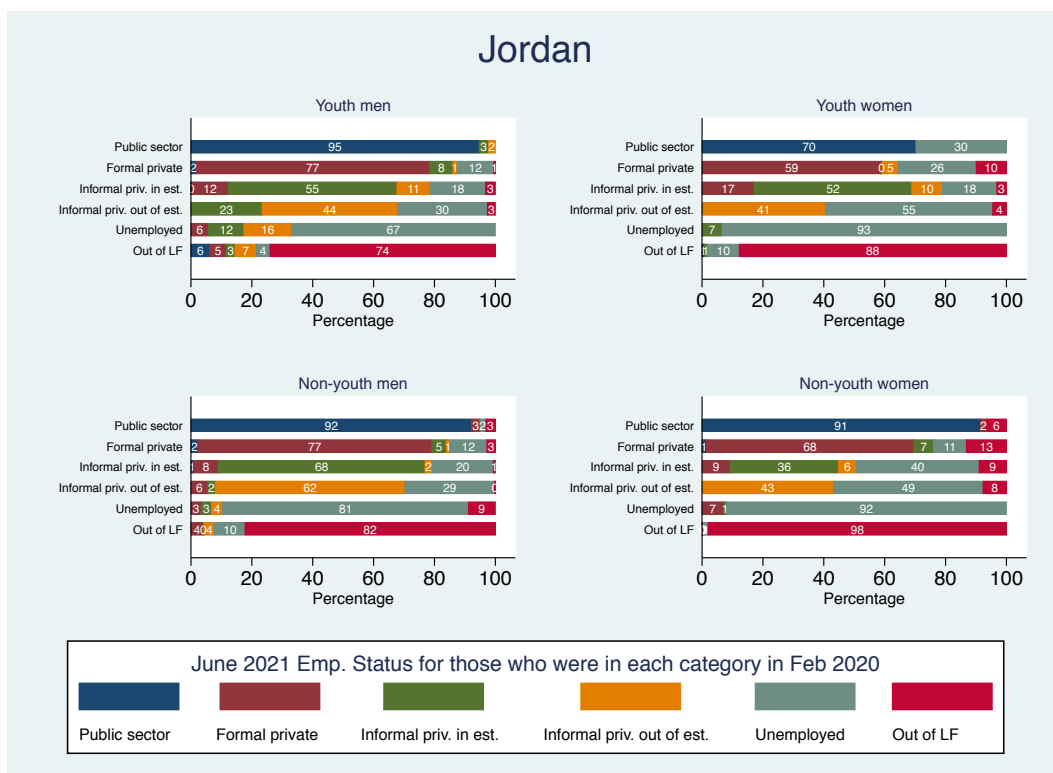
Figure A8b. Employment Status transitions from Feb 2020 to June 2021, Morocco, by age and gender
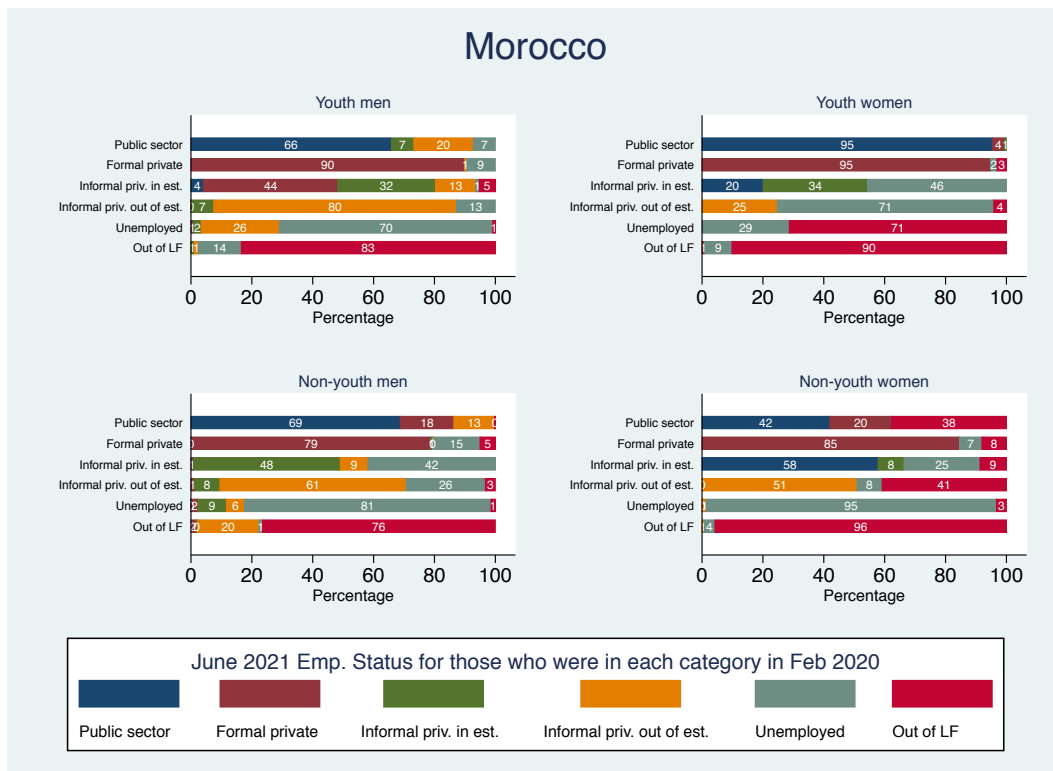
Figure A8c. Employment Status transitions from Feb 2020 to June 2021, Tunisia, by age and gender
