Unpacking the Effects of Covid-19 on Labor Market Outcomes: Evidence from Turkey

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Abstract

This paper investigates how the pandemic affected the labor market in Turkey, using a unique dataset collected via face-to-face interviews in September and October 2020. Relying on the retrospective nature of our dataset, we study a broad set of outcome variables to identify the most affected groups in labor market during the first wave of COVID-19. We contribute to the literature by providing evidence from a developing country which has long-lasting structural problems in its labor market such as gender divide in paid work and high informal employment. Our results indicate that, being a woman, having low education levels and having children at home were important risk factors in terms of labor market outcomes during the pandemic. At the intersection, women with children who did not have a high school degree are found be the most vulnerable group as they are more likely drop out of employment and to report a loss in income and in hours of paid work. Self-employment and informal employment are emerged as other risk factors contributing to the vulnerability in labor market. Our findings provide insightful evidence on discussing the effectiveness of job protection policies that cover only formal employment and disregards the gender imbalances in labor force in Turkey.

ملخص

تبحث هذه الورقة في كيفية تأثير الوباء على سوق العمل في تركيا، باستخدام مجموعة بيانات فريدة تم جمعها من خلال مقابلات وجهًا لوجه في سبتمبر وأكتوبر 2020. بالاعتماد على الطبيعة الاسترجاعية لمجموعة البيانات الخاصة بنا، ندرس مجموعة واسعة من متغيرات النتائج لتحديد الفئات الأكثر تضررًا في سوق العمل خلال الموجة الأولى من جائحة كوفيد 19. نساهم في الأدبيات من خلال تقديم أدلة من بلد نام لديه مشاكل هيكلية طويلة الأمد في سوق العمل مثل الفجوة بين الجنسين في العمل المأجور والعمالة غير الرسمية المرتفعة. تشير نتائجنا إلى أن كونك امرأة، ومستويات تعليمها منخفضة وإنجاب أطفال في المنزل كانت عوامل خطر مهمة من حيث نتائج سوق العمل أثناء الوباء. عند التقاطع، وُجد أن النساء اللواتي لديهن أطفال لم يكن حاصلين على شهادة الثانوية العامة هم أكثر الفئات ضعفاً لأنهن أكثر عرضة للتسرب من العمل ولإبلاغهن عن خسارة في الدخل وفي ساعات العمل المأجور. ظهرت العمالة الذاتية والعمالة غير الرسمية كعوامل خطر أخرى تساهم في ضعف سوق العمل. تقدم النتائج التي توصلنا إليها أدلة ثاقبة حول مناقشة فعالية سياسات الحماية الوظيفية التي تغطي التوظيف الرسمي فقط وتتجاهل الاختلالات بين الجنسين في القوى العاملة في تركيا.

1. Introduction

In the wake of the first wave of COVID-19 pandemic, between mid-March and early June 2020, a series of social distancing measures were implemented to contain the spread of the outbreak in Turkey, as in many other countries. These restrictions led to a significant economic recession, and negative growth was recorded in the first and second quarters of 2020 (BETAM, 2020a). The recession had detrimental effects in the labor markets with strong declines in employment and labor force participation during the first wave of the COVID-19 (BETAM, 2020b). Moreover, this damage has been disproportionately shouldered by women as male labor force participation gradually recovered after the lift of restrictions while the effect on female labor force participation persists (BETAM, 2020c).

There has been a growing literature investigating the early labor market effects of the COVID-19 pandemic that provides evidence disproportionately from high-income economies including Europe (Casarico and Lattanzio, 2020; Poulikas and Branka, 2020; Meekes et al., 2020, Juranek et al. 2020) and the US (Adams-Prassl, 2020; Albanesi and Kim 2021; Fabrizio et al 2021; Collins et al. 2020). Although these studies confirm the sizeable initial effect of the pandemic concentrated among economically vulnerable groups, who these vulnerable groups are depends on the setting. For instance, in the US, women experience higher employment losses and increase in non-participation rates compared to men at every stage of the pandemic, with the most sizeable effect estimated for married women with children (Landivar et al., 2020; Albanesi & Kim, 2021). On the other hand, gender is not a significant predictor of job-loss in Italy during the first phase of pandemic, while young people, low-skilled and temporary workers faced higher risks of losing their job (Casarico and Lattanzio, 2020). Germany and Netherlands are among other European countries where female employment was not disproportionately affected by the pandemic (Alon et al, 2021; Meekes et al. 2021).

Despite the voluminous literature from high-income countries, there is scant evidence from the developing world on the labor market impacts of COVID-19, largely due to lack of data (Khamis et al., 2021). For Morocco and Tunisia, Krafft et al. (2020) finds that the first wave of COVID-19 has been particularly detrimental for workers who are employed in private sector and irregular or informal jobs. In terms of gendered effects of the pandemic in developing countries, İlkkaracan and Memiş (2021) shows that, the decline in average time spent in paid work during the pandemic was smaller among women in Turkey.[2]

This study aims to identify the groups whose employment, income and work hours were most affected by the pandemic, and to investigate the correlates of employment losses and exit from

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[2] The data in İlkkaracan and Memiş (2020) was collected in March and April 2020, while our data covers until September or October 2020. Hence, we provide evidence on the first wave of the pandemic in Turkey while their study investigates the immediate effects of the pandemic.

labor market in Turkey during the COVID-19 crisis. In so doing, we collect a nationally representative data set of the working age population in September and October 2020 via face-to-face interviews.

The Household Labor Force Surveys (HLFS) collected and released by TurkStat are the main source of microdata to study the labor market in Turkey. However, this data is released annually, and it aggregates the labor market information of pre- and post-lockdown periods. To measure the impact of COVID-19 on labor markets accurately, we collected retrospective data on labor market indicators by dividing the questionnaire into three parts: (i) pre-covid period (February 2020) (ii) first-wave lockdown (March-June 2020) (iii) period of relaxed measures (September-October 2020). Relying on this unique source of data, to our best knowledge, our paper provides the first evidence regarding the effect of the COVID-19 on Turkish labor market.

We show that higher educated men and women without children were most likely to keep their jobs. We find that women were more likely to lose their jobs during the pandemic, with the only exception being university graduate women without children. Coherent with the gendered distribution of unpaid work in Turkey, existence of children reduced the likelihood of staying employed for women while it did not affect men. Our findings also indicate that the younger 20-24 age group were more likely to lose their jobs.

Looking at the characteristics of the jobs held before the pandemic, informal employment posed an important risk for job losses. This is an expected result given that the policies implemented as a response to the pandemic were protecting formal jobs. We do not find a significant difference by the sector of employment. This finding is different than the evidence in other countries, indicating greater employment losses in the services sector which was hit hardest by the containment measures. However, it also means that the short time work allowance may have helped protect the jobs of the employees in the affected establishments.[3]

We contribute to the growing literature of the labor market impact of the pandemic by providing evidence from Turkey. Turkey is a country with low female labor force participation and gendered division of unpaid work (Ilkkaracan, 2012; Kongar and Memis, 2017) Also, as recently shown by the evidence from the refugee influx to Turkey, women with lower levels of education are particularly prone to worsening labor market conditions. Especially, women who work in part time jobs exited the labor market following a shock imposed by the supply of unskilled refugees in the informal employment (Aksu et al., 2018). Altogether, these mean that a negative effect on female

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[3] The finding that the service sector was hit particularly hard by the pandemic was used to explain why, during the first wave, job losses were more common among women in the USA (Alon et al, 2020).

employment during the pandemic imposes a higher risk for Turkey's already fragile female labor force and needs to be observed closely.

Our paper also adds to the literature on how the government policy responses to the pandemic affected the employment changes. Previously, employment reduction among women was shown to be more common in the US, whereas in European countries like Germany, Netherlands, or Italy there was not a clear difference between men and women in terms of job losses (Alon et al, 2021; Meekes et al. 2021; Casarico and Lattanzio, 2020). These studies conclude that the job protection policies in the European countries, especially the implementation of short-time work allowance was effective to keep both men and women in their jobs despite school closures. Our results imply that the employment protection policies alone were not effective in protecting the jobs and income of less-educated women with children, who turn out to be the most vulnerable group during this period. This could be explained by the weaker attachment of these women to the labor market, exacerbated by the school closures and non-existence of public provided childcare during the pandemic.

The final contribution of our study is the novelty of our data. Taking the advantage of the relaxed measures during September and October 2020, we conducted face-to-face interviews by paying attention to social distancing. This opportunity allowed us to collect a nationally representative data and eliminate selection issues arises from phone surveys since women living in developing countries are less likely to own a mobile phone (Krafft et al.2021) and they are less likely to answer unknown calls due to security concerns, as compared to men.