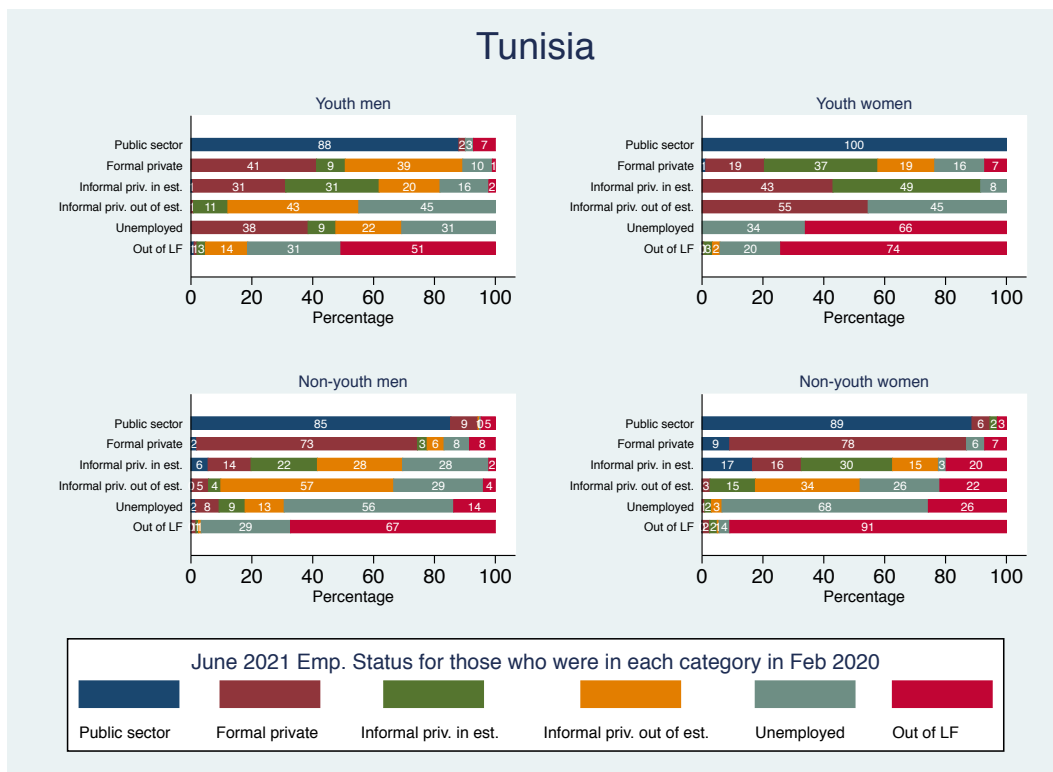
Figure A8d. Employment Status transitions from Feb 2020 to June 2021, Egypt, by age and gender
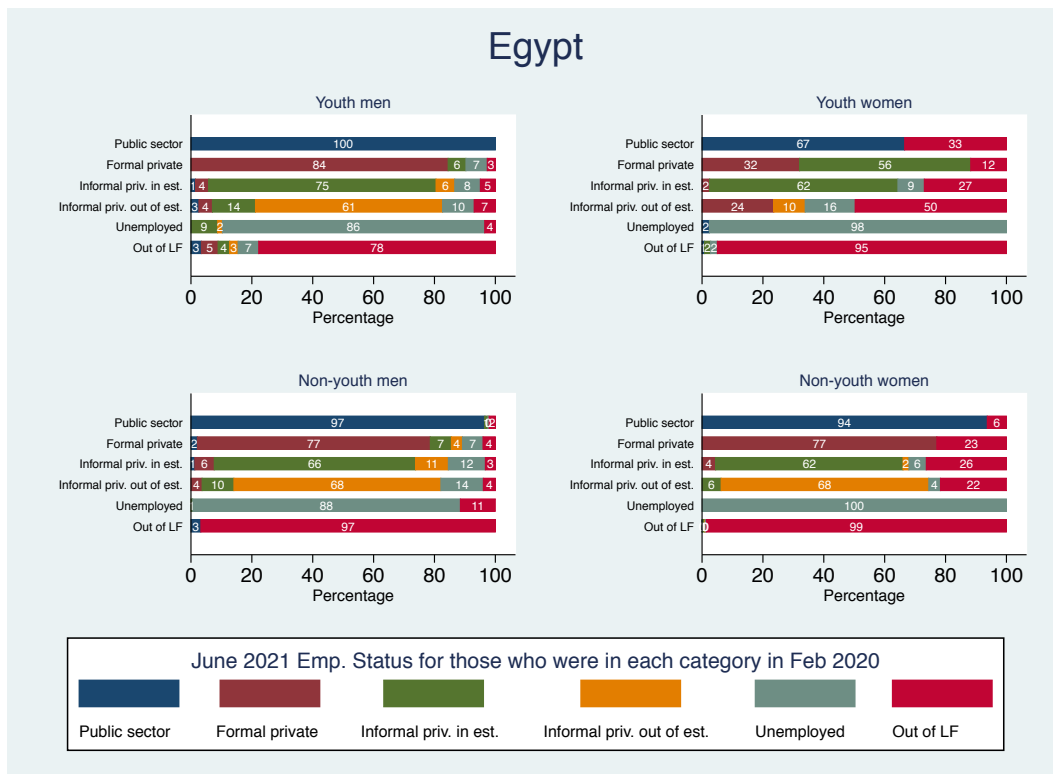
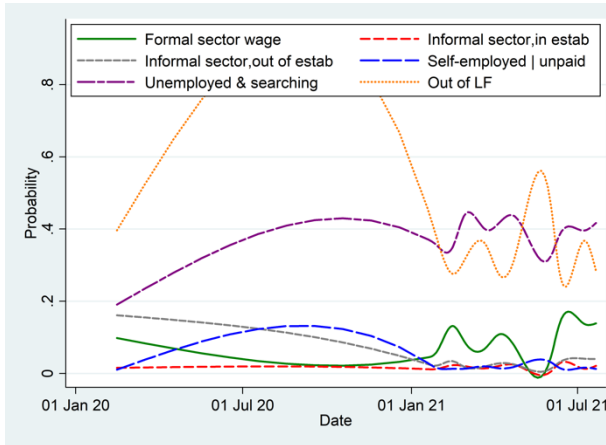Figure A9. Static-model predicted probability of employment by date, age-group & sex, Egypt