2. Background
2.1. Labor market and labor market policies in turkey

Periods of low growth were followed by increasing unemployment rates. Unfortunately, the last stretch of high unemployment rates in the years leading up to the pandemic caused the share of long-term unemployment to increase and the labor force participation rates (LFPR) to decline. At the beginning of 2020 (January and February 2020), the unemployment rates seemed to have reached a plateau, yet the main reason behind it was not job creation, but merely a drop in labor force participation. Women had been experiencing a decline in LFPR since the second half of 2019. To sum up, the labor market conditions were not favorable before the pandemic, to say the least (Uysal et al., 2020).

The first reported case of COVID-19 in Turkey was announced on March 11th 2020. Following the announcement, a series of containment measures were implemented which has indispensably affected the economic and social lives of many people. The measures include temporary but long-term closure of non-essential service providers, flexible work hours for the public servants, restriction of travel to and from the most populated provinces, stay-at-home orders and remote

working advise in other sectors. These measures were kept tightest until June 2020, some were relaxed in the summer and again tightened in the fall depending on the number of COVID cases.

Further restrictions were enacted in the education system. A break was given to the preschool, primary and secondary education during the first week following the announcement. Later, on March 23rd 2020, face-to-face learning was halted for classes at all levels, and were transformed to distant learning. Schools stayed closed until the end of the school year. Universities also switched to online learning and with the dormitories closing, many university students moved to their parents' houses.[4]

When the pandemic hit and the distancing measures were enacted, the labor market was also severely affected. Some social protection policies were urgently put into effect by the Turkish government.[5] The credit payments of firms were postponed, and new credit lines were opened. The firms could also apply for short-time work allowance for their formally employed employees whereby the government would pay 60 percent of the employee's wage. The remaining 40 percent could be paid by the firms. Note that only formally employed workers could benefit from this program.[6] Informally employed workers constitute about 20 percent of all employed workers in Turkey.

A firing ban on formal employment was introduced. The firms were not allowed to lay off, but allowed to furlough workers.

There was also a one-time direct cash transfer 1000 TL to households. The qualifying conditions for receiving the direct cash transfer were not publicly announced. The government announced that more than 5.3 million households benefited from the direct transfer.[7]

2.2. Conceptual Framework

The first and foremost effect of the distancing measures and the pandemic is a sharp decline in aggregate demand, immediately translating into a drop in labor demand. Labor economics theory predicts that employment, hours, and wages decline following a sharp decline in labor demand. The government enacted various policies to curb the decline in employment (firing ban) and wages

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[4] During this period, other partial lockdowns were also implemented. The age groups 65 and older and 20 and younger were not allowed to leave their residences. Curfew on weekends in the most populated 30 provinces (corresponding to 82 percent of the population) was applied throughout this time.

[5] For a brief summary, please see Uysal (2020). https://ipc.sabanciuniv.edu/Content/Images/Document/covid19-pandemisi-ve-turkiyede-hanelerin-korunmasi-bdbe53/covid19-pandemisi-ve-turkiyede-hanelerin-korunmasi-bdbe53.pdf

[6] Uysal (2020) provides a discussion of how these measures may have affected informal employment in Turkey. https://www.tesev.org.tr/en/research/informal-employment-covid-19/

[7] https://www.dw.com/tr/türkiyenin-yüzde-34ü-sosyal-yardım-aldı/a-53495005

(short-term work allowance and direct wage payments for the furloughed workers). These types of policies can create a wide range of effects on labor markets. Given that the labor market in Turkey already has a dual structure and high informal employment, these policies can cause long-lasting effects on the extant discrepancies.

First, concentrate on the workers with formal employment contracts where the ban has direct effects. As product demand and thus labor demand declines, firms seek to lower labor costs in the short run. The ban on lay-offs indicates that the number of employed would not change despite the decrease in demand. When firms cannot adjust the extensive margin of labor, they adjust the intensive margin, decreasing hours of work and suppressing wages when they cannot end labor contracts. The short-term wage allowance is an attempt at mitigating the effects on take-home wages by subsidizing employment in firms that experience a sharp decline in product demand.

Alternatively, firms may have furloughed some of their workers. We expect this to be of limited scope as with the short-time work allowance 60 percent of the wages was paid by the government, partially covering the wedge between labor supply and labor demand, and cushioning the wage decline.[8]

Secondly, the firing ban has indirect effects on the informal contracts. Since the informal contracts were exempt from the firing ban, firms will be more likely to lay off informal workers as the product demand, hence the labor demand declines. On the other hand, when the formal labor contracts become more costly to dissolve, they are less likely to be formed. That is, in an environment where firms cannot lay off formal workers, they will be less likely to hire workers formally in the first place. Therefore, holding all else equal, we would expect new employment creation to be in informal employment disproportionately. In other words, transitions into formal employment were discouraged by this policy during the pandemic.

As for the labor supply side, as labor demand and thus vacancies plummeted and distancing measures took effect, workers were discouraged from job search under the circumstances. Furthermore, as wages were declining and many people were either furloughed or on short-term work allowance, workers with relatively higher reservation wages may also be inclined to drop out of the labor market. The elasticity of the labor supply is an important determinant in this regard. As previous studies show that women and young workers may have higher wage elasticity, they may be more likely to leave the labor market as a response.

3. Data and estimation method

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[8] Practically, the firms could pay the remaining 40 percent of the wages if they were willing. We assume this would not happen in a perfectly competitive market.

3.1. Survey design and descriptive statistics

HLFS collected and released by TurkStat are the main source of microdata to study the labor market in Turkey. Even though macro data are publicly announced with a lag of 2 months, the micro data is released more than a year after the reference year. In other words, the micro data of HLFS 2020 was available only by May 2021. Furthermore, the micro data does not provide information on the month the data was collected, and therefore represents the entire year, aggregating the labor market information of pre- and post-lockdown periods.

To isolate the impact of the pandemic on labor markets, the ideal data set would be a panel where the same individual is observed prior to and during the pandemic. Unfortunately, the HLFS panel is not publicly available in Turkey. The second-best option would be to collect retrospective and current data from the respondents. To this end, we designed and conducted a comprehensive and nationally representative survey, HCOVIDA, to collect information about the changes in the labor market and the household incomes during the COVID-19 pandemic.

The dataset for this study, HCOVIDA, entails a survey instrument implemented via face-to-face interviews with 1500 individuals in the first week of September and a different set of 1500 individuals in the second half of October.[9] The data set was constructed as a repeated cross-sectional survey, and does not have panel data properties, i.e., different households and individuals were interviewed in different months. One person over the age of 15 was randomly selected to be surveyed in each household. The survey was conducted in person, respecting the social distancing measures.[10] In our analysis, we combine September and October surveys and use repeated cross sections data amounting to 3000 observations.

We generate sample weights to ensure national representativeness of our dataset. For this, we use TurkStat's HLFS data as the benchmark. We generate the weights based on the age groups (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65 and above) and the labor market status (employed, unemployed, not in the labor force) distribution in February 2020 data. By doing so, we ensure that our weighted data resembles the distribution of the pre-pandemic labor market status of different age groups and is representative along age and labor market status before the pandemic. We present the weighted and unweighted distributions for our dataset (based on the reported labor market status in February 2020) and their comparison with the HLFS data in the Appendix.

The respondents are asked questions about three different time periods: (1) February 2020 to understand the pre-pandemic labor market outcomes, (2) the changes in labor market outcomes

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[9] Given the sample size, the margin of error is 2.5 percent at the 95 percent confidence level.
[10] The face-to-face interviews were conducted after the relaxation of restrictions as of June 2020 in Turkey.

during the pandemic, and (3) during the survey month, i.e., September or October 2020. Note that the pandemic had continued for at least 5 months by the time the survey was implemented. This period is already too long to document all the transitions that may have occurred because of the pandemic. Therefore, in part (2) individuals were asked about whether any labor market changes occurred because of the pandemic. For example, "Did you lose income because of the pandemic?", "Did your working hours change during the pandemic?", etc.

In our analysis, we choose to focus on the effects of the pandemic on those who were already employed in February 2020. The transitions from other labor market states to employment are much less likely to happen during the pandemic. Therefore, we narrow our sample down to individuals who were employed in the pre-pandemic period. This restricts our attention to individuals whose labor market attachment is relatively strong. In other words, these workers were in the labor market, they had searched for and found jobs prior to February 2020.[11]

We analyze the wage earners and self-employed separately to better understand the heterogonous effects of the pandemic on these two groups. We also impose a restriction on the sector of employment when needed. The mode of production in Turkey is very different in the agricultural and the non-agricultural sectors. Self-employment in family farms is the most common form of employment in agriculture whereas in non-agricultural sectors, workers are usually wage earners. Therefore, we expect different labor market dynamics for these two groups. More specifically, we restrict our sample to those employed in non-agricultural sector to be able to capture the different labor market dynamics, both before and during the pandemic.