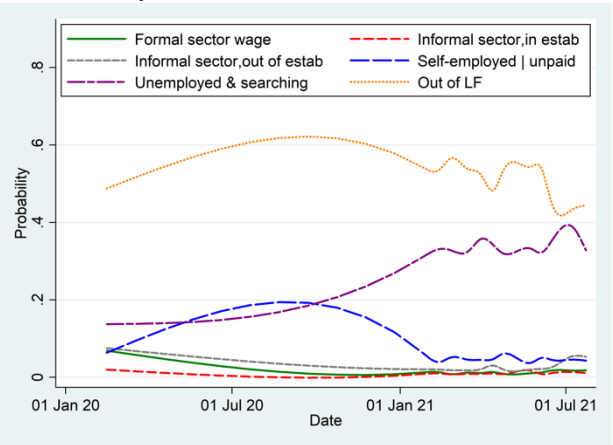i. Youth men   ii. Non-youth men
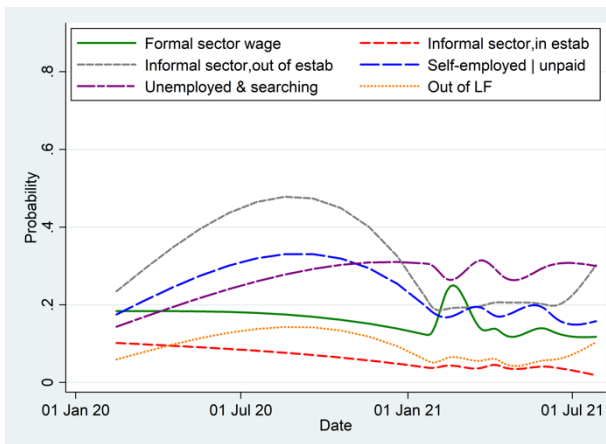