The outcomes we consider here are as follows; (i) transition from employment in February 2020 to employment in the survey month, (ii) transition from employment to unemployment in the survey month (iii) transition from employment to inactivity in the survey month, (iv) changes in wages according to two different measures and (v) changes in hours worked. The data is summarized in Table 1. These outcome variables summarize the pandemic's impact on the living and working conditions of the employed in Turkey.[12]

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[11] Restricting the sample to workers who were employed in February 2020 indicates that we leave out the unemployed and the inactives in February 2020. We know that the labor force participation has declined on average during this period, therefore, we would expect a net exit. Furthermore, it is well documented that employment-to-employment transitions are easier than unemployment-to-employment transitions. Therefore, we believe that our results represent relatively better labor market outcomes with our restricted sample and would paint a bleaker picture if the unemployed and the inactive were to be included.

[12] The dataset also includes information about whether the respondents started to work from home during the pandemic. However, we observe that only 9 percent of the employed started to work from home who are predominantly those with more than high school education. Hence, we do not present the regression results using this outcome variable.

Table 1: Descriptive Statistics

Outcome Variables	Employed in non-agricultural sector in Feb		Wage-earner in non-agricultural sector in Feb		Self employed in non-agricultural sector in Feb	
	Mean	SD	Mean	SD	Mean	SD
LM status in the survey month						
Employed	0.912	0.283	0.893	0.309	0.963	0.189
Unemployed	0.058	0.234	0.073	0.261	0.014	0.118
Inactive	0.030	0.170	0.033	0.179	0.023	0.150
Self-reported income loss	0.363	0.481	0.281	0.450	0.580	0.494
Inferred Income loss	0.071	0.257	0.046	0.209	0.149	0.356
Reduced working hours	0.548	0.498	0.533	0.499	0.587	0.493
Covariates						
Employment Type in February						
Informally Employed	0.127	0.333	0.088	0.284	0.203	0.403
Self Employed	0.253	0.435	0.000	0.000	1.000	0.000
Sector of Employment in February						
Services	0.770	0.421	0.739	0.440	0.849	0.358
Construction	0.038	0.190	0.048	0.213	0.009	0.095
Industry	0.192	0.394	0.214	0.410	0.142	0.349
Demographic Variables						
Single	0.374	0.484	0.422	0.494	0.206	0.405
Female	0.381	0.486	0.446	0.497	0.193	0.395
Child dummy	0.489	0.500	0.484	0.500	0.505	0.501
Age Group						
15-19	0.045	0.207	0.051	0.221	0.008	0.090
20-24	0.090	0.287	0.113	0.316	0.012	0.109
25-44	0.563	0.496	0.618	0.486	0.428	0.496
45-64	0.277	0.448	0.209	0.407	0.480	0.500
65+	0.024	0.154	0.009	0.092	0.072	0.258
Education						
Less than high school	0.314	0.464	0.279	0.449	0.419	0.494
High school	0.421	0.494	0.417	0.493	0.420	0.494
More than high school	0.265	0.442	0.304	0.460	0.160	0.367
Observations	1668		1217		405	

Source: HCOVIDA data.

To reiterate, we concentrate on the respondents who were employed in February 2020, prior to the pandemic, and analyze the transition to different labor market status by the survey month. The fraction of the survey respondents who stayed employed in the reference month is 91 percent. Those who switched to unemployment and inactivity are 6 and 3 percent, respectively. We report the same statistic by employment type: Among those who were wage-earners in February 2020, 89 percent was still employed in the survey month, and 7 percent had transitioned to unemployment. Among the self-employed, 96 percent was employed, 1 percent was unemployed, and 2 percent was inactive by the survey month.

We use two different variables to measure the wage and income losses. First, we use a measure of *self-reported income loss* which takes the value 1 if the respondent confirmed that their personal income fell due to the pandemic and 0 otherwise. According to Table 1, 36 percent of the employed in February experienced a reduction in their income due to the pandemic. The reduction in income is more common among the self-employed (58 percent) than the wage earners (28 percent).

The second measure is an *inferred income loss* variable that we construct. The respondents report their wages in February 2020 and in the survey month. Note that the wage data was collected in brackets as individuals in Turkey are reluctant to share information on their wage and income levels. The wage brackets used in the survey are as follows: less than half the minimum wage (less than 1162 TL), between half the minimum wage and the minimum wage (1162 TL – 2325 TL), the minimum wage (2325 TL), between the minimum wage and twice the minimum wage (2325 TL – 4650 TL), and more than twice the minimum wage (4650 TL or more). The midpoint of the bracket was assigned as the wage of the respondent.

The outcome variable in this analysis takes on the value 1 if the individual's wage bracket is lower during the survey month than it is during February 2020, and 0 otherwise. Given that the wage brackets are considerably large, this measure can only catch major changes in wages causing the individuals to move one bracket up or down. Moreover, the individuals in the lowest wage bracket cannot move down. Therefore, reductions would be less likely to be captured by this variable: only 7 percent of the employed is observed to lose wage income. Even so, the self-employed are more likely than the wage earners to experience income losses with 15 and 4.6 percent, respectively. Note that had we had more detailed data, the real effects would be larger. That is, using this particular definition with income brackets would bias our estimates downward.

We also use a self-reported indicator of the decrease in working hours. Reductions in working hours is quite common in our sample. More than 50 percent of the employed report to experience this type of an effect of the pandemic which is slightly more likely for the self-employed with 59 percent, while it is the case for 53 percent of the wage earners.

3.2. Econometric method

We run the following equation using Linear Probability Model:

$$Y_i = \beta_0 + \beta_1 Female_i + \beta_2 Education_i + \beta_3 Childless_i + \beta_4 (Education * Female)_i$$
$$+ \beta_5 (Education * Childless)_i + \beta_6 (Female * Childless)_i$$
$$+ \beta_7 (Education * Female * Childless)_i + \beta_8 InformalFeb_i + \beta_9 SectorFeb_i$$
$$+ \beta_{10} X_i + \varepsilon_i$$

Y_i: Binary outcome on self-reported income loss, inferred income loss, decrease in work hours,

$Female_i$: Female dummy indicating the gender of the respondent

$Education_i$: Education level of the respondent (Less than secondary, Secondary, Higher),

$Childless_i$: No child dummy indicating that there are no children (age 14 or younger) living in the same household as the respondent,

$InformalFeb_i$: dummy for informal employment in February,

$SectorFeb_i$: sector of employment in February (services, construction, and industry)

X_i: Age group, dummy indicating single or divorced marital status,

ε_i: Robust standard errors.

Additionally, we estimate the probability of being unemployed or inactive in the reference month relative to remaining employed using Multinomial Logit Regression. This model uses the same set of independent variables as in the above equation. We also report predicted probabilities for the Multinomial Logit Regression results. Multinomial Logit Regression assumes independence of irrelevant alternatives: i.e., the conditional probability of staying employed when employment and unemployment are the two options should not be affected when exit from the labor force is also introduced as an option (Cameron and Trivedi, 2005). However, this might be difficult to satisfy in our setting. For instance, an option to exit from the labor force might decrease the probability of staying unemployed while leaving the probability of employment unaffected. Moreover, an individual who is willing to decrease the time spent at work to allocate more time in increased domestic workload, might be indifferent between looking for a job or exiting the labor force. Hence, introduction of exit from the labor force option would decrease the conditional probability of employment by reducing the probability of unemployment and not changing the probability of staying employed. For this reason, we refer to the Hausman test to ensure that Multinomial Logit Regression model could be used in our setting (Hausman and McFadden, 1984). We test using seemingly unrelated regressions that the coefficients of a full model (multinomial logit regression with three options) and a binary choice model (where unemployment is left out as

an option) are not different. The test of the null hypothesis that the two sets of coefficients are equal cannot be rejected with a p-value of 0.423 for the wage earners sample.

Another challenge in isolating the impact of the COVID-19 on the labor market arises from its universal nature. As known, this exogenous shock to the economy did not spare any group or country, hence it is not possible to construct a counterfactual scenario allowing for a causal impact analysis. However, given the nature of the government aid policies implemented as a response to the pandemic, some groups such as the self-employed or those in informal employment are expected to be affected differently. In order to capture the differential impact of the pandemic between these groups, we control for some characteristics of the job the respondents held in February in our regression analysis. Since February refers to the pre-pandemic period, these characteristics can be considered as exogenous, i.e., they are not determined as a response to the pandemic.