iii. Youth women   iv. Non-youth women
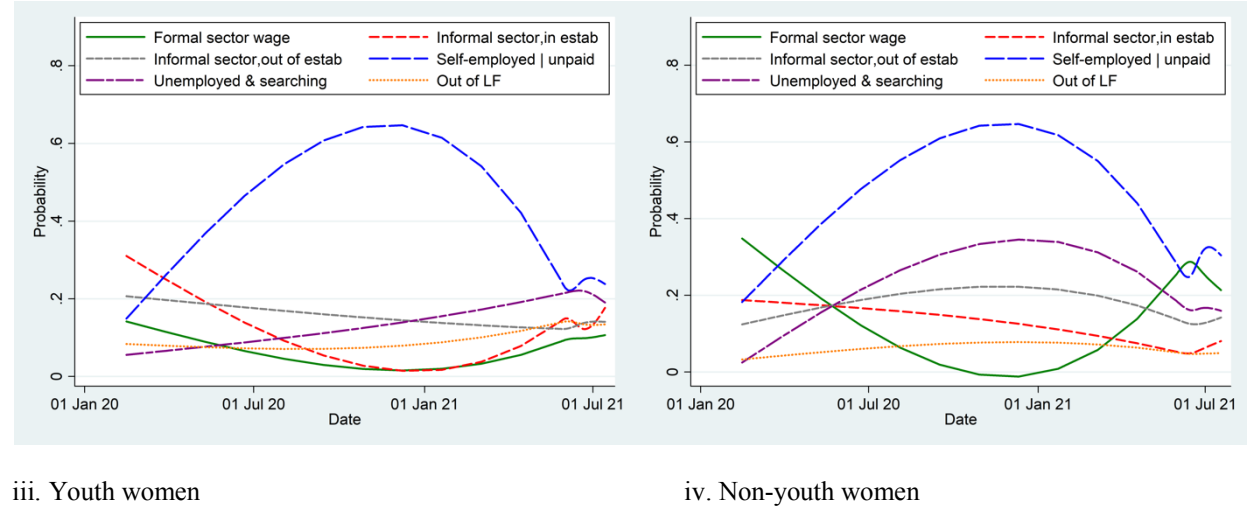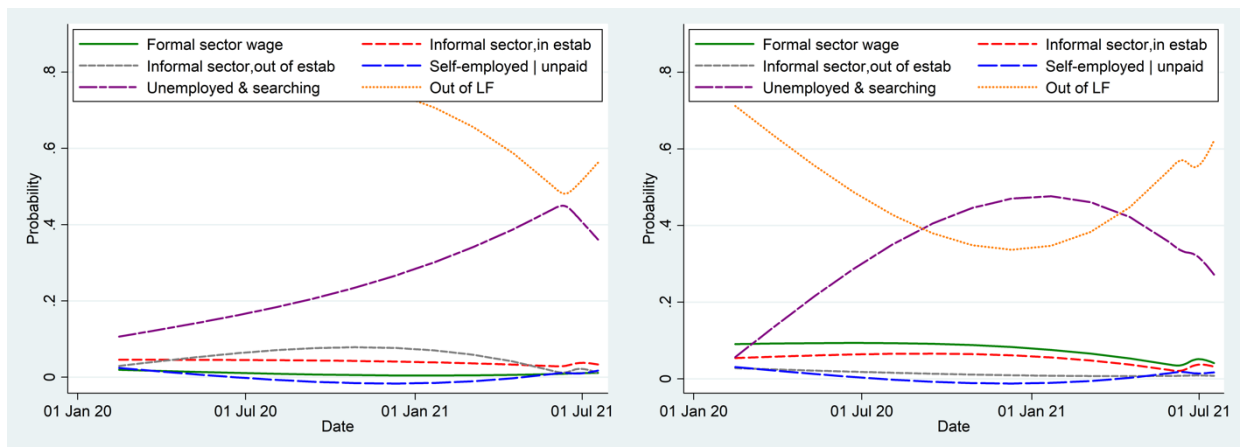
Source: Authors' calculations based on ERF COVID-19 Household Monitors, Egypt waves 0 and 4.