Most of the demographic control variables we use are also predetermined, i.e., irrelevant to the pandemic with one possible exception: marital status which could be endogenous to the pandemic if the marriages were affected by the containment measures. This would have generated a bias if the labor market attachment of those whose marital status was affected by the pandemic were systematically different than the rest. Such a discrepancy would prevail among women as they are more likely to drop out of the labor market upon getting married. In that case, we would expect younger women who could not get married because of the pandemic to stay in the labor market. However, our results indicate the opposite; the younger cohort is more likely to lose employment in the pandemic according to results of the Multinomial Logit Regression presented in Appendix Table 5.

Our control variables are also presented in Table 1. Data indicates that 13 percent of the respondents were informally employed in February. The type of employment is an important correlate: 20 percent of the self-employed reported to lack any social security coverage and only 8.8 percent of the wage earners worked informally.[13] Note that the fraction of self-employed is 25 percent in our sample.

Employment in the services sector was most common as 77 percent of the respondents were employed in services in February. This ratio increased to 85 percent among the self-employed. Jobs in the construction sector were only held by 4 percent of the respondents and almost all the respondents who worked in construction were wage earners as very few people were self-

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[13] Note that this figure is lower than the average in non-agricultural employment in the HLFS data. Hence, we expect our results to underestimate the income and job losses due to COVID-19 in Turkey.

employed in this sector. Industry sector employed 19 percent of the respondents: 21 percent of the wage earners and 14 percent of the self-employed.[14]

Table 1 further presents other independent variables we use in our regression analysis. Women account for 38 percent of our sample. The proportion of not married is 37 percent. Almost half of our sample lives with at least one child. The proportions of age groups in our sample are 5 percent for 15-19, 9 percent for 20-24, 56 percent for 25-44, 28 percent for 45-64 and 2.4 percent for 65 or above. Holders of a less than high school degree constitute 31 percent, a high school degree 42 percent, and more than a high school degree 26 percent of the sample. In our analysis, we also use interaction terms of these variables as presented in the Results section.

4. Results

4.1. Employment losses and drop out of the labor market (multinomial logit regression results)

Table 2 provides the predicted probabilities for different groups of workers based on the regressions summarized above.[15] Note that these probabilities are for transitioning from employment in February 2020 to different labor market states in the reference month, i.e., the first panel contains the probabilities of staying employed, the second the probabilities of becoming unemployed, and the third the probabilities of dropping out of the labor market.

Concentrating on the first panel, we observe that the probability of staying employed is the lowest for the women with children who do not hold a high school degree at 74.2 percent. We also observe that for a given education level, women with children have the lowest marginal probabilities of staying employed compared to men with children as well as men and women without children. Having higher levels of education does help women and men stay in employment during the pandemic. The marginal probabilities of staying employed are 74.2 percent among women without a high school degree, 85.8 percent among women with a high school degree, and 90.7 percent among with a university degree.

As stated above, the second panel summarizes the marginal probabilities of transitioning from employment to unemployment, and the third, to inactivity. Read together, the results indicate that women with children were more likely to become unemployed than men within given education categories. Furthermore, women without a high school degree faced the highest risk. The

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[14] In comparison to HLFS statistics, employment in services is more common and employment in both construction and industry sectors is less common in our sample. In HLFS February 2020 data, of those employed in a non-agricultural sector 25 percent is employed in industry, 6 percent in construction and 69 percent in services.
[15] Coefficient obtained from the multinominal logit regressions are reported in Appendix Table 2.

probability of becoming unemployed was 21.4 percent among this category of women whereas the same probability was 12.4 among men with children having to the same education level. Again, these probabilities decline with education, in line with the previous findings that education helps shield workers as they face the pandemic. These probabilities are 10.5 percent among women with children holding a high school degree vs. 7 percent for among comparable men, and 5.4 among women with children holding a university degree vs. statistically zero among comparable men.

When we concentrate on workers without children, we find that the probability of becoming unemployed among workers without a high school degree does not vary significantly across genders. However, women are more likely to become unemployed among high school graduates (7 percent vs. 10.4 percent). This probability is statistically zero among women with a university degree who do not have children.

The probabilities of dropping out of the labor market support the view that women with children are particularly more vulnerable to the detrimental effects of the pandemic, and these effects are exacerbated for lower education levels. The probabilities of dropping out are 4.4 percent among women with children who do not hold a high school degree and 3.7 percent among women who do. The probability of dropping out is not statistically significant among university graduate women with children.

Among men, the probability of dropping out is either statistically insignificant or very close to zero, regardless of education levels.

Another interesting observation concerns the women without children. We find that, within this category, women without a high school degree (9.4 percent) and women with a high school degree (9 percent) were statistically more likely to drop out. We believe that this finding may reflect age. Marriage and having children are almost universal in Turkey. Therefore, these women are more likely to be young. Given that the current labor market regulations concerning severance pay in Turkey favor workers with longer periods of tenure, younger workers are more prone to losing their jobs. It may have been that these women lost their jobs and decided to wait out the pandemic before starting to look for jobs again.

Table 2: Predicted Probabilities for the Multinomial Logit Model: Wage-earner in non-agricultural sector in February

		Margin	Std. Err.	z
Employed	1#Less than high school#Male#No Child	0.903	0.029	30.62
	1#Less than high school#Male#Child	0.870	0.032	27.45
	1#Less than high school#Female#No Child	0.850	0.045	19.06
	1#Less than high school#Female#Child	0.742	0.054	13.87
	1#High school#Male#No Child	0.903	0.026	34.42
	1#High school#Male#Child	0.906	0.022	41.57
	1#High school#Female#No Child	0.806	0.037	22.07
	1#High school#Female#Child	0.858	0.034	25.25
	1#More than high school#Male#No Child	0.973	0.019	50.44
	1#More than high school#Male#Child	0.985	0.015	64.4
	1#More than high school#Female#No Child	0.981	0.014	72.45
	1#More than high school#Female#Child	0.907	0.032	28.03
Unemployed	2#Less than high school#Male#No Child	0.061	0.024	2.52
	2#Less than high school#Male#Child	0.124	0.031	3.97
	2#Less than high school#Female#No Child	0.056	0.032	1.74
	2#Less than high school#Female#Child	0.214	0.052	4.12
	2#High school#Male#No Child	0.079	0.024	3.3
	2#High school#Male#Child	0.070	0.019	3.69
	2#High school#Female#No Child	0.104	0.026	3.95
	2#High school#Female#Child	0.105	0.030	3.55
	2#More than high school#Male#No Child	0.000	0.000	5.92
	2#More than high school#Male#Child	0.015	0.015	1.01
	2#More than high school#Female#No Child	0.019	0.014	1.41
	2#More than high school#Female#Child	0.054	0.025	2.12
Inactive	3#Less than high school#Male#No Child	0.036	0.018	2.02
	3#Less than high school#Male#Child	0.006	0.006	1.01
	3#Less than high school#Female#No Child	0.094	0.033	2.84

3#Less than high school#Female#Child	0.044	0.022	2.01
3#High school#Male#No Child	0.019	0.012	1.48
3#High school#Male#Child	0.023	0.012	2.02
3#High school#Female#No Child	0.090	0.029	3.13
3#High school#Female#Child	0.037	0.018	2.03
3#More than high school#Male#No Child	0.027	0.019	1.42
3#More than high school#Male#Child	0.000	0.000	4.4
3#More than high school#Female#No Child	0.000	0.000	4.38
3#More than high school#Female#Child	0.039	0.022	1.78

4.2. Wages

4.2.1. All workers

To investigate the possible effects of the pandemic on wages in Turkey, we focus on the individuals who were employed as wage earners during February 2020 (pre-pandemic period) and during the survey month (during the pandemic). We focus on the wage earners as the income data of the self-employed is likely to confound the wages and the profits.

We first report the regression results for the inferred income loss variable. Remember that this variable indicates a relatively large drop in income that causes the individual to fall down a bracket.

The regression results reported in Appendix Table 3 show that the 15- to 19-year-old workers were less likely to report loss in wages. Given that this age group was more likely to both become unemployed and to drop out of the labor market, we can conclude that only the ones that had higher productivity levels and/or who received better job offers could keep their jobs or received job offers with higher wages. A similar discussion would hold for the workers who are above the age of 65.

The workers in the manufacturing industry were less likely to report income losses compared to those employed in services and in construction. It is easy to imagine that the service sector was hit harder due to the social distancing measures.

The main caveat of this analysis stems from the fact that our sample for this outcome variable focuses on workers who were employed both before and during the pandemic. This introduces a survival bias as we would expect workers with higher productivity levels to be employed during both periods, and workers with lower productivity levels to either to become unemployed or to drop out of the labor market.