Figure A10. Static-model predicted probability of employment by date, age-group & sex, Jordan

i. Youth men   ii. Non-youth men
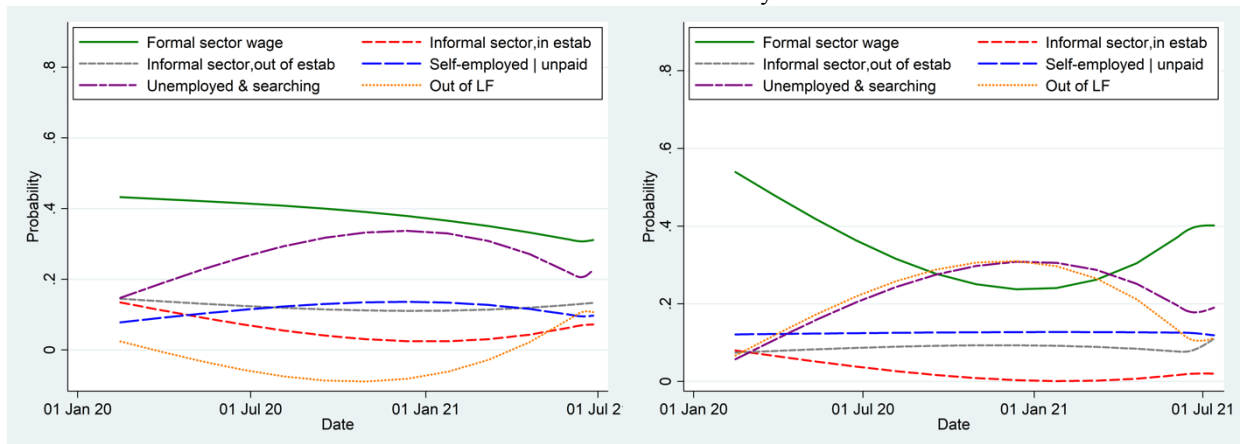
iii. Youth women   iv. Non-youth women
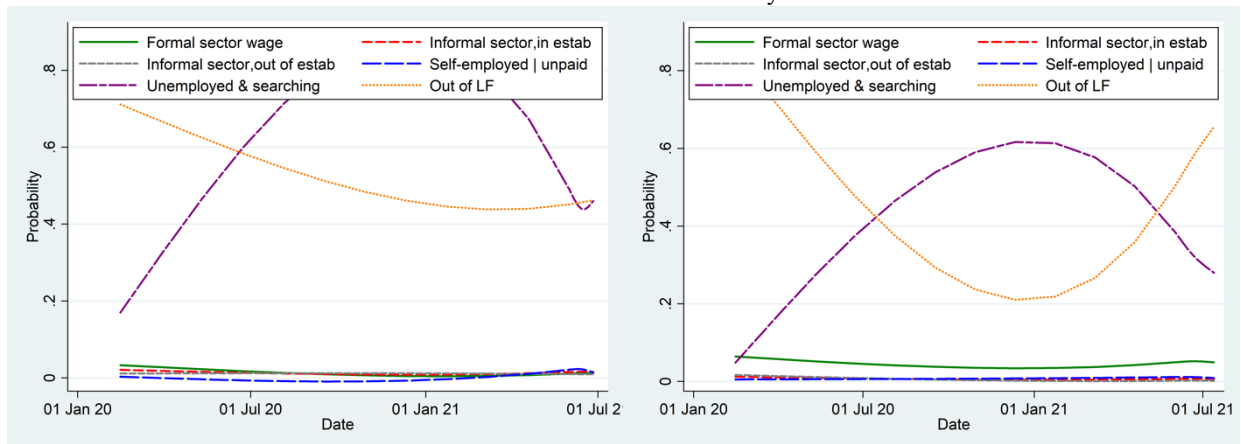
Source: Authors' calculations based on ERF COVID-19 Household Monitors, Jordan waves 0 and 4.