As explained above, HCOVIDA provides an alternative way to investigate the effects of the pandemic on wages. The questionnaire of HCOVIDA included a direct question on whether the respondent experienced any income losses due to the pandemic. The alternative regression uses an outcome variable defined by using this self-reported occurrence of income loss.

Appendix Table 4 reports the regression results for the self-reported income reduction variable. Accordingly, single workers are about 6 percent more likely to report a decline in their income due to the pandemic. In the first model, gender is not a statistically significant correlate, nevertheless, having children is. Workers who do not have children are 8.8 percent less likely to report a decline in their income due to the pandemic. Controlling for all other factors, this finding implies that childcare responsibilities may have been detrimental to parental labor market outcomes, not only in terms of job loss or dropping out of the labor market, but also in terms of wages as well.

Having a university degree is an important correlate. Workers with a university degree are 14.5 percent less likely to report a decline in their income levels due to the pandemic.

When the gender and the education variables are allowed to interact, the results indicate gender is indeed important. Women are significantly more likely to report declines in their income levels. However, note that this is particularly widespread among women without a high school degree. Education matters among women as well.

We introduce another interaction, representing the presence of children in the household. The predicted probabilities are provided in Table 3. Among the workers who do not have a high school degree, workers with children are more likely to report income losses due to the pandemic, regardless of their gender (28.8 percent vs. 43.9 percent among men; 35.1 percent vs. 65 percent among women). Furthermore, regardless of the presence of children, women are more likely to report income losses. In other words, among the workers with the lowest skill sets, having children and being a woman are two separate vulnerabilities, indicating that women with children are doing worse.

Among the high school graduates, the differences are less pronounced. Men and women without children are equally likely to report income losses. Men with children are still more likely to experience income losses whereas this child penalty seems to disappear for high school graduate women.

As discussed above, the probability of reporting income loss due to the pandemic is lowest among the university graduates, particularly among men with children (22.5 percent) and among women without children (22.9 percent).

Table 3: Predicted probabilities for self-reported income reduction among all workers

	Predicted Probability	Std dev	T-stat
Less than high school#Male#No Child	0.288	0.037	7.79
Less than high school#Male#Child	0.439	0.035	12.63
Less than high school#Female#No Child	0.351	0.055	6.33
Less than high school#Female#Child	0.650	0.055	11.85
High school#Male#No Child	0.331	0.034	9.63
High school#Male#Child	0.445	0.032	13.88
High school#Female#No Child	0.384	0.038	9.99
High school#Female#Child	0.383	0.043	8.93
More than high school#Male#No Child	0.310	0.038	8.21
More than high school#Male#Child	0.225	0.041	5.44
More than high school#Female#No Child	0.229	0.036	6.44
More than high school#Female#Child	0.294	0.042	7.07

As for labor market conditions, there are two correlates with robust coefficients in the regressions. First, the informally employed individuals are significantly more likely to report that their income levels declined because of the pandemic. Secondly, the self-employed are about 27 to 29 percent more likely to report declines in their income levels. Therefore, we focus on these two groups separately to unearth any differences across these two groups.

4.2.2 Wage Earners
The regression results for the sample of wage earners are presented in Appendix Table 5. Let us discuss the results for the self-reported decline in income. First, age is not a significant factor in experiencing a decline in wages due to the pandemic.

Informality emerges as a very important correlate here. The workers who were informally employed in February are about 32.7 percent more likely to report that their wages declined because of the pandemic. The sector of employment in February is not as strongly correlated with wage declines. The workers in the construction sector and in the industry are more likely to report that their wages declined. This finding is significant at the 10 percent level.

As expected, the probability of reporting a decline is 8.3 percent lower for university graduates. Yet, the difference between the lowest skilled group. i.e., those who do not hold a high school degree and those who do, is not statistically significant. In other words, workers with university degrees were significantly shielded against a decline in their wages during the pandemic.

Note that workers who do not have children are 8.2 percent less likely to report a decline in their wages. Interestingly, in the first regression, the coefficient on gender is not statistically significant, even though that on the presence of children is. To investigate the possible interactions between gender, education, and the presence of children into account, further regressions were run. In the second regression, we allow for an interaction term of gender and education. Women are 18.3 percent more likely to report wage declines among the workers with the lowest education levels. Among the high school graduates, women are 20.5 percent more likely to report a decrease in their wages, and furthermore, among the college graduates, women are 18.6 percent more likely than men with the same education level.

As a last exercise, we also allow for gender, education, and children interactions. The predicted probabilities are provided in Table 4. 22.4 percent of men who do not have a high school degree and who do not have a child report that their income has declined due to the pandemic. Once again, having children and being a woman affects this probability negatively. Taken together, 55 percent of women who have children and who do not have a high school degree report that their income decreased because of the pandemic. Looking at all the marginal effects among the wage earners, this category stands out as the most vulnerable one.

The predicted probabilities confirm that the university graduates' probabilities of reporting a decline in their wages is lower, generally around 20 percent. Among the university graduates, the detrimental effects of having children and being woman are considerable smaller.

Table 4: Predicted probabilities for self-reported income reduction among the wage earners

	Predicted Probability	Std dev	T-stat
Less than high school#Male#No Child	0.224	0.047	4.8
Less than high school#Male#Child	0.306	0.042	7.23
Less than high school#Female#No Child	0.328	0.062	5.33
Less than high school#Female#Child	0.555	0.059	9.36
High school#Male#No Child	0.267	0.039	6.91
High school#Male#Child	0.400	0.040	10.01
High school#Female#No Child	0.288	0.040	7.16
High school#Female#Child	0.336	0.046	7.25
More than high school#Male#No Child	0.186	0.039	4.74
More than high school#Male#Child	0.159	0.042	3.78
More than high school#Female#No Child	0.157	0.036	4.39
More than high school#Female#Child	0.207	0.043	4.79

4.2.3. Self employed

To get a glimpse into the effects of the pandemic among the self-employed, we focus on a similar regression where the outcome is again self-reported income loss due to the pandemic among the self-employed. In this group, the self-employed among the youngest age group are less likely to report a decline in their wages. Once again, this is probably due to these workers dropping out of the labor market or losing their jobs all together during the pandemic. In other words, we expect the survival bias to be stronger among this category.

Even though gender does not seem to be a significant correlate in income loss among the self-employed, the presence of children increases the probability of reporting a decline in income among the self-employed by 11.7 percent.

Education does not seem to be an important correlate among the self-employed. Nevertheless, as the previous analyses show that the interaction of gender, education and the presence of children may reveal important discrepancies, we implement the approach here. Surprisingly, we find that income loss also differs significantly along these axes among the self-employed.

Let us focus on the last model in Appendix Table 6 to discuss the regression results. Once again, university education is an important shield against income loss among the self-employed men. Unfortunately, this does not hold for women. Self-employed women with no degrees, and with university degrees are significantly more likely to report income losses.

Previous findings on informality apply. No sectoral differences exist among the self-employed. This finding remains to be explored further as we know that the services sector was more likely to suffer from the distancing measures. Our sample size may be too small to yield significant differences among the self-employed.

Below in Table 5, we present the predicted probability of income loss at the intersection between gender, education level and childbearing. Among the respondents with less than high school education, having a child remarkably increases the risk of income loss both for men and women. The probability of income loss is particularly strong among mothers with less than high school education by almost 95 percent. On the other hand, considering the high school graduates, the highest probability of income loss is predicted for women without children with almost 70 percent. Furthermore, no consistent pattern across gender and of having children is observed among the university graduates as the highest risk of income reduction is predicted among women with and men without children by 71.5 and 73.9 percent, respectively.

Table 5: Predicted probabilities for self-reported income reduction among the self-employed

	Predicted Probability	Std dev	T-stat
Less than high school#Male#No Child	0.492	0.059	8.32
Less than high school#Male#Child	0.736	0.057	12.84
Less than high school#Female#No Child	0.345	0.142	2.42
Less than high school#Female#Child	0.947	0.057	16.64
High school#Male#No Child	0.513	0.074	6.91
High school#Male#Child	0.621	0.056	11.12
High school#Female#No Child	0.697	0.112	6.21
High school#Female#Child	0.431	0.110	3.9
More than high school#Male#No Child	0.739	0.097	7.61
More than high school#Male#Child	0.403	0.118	3.43
More than high school#Female#No Child	0.442	0.142	3.12
More than high school#Female#Child	0.715	0.133	5.36

4.3. Working hours

4.3.1. All workers

Predicted probabilities presented below in Table 6 show that education, gender, and childbearing are important risk factors in reduced working hours[16]. Accordingly, both among respondents with less than high school and high school degree, women with children have the highest probability of reducing their work hours, by 71.2 and 59.4 percent, respectively. On the other hand, among the university graduates, the probability of reducing working hours is the at highest levels both for women and men with children by 58.9 and 59.4 percent, respectively.