Figure A11. Static-model predicted probability of employ. by date, age-group & sex, Morocco

i. Youth men   ii. Non-youth men
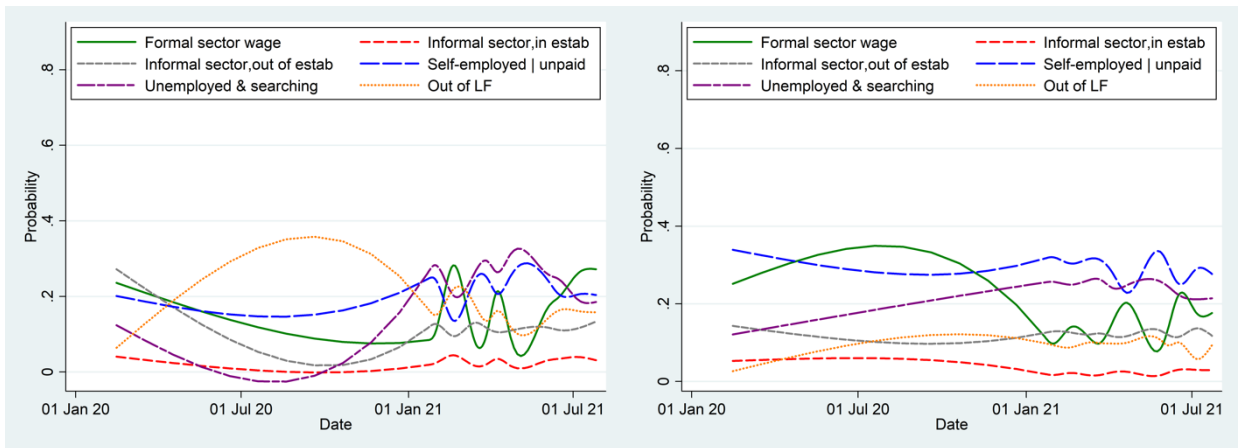
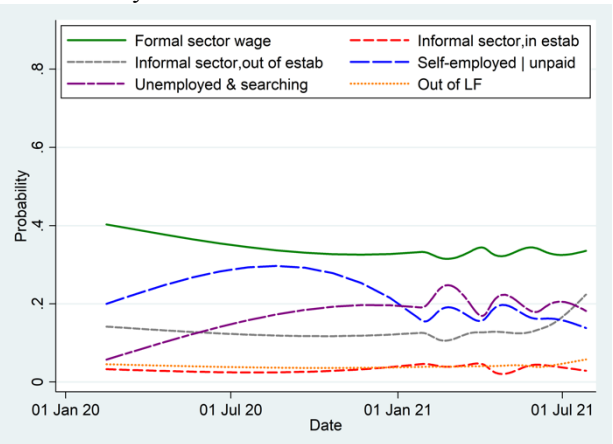iii. Youth women   iv. Non-youth women

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Morocco waves 0, 2, 3 and 4.

Figure A12. Static-model predicted probability of employment by date, age-group & sex, Tunisia
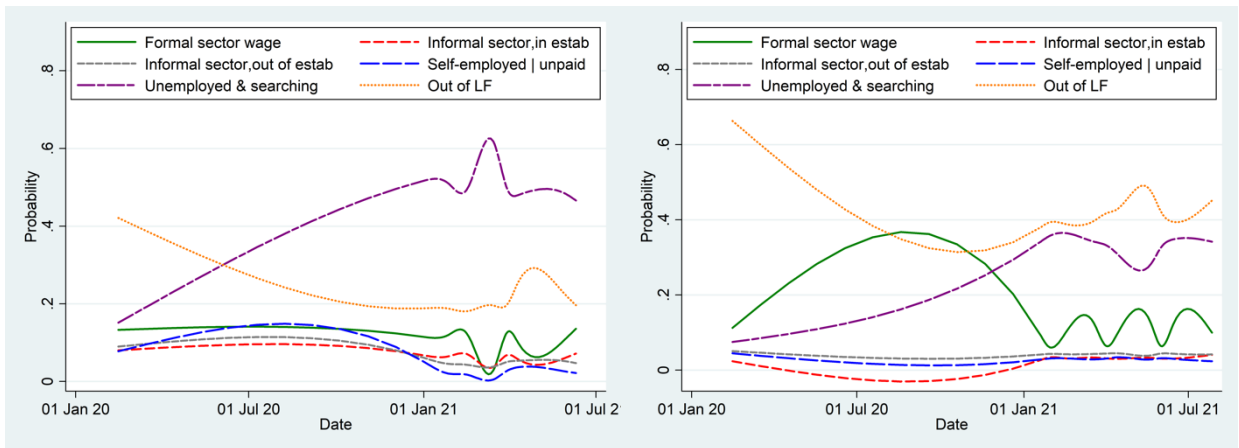
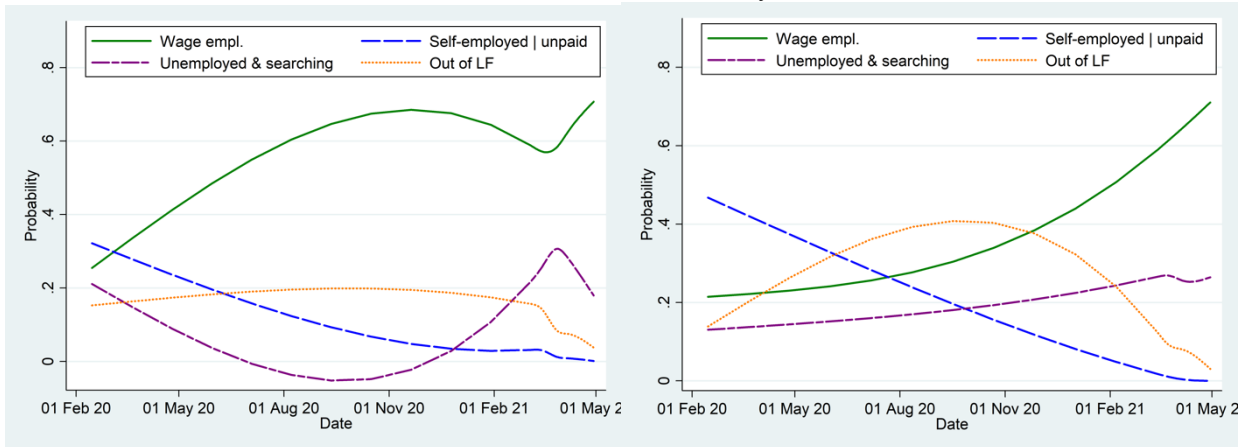i. Youth men   ii. Non-youth men

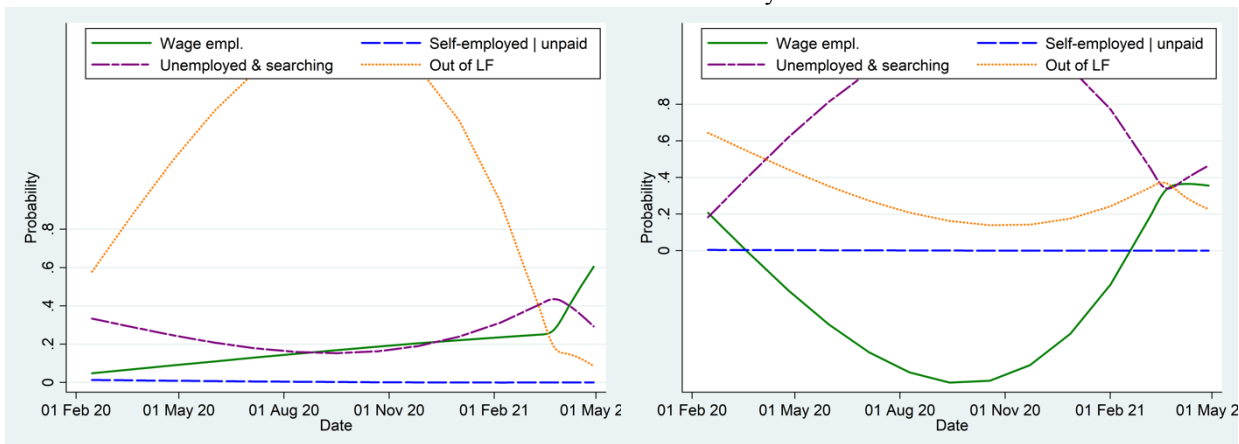iii. Youth women   iv. Non-youth women

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Source: Authors' calculations based on ERF COVID-19 Household Monitors, Tunisia waves 0, 2, 3 and 4.

Figure A13. Static-model predicted probability of employment by date, age-group & sex, Sudan

i. Youth men   ii. Non-youth men

iii. Youth women   iv. Non-youth women

Source: Authors' calculations based on ERF COVID-19 Household Monitors, Sudan waves 0 and 3.