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[16] Coefficients are reported in Appendix Table 7

Table 6: Predicted Probabilities for the decline in working hours among all workers

	Predicted Probability	Std dev	T-stat
Less than high school#Male#No Child	0.418	0.039	10.64
Less than high school#Male#Child	0.608	0.037	16.32
Less than high school#Female#No Child	0.498	0.058	8.61
Less than high school#Female#Child	0.712	0.056	12.75
High school#Male#No Child	0.492	0.038	12.92
High school#Male#Child	0.581	0.033	17.84
High school#Female#No Child	0.508	0.041	12.27
High school#Female#Child	0.594	0.045	13.14
More than high school#Male#No Child	0.578	0.043	13.33
More than high school#Male#Child	0.594	0.054	10.98
More than high school#Female#No Child	0.555	0.045	12.23
More than high school#Female#Child	0.589	0.053	11.22

4.3.2. Wage earners

As shown in Table 7 the predicted probabilities of wage earners follow a similar pattern as the entire workers' sample[17]. Likewise, mothers holding less than high school education have the highest probability (69.2 percent) to reduce their working hours. Among the high school graduates, fathers are slightly more likely to work fewer hours (60.6 percent) as compared to mothers (60.2 percent), however both have significantly higher probability to reduce working hours as compared to their childless counterparts. Moreover, women with children have the highest risk to work fewer hours during lockdown also among university graduates with the probability of 59.1 percent.

Table 7: Predicted Probabilities for the decline in working hours among wage earners

	Predicted Probability	Std dev	T-stat
Less than high school#Male#No Child	0.347	0.052	6.7
Less than high school#Male#Child	0.557	0.048	11.6
Less than high school#Female#No Child	0.498	0.066	7.57
Less than high school#Female#Child	0.692	0.058	11.84
High school#Male#No Child	0.465	0.045	10.31
High school#Male#Child	0.606	0.041	14.74
High school#Female#No Child	0.471	0.045	10.42
High school#Female#Child	0.602	0.050	12.05
More than high school#Male#No Child	0.539	0.049	10.93

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[17] Coefficients are reported in Appendix Table 8

More than high school#Male#Child	0.573	0.063	9.1
More than high school#Female#No Child	0.538	0.049	11.04
More than high school#Female#Child	0.591	0.057	10.36

4.3.3. Self employed

The regression results for reduced working hours among the self-employed presented in Appendix Table 9 show that the 15- to 19-year-olds are significantly less likely to report reduced hours. These workers are probably casual workers, who get paid a daily wage, and they are probably doing manual work. In other words, these workers have a very low set of skills, and are more likely to be living with their parents. Therefore, we would expect this group of workers to be more likely to drop out of the labor market when faced with very low return.

Another surprising finding concerns the sectors. The self-employed workers in the construction sector are significantly less likely to report a decline in working hours. Once again, it is easy to imagine that these workers are casual workers who must find work daily, and they may have dropped out of the labor market.

The relief packages in Turkey provided credit rather than direct help. There is preliminary evidence that opening up the credit lines has stimulated the housing market and thus the construction sector. However, the positive effects of the credit on construction employment are more visible from November 2021 onwards whereas our sample is from September and October 2021.[18]

5. Conclusion

In this study we investigate how the COVID-19 affected the labor market in Turkey. We use a unique, nationally representative data set of the working age population which was collected in September and October 2020 via face-to-face interviews. We shed light on the groups who were most affected by the pandemic in terms of employment and income losses and decline in work hours. We also provide suggestive evidence on the effects of the social protection policies on different groups.

Our econometric analysis of the labor market transitions focused on the transition from employment prior to the pandemic to different labor market states during the pandemic. The results indicate that women with relatively lower education levels (less than high school and high school) were more likely to drop out of the labor market. This effect was exacerbated by the presence of children. Women without a high school degree and with children constitute the most vulnerable group in this respect.

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[18] https://betam.bahcesehir.edu.tr/wp-content/uploads/2021/10/IsgucuGorunum2021M10.pdf

We also find that education helps women. That is, women with a university degree were doing considerably better thanks to their education, even when there were children in the household, albeit still behind men with similar characteristics. In other words, men with university degrees (with or without children) were doing significantly better in keeping their employment during the pandemic.

We find not only that the parents had a tougher time keeping their jobs, but also that the parents were more likely to suffer income drops. Income losses were relatively more common among parents, both fathers and mothers with lower education levels. Once again, university graduates were doing relatively better in terms of wages.

Income drops were more common among the informally employed, as one would expect. Note that since they are not working with formal job contracts, the minimum wage would not be binding for the informally employed.

Among the wage earners, the self-reported decline in income due to the pandemic is much more prevalent among women with less than a high school degree. Being a man, not having children or having a university degree, all emerge as important characteristics when it comes to mitigating income losses due to the pandemic. That being said, even among the university graduate men with no children, the predicted probability of reporting a decline in income is 18.6 percent.

Among the self-employed, the results are similar, but the probabilities of suffering income losses are considerably higher. Again, the usual suspects of not having education, being a woman and having children are the basic vulnerabilities of the self-employed. We predict that almost 95 percent of the lowest educated group among the women with children suffered income losses due to the pandemic.

Working hours are reported to be reduced across the board as well. Again, parents with lower education levels are more likely to report decreases in hours worked. However, the differences are not large, and the gender gaps are narrower. Part-time work is not common in Turkey. It is quite possible that the extensive margin was the more important margin. We believe that these respondents may have worked fewer hours either because they could not go to work or because there was no work to be done due to the distancing measures.

In a nutshell, being a woman, having low education levels and having children at home were important risk factors in terms of labor market outcomes during the pandemic. At the intersection, women with children who did not have a high school degree suffered the most. They were more likely to transition out of employment, to report a drop in income and in hours of paid work. Other vulnerabilities that emerged are informal employment and being self-employed.

While presenting the effects of the pandemic on deepening the gender divide in Turkey, this paper does not directly address the mechanisms behind. This outcome could be driven from the demand side when the employers discriminate against women who have children and lay them off as a result. Alternatively, facing the increased unpaid work during the pandemic, mothers who lack childcare support might be willing to exit the labor market or leave their jobs. Our data lacks information to test which mechanism is more dominant. However, we observe that women with children were more likely to report that they could not go to work and could not work from home during the pandemic, which suggests that existence of children introduced an inability to work for the mothers.

The pandemic, the distancing measures and the relief packages taken together had an enormous effect on the labor market trajectories of vulnerable groups in Turkey. They magnified the extant structural imbalances between genders, between formal and informal employment contracts, and between the wage earners and the self-employed. Policies designed to alleviate the detrimental effects of the pandemic on the labor market should be widened to address the sources of the existing inequalities in labor market outcomes. Otherwise, they only serve to aggravate the already vulnerable conditions of the workers they claim to protect.

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Appendix Table 1: Comparison of HLFS with the weighted and unweighted HCOVIDA data.[19]

Age groups	Employed / 15+			Unemployed / 15+			Inactive / 15+		
	HLFS Feb 2020	HCOVIDA-Unweighted	HCOVIDA-Weighted	HLFS Feb 2020	HCOVIDA-Unweighted	HCOVIDA-Weighted	HLFS Feb 2020	HCOVIDA-Unweighted	HCOVIDA-Weighted
15-19	18.8	19.1	18.7	5.0	16.2	4.4	76.3	64.8	76.8
20-24	41.0	53.1	41.0	14.4	19.4	13.6	44.6	27.4	45.4
25-29	54.5	82.2	54.6	12.7	8.9	12.6	32.8	8.9	32.8
30-34	59.2	73.9	59.2	8.9	7.4	8.9	31.9	18.8	31.9
35-39	61.5	76.2	61.5	7.6	5.8	7.6	30.9	18.0	30.9
40-44	61.4	79.0	61.4	7.5	5.6	7.5	31.1	15.4	31.1
45-49	58.4	71.5	58.4	6.8	6.6	6.1	34.8	21.9	35.5
50-54	47.2	69.4	47.2	5.1	1.9	5.1	47.7	28.7	47.7
55-59	34.9	50.5	34.9	3.5	1.9	3.5	61.6	47.6	61.6
60-64	26.0	32.6	26.0	1.8	2.3	1.8	72.2	65.1	72.2
65+	10.1	12.5	10.1	0.2	1.0	0.1	89.7	86.5	89.8
TOPLAM	43.1	61.0	43.1	6.8	7.7	6.6	50.1	31.3	50.3

[19] The data presented in Appendix Table 1 provides the age-specific employment rate, the unemployed / the working age population, and the inactivity rate in HLFS and HCOVIDA. As seen, the non-weighted data is biased towards higher employment rates, and thus lower unemployment rates and lower inactivity rates for most of the age groups, except among the youth. Note that using weights allows us to align the HCOVIDA data with the labor force statistics as reported by the HLFS.

Appendix Table 2: Multinomial Logit Model: Wage-earner in non-agricultural sector in February[20]

	(1)		(2)		(3)	
	U	I	U	I	U	I
15-19	0.133	0.987	0.144	0.977	0.07	0.892
	[0.580]	[0.632]	[0.582]	[0.633]	[0.593]	[0.640]
20-24	1.411***	0.058	1.412***	0.079	1.373***	0.051
	[0.367]	[0.726]	[0.369]	[0.731]	[0.367]	[0.751]
45-64	-0.064	-0.178	-0.057	-0.171	-0.019	-0.208
	[0.310]	[0.408]	[0.312]	[0.403]	[0.306]	[0.412]
	-		-		-	
65+	12.795***	1.207	11.405***	1.213	17.269***	1.269
Marital status (ref:						
Married)	[0.516]	[0.806]	[0.518]	[0.794]	[0.557]	[0.807]
Single	-0.29	-0.974**	-0.294	-0.982**	-0.302	-0.869*
Schooling (ref: Less						
than high school)	[0.348]	[0.491]	[0.350]	[0.498]	[0.364]	[0.493]
High school	-0.326	0.003	-0.299	0.216	-0.632	1.352
	[0.268]	[0.370]	[0.351]	[0.627]	[0.431]	[1.118]
						-
More than high school	-1.939***	-1.031*	-2.795***	-0.298	-2.275**	13.331***
gender(ref: Male)	[0.447]	[0.554]	[1.039]	[0.838]	[1.052]	[1.038]
Female	0.585**	1.163***	0.542	1.462***	0.751*	2.233**
Child (ref: Child)	[0.230]	[0.358]	[0.368]	[0.557]	[0.434]	[1.103]
No Child	-0.477**	0.629*	-0.472**	0.615*	-0.774	1.787

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[20] Appendix Table 2 summarizes the regression results of a multinomial logit regression among the individuals who worked as wage earners in non-agricultural sectors in February. The baseline outcome of the multinomial logit regression is employment in the survey month vs. unemployed and inactive. The relative log odds of becoming unemployed are higher among the 20- to 24-year-olds compared to the reference category (25- to 44-year-olds). The regression results also indicate that workers above the age of 65 were much less likely to enter unemployment. Once again, the group with the highest set of skills, i.e., the university graduates, are less likely to have lower relative log odds of becoming unemployed (and dropping out in some models). We also find that being a woman is associated with an increase in the relative log odds of dropping out of the labor market vs. being employed in the survey month. This finding is in line with the international evidence that bluntly unearths the impossible trinity women face: working, doing household chores, and taking care of the children at the same time during the pandemic. To investigate this further, we also include a dummy for having children. The results indicate that having children is associated with an increase in the relative log odds of being unemployed. As for the employment conditions in February that may shed light on the productivity level of the worker, being informally employed in February is associated with an increase in both becoming unemployed and dropping out of the labor market.

Employment Type in February						
Employment Type in February	[0.232]	[0.362]	[0.233]	[0.354]	[0.502]	[1.150]
Informally Employed	1.018***	1.675***	1.019***	1.691***	1.072***	1.653***
	[0.307]	[0.368]	[0.306]	[0.369]	[0.310]	[0.374]
Self Employed						
February Sector (ref: sevices)						
Construction	0.364	0.128	0.334	0.215	0.295	0.269
	[0.519]	[0.795]	[0.523]	[0.795]	[0.521]	[0.829]
Industry	-0.096	0.107	-0.097	0.113	-0.1	0.095
Education-Gender Interaction (ref:Less than HS-male)	[0.291]	[0.405]	[0.292]	[0.405]	[0.293]	[0.409]
High school female			-0.043	-0.328	-0.274	-1.703
			[0.477]	[0.767]	[0.619]	[1.328]
More than high school female			1.127	-1.077	0.619	12.976***
Education-Child Interaction (ref: Less than HS, no child)			[1.150]	[1.074]	[1.210]	[1.288]
High school, no child					0.898	-2.023
					[0.688]	[1.395]
More than high school, no child					-12.405***	12.965***
Gender-Child Interaction (ref: Men with child)					[1.142]	[1.409]
Female, no child					-0.768	-1.161
Education-Gender-Child Interaction(ref: Less than HS men with child)					[0.859]	[1.354]
High-school female, no child					0.71	2.39
					[1.059]	[1.697]
More than high school female, no child					-12.797***	28.274***
					[1.597]	[1.688]
Observations	1,217	1,217	1,217	1,217	1,217	1,217

Appendix Table 3: Self-reported income loss among the wage earners

	wageloss	wageloss	wageloss
15-19	-0.041***	-0.042***	-0.036***
	[0.014]	[0.014]	[0.014]
20-24	0.016	0.017	0.014
	[0.022]	[0.022]	[0.022]
45-64	0.005	0.005	0.001
	[0.017]	[0.017]	[0.017]
65+	-0.047***	-0.047***	-0.056***
Marital status (ref: Married)	[0.014]	[0.013]	[0.022]
Single	-0.011	-0.010	-0.005
Schooling (ref: Less than high school)	[0.015]	[0.015]	[0.015]
High school	-0.013	-0.007	0.020
	[0.016]	[0.021]	[0.027]
More than high school	-0.022	-0.011	0.014
gender(ref: Male)	[0.019]	[0.023]	[0.035]
Female	0.000	0.014	-0.020
Education-Gender Interaction (ref:Less than HS-male)	[0.012]	[0.026]	[0.023]
High school female		-0.015	0.002
		[0.032]	[0.036]
More than high school female		-0.025	0.010
Child (ref: Child)		[0.033]	[0.045]
No Child	0.004	0.004	0.032
Education-Child Interaction (ref: Less than HS, no child)	[0.012]	[0.012]	[0.030]
High school, no child			-0.065*
			[0.039]
More than high school, no child			-0.052
Gender-Child Interaction (ref: Men with child)			[0.046]
Female, no child			0.076
Education-Gender-Child Interaction(ref: Less than HS men with child)			[0.055]
High-school female, no child			-0.038
			[0.067]
More than high school female, no child			-0.081
Employment Type in February			[0.071]
Informally Employed	-0.031**	-0.031**	-0.035**
	[0.015]	[0.016]	[0.016]
Self Employed	-	-	-
February Sector (ref: sevices)			
Construction	-0.001	0.002	0.004

	[0.030]	[0.031]	[0.031]
Industry	-0.028**	-0.028**	-0.028**
	[0.013]	[0.013]	[0.013]
Observations	1,217	1,217	1,217
R-squared	0.009	0.010	0.020

Appendix Table 4: Self-reported income reduction among all workers

	Reduced income	Reduced income	Reduced income
15-19	0.018	0.014	0.009
	[0.064]	[0.062]	[0.061]
20-24	-0.005	0.001	0.011
	[0.041]	[0.041]	[0.042]
45-64	-0.036	-0.034	-0.019
	[0.029]	[0.029]	[0.029]
65+	0.075	0.075	0.105
Marital status (ref: Married)	[0.104]	[0.105]	[0.103]
Single	0.061**	0.062**	0.051*
Schooling (ref: Less than high school)	[0.030]	[0.030]	[0.030]
High school	-0.025	0.019	0.006
	[0.029]	[0.035]	[0.046]
More than high school	-0.145***	-0.086**	-0.214***
gender(ref: Male)	[0.032]	[0.039]	[0.054]
Female	0.026	0.133***	0.211***
Education-Gender Interaction (ref:Less than HS-male)	[0.023]	[0.047]	[0.064]
High school female		-0.137**	-0.272***
		[0.059]	[0.083]
More than high school female	-0.159***		-0.142
Child (ref: Child)		[0.060]	[0.086]
No Child	-0.088***	-0.089***	-0.152***
Education-Child Interaction (ref: Less than HS, no child)	[0.025]	[0.025]	[0.050]
High school, no child			0.038
			[0.067]
More than high school, no child		0.237***	
Gender-Child Interaction (ref: Men with child)		[0.074]	
Female, no child			-0.147
Education-Gender-Child Interaction(ref: Less than HS men with child)		[0.092]	
High-school female, no child			0.262**
			[0.117]
More than high school female, no child		-0.002	
Employment Type in February		[0.118]	
Informally Employed	0.227***	0.225***	0.235***
	[0.037]	[0.037]	[0.037]
Self Employed	0.279***	0.287***	0.288***
February Sector (ref: sevices)	[0.030]	[0.031]	[0.030]
Construction	0.082	0.096	0.098
	[0.061]	[0.061]	[0.062]
Industry	0.040	0.036	0.037
	[0.030]	[0.030]	[0.030]
Observations	1,668	1,668	1,668
R-squared	0.124	0.128	0.139

Appendix Table 5: Self-reported income reduction among wage earners

	Reduced income	Reduced income	Reduced income
15-19	0.069	0.063	0.057
	[0.065]	[0.064]	[0.063]
20-24	0.026	0.032	0.040
	[0.042]	[0.042]	[0.043]
45-64	-0.024	-0.022	-0.010
	[0.034]	[0.034]	[0.035]
65+	0.083	0.079	0.110
Marital status (ref: Married)	[0.186]	[0.189]	[0.190]
Single	0.037	0.040	0.035
Schooling (ref: Less than high school)	[0.032]	[0.032]	[0.033]
High school	-0.015	0.067	0.095
	[0.034]	[0.042]	[0.058]
More than high school	-0.160***	-0.083*	-0.147**
gender(ref: Male)	[0.035]	[0.043]	[0.059]
Female	0.038	0.183***	0.249***
Education-Gender Interaction (ref:Less than HS-male)	[0.025]	[0.053]	[0.072]
High school female		-0.205***	-0.313***
		[0.066]	[0.093]
More than high school female		-0.186***	-0.202**
Child (ref: Child)		[0.065]	[0.093]
No Child	-0.082***	-0.082***	-0.082
Education-Child Interaction (ref: Less than HS, no child)	[0.028]	[0.028]	[0.063]
High school, no child			-0.052
			[0.082]
More than high school, no child			0.109
Gender-Child Interaction (ref: Men with child)			[0.084]
Female, no child			-0.145
Education-Gender-Child Interaction(ref: Less than HS men with child)			[0.105]
High-school female, no child			0.230*
			[0.133]
More than high school female, no child			0.069
Employment Type in February			[0.130]
Informally Employed	0.327***	0.328***	0.334***
	[0.048]	[0.048]	[0.048]
Self Employed	-	-	-
February Sector (ref: sevices)			
Construction	0.086	0.108*	0.114*
	[0.064]	[0.065]	[0.065]
Industry	0.058*	0.057*	0.058*
	[0.033]	[0.033]	[0.033]
Observations	1,217	1,217	1,217
R-squared	0.097	0.106	0.112

Appendix Table 6: Self-reported income reduction among the self-employed

	Reduced income	Reduced income	Reduced income
15-19	-0.678***	-0.678***	-0.630***
	[0.076]	[0.076]	[0.087]
20-24	-0.242	-0.248	-0.316
	[0.205]	[0.205]	[0.207]
45-64	-0.056	-0.058	-0.049
	[0.056]	[0.056]	[0.054]
65+	0.050	0.054	0.073
Marital status (ref: Married)	[0.134]	[0.134]	[0.128]
Single	0.113	0.113	0.086
Schooling (ref: Less than high school)	[0.072]	[0.072]	[0.071]
High school	-0.037	-0.048	-0.115
	[0.057]	[0.061]	[0.078]
More than high school	-0.024	-0.036	-0.333**
gender(ref: Male)	[0.080]	[0.094]	[0.129]
Female	-0.037	-0.096	0.212**
Education-Gender Interaction (ref:Less than HS-male)	[0.065]	[0.127]	[0.082]
High school female		0.081	-0.402***
		[0.158]	[0.148]
More than high school female		0.075	0.101
Child (ref: Child)		[0.178]	[0.195]
No Child	-0.106*	-0.105*	-0.244***
Education-Child Interaction (ref: Less than HS, no child)	[0.056]	[0.057]	[0.082]
High school, no child			0.137
			[0.121]
More than high school, no child			0.580***
Gender-Child Interaction (ref: Men with child)			[0.171]
Female, no child			-0.358**
Education-Gender-Child Interaction(ref: Less than HS men with child)			[0.173]
High-school female, no child			0.733***
			[0.249]
More than high school female, no child			-0.251
Employment Type in February			[0.296]
Informally Employed	0.108*	0.110*	0.126**
	[0.059]	[0.060]	[0.060]
Self Employed	-	-	-
February Sector (ref: sevices)			
Construction	-0.092	-0.091	-0.141
	[0.241]	[0.242]	[0.205]
Industry	-0.066	-0.062	-0.061
	[0.073]	[0.074]	[0.073]
Observations	405	405	405
R-squared	0.041	0.042	0.092

Appendix Table 7: Decline in working hours among all workers [21]

	Reduced workinghours	Reduced workinghours	Reduced workinghours
15-19	-0.083	-0.086	-0.087
	[0.065]	[0.064]	[0.064]
20-24	-0.035	-0.031	-0.022
	[0.046]	[0.046]	[0.046]
45-64	-0.056*	-0.055*	-0.047
	[0.032]	[0.032]	[0.032]
65+	-0.015	-0.015	0.011
Marital status (ref: Married)	[0.119]	[0.120]	[0.122]
Single	0.082**	0.083**	0.072**
Schooling (ref: Less than high school)	[0.033]	[0.033]	[0.033]
High school	-0.006	0.016	-0.027
	[0.030]	[0.037]	[0.048]
More than high school	0.034	0.075*	-0.013
gender(ref: Male)	[0.036]	[0.045]	[0.065]
Female	0.025	0.089*	0.104
Education-Gender Interaction (ref:Less than HS-male)	[0.026]	[0.048]	[0.066]
High school female		-0.073	-0.091
		[0.061]	[0.085]
More than high school female		-0.108	-0.110
Child (ref: Child)		[0.067]	[0.100]
No Child	-0.106***	-0.107***	-0.190***
Education-Child Interaction (ref: Less than HS, no child)	[0.028]	[0.028]	[0.053]
High school, no child			0.101
			[0.071]
More than high school, no child			0.173**
Gender-Child Interaction (ref: Men with child)			[0.086]
Female, no child			-0.024
Education-Gender-Child Interaction(ref: Less than HS men with child)			[0.095]
High-school female, no child			0.027
			[0.122]
More than high school female, no child			0.007
Employment Type in February			[0.134]
Informally Employed	0.093**	0.091**	0.098***
	[0.037]	[0.037]	[0.037]
Self Employed	0.075**	0.081***	0.082***
February Sector (ref: sevices)	[0.031]	[0.031]	[0.031]
Construction	-0.006	0.003	0.001
	[0.065]	[0.065]	[0.066]
Industry	-0.047	-0.049	-0.051
	[0.031]	[0.031]	[0.032]
Observations	1,668	1,668	1,668
R-squared	0.025	0.027	0.031

[21] We report the findings that are robust across the three models for all workers, i.e., wage earners and the self-employed. We find that, once again, being single is a statistically significant correlate as single workers are about 8 percent more likely to report that their working hours were reduced. Again, workers without children are 10 to 19 percent less likely to report reduced hours because of the pandemic. Similar to the findings on reduced income, the informally employed and the self-employed are significantly more likely to report reduced hours because of the pandemic. Given that the self-employed can adjust their own hours, whereas the wage earners have to abide by the company rules, we run the regressions separately on these two groups of workers.

Appendix Table 8: Decline in working hours among wage earners[22]

	Reduced workinghours	Reduced workinghours	Reduced workinghours
15-19	-0.041	-0.046	-0.047
	[0.069]	[0.069]	[0.069]
20-24	-0.023	-0.018	-0.009
	[0.048]	[0.048]	[0.049]
45-64	-0.032	-0.031	-0.019
	[0.040]	[0.040]	[0.040]
65+	0.155	0.154	0.187
Marital status (ref: Married)	[0.225]	[0.222]	[0.223]
Single	0.106***	0.108***	0.102***
Schooling (ref: Less than high school)	[0.038]	[0.038]	[0.038]
High school	0.019	0.075	0.048
	[0.036]	[0.047]	[0.062]
More than high school	0.048	0.106**	0.016
gender(ref: Male)	[0.041]	[0.054]	[0.079]
Female	0.038	0.141**	0.135*
Education-Gender Interaction (ref:Less than HS-male)	[0.029]	[0.055]	[0.074]
High school female		-0.140**	-0.139
		[0.070]	[0.097]
More than high school female		-0.139*	-0.118
Child (ref: Child)		[0.076]	[0.112]
No Child	-0.127***	-0.128***	-0.210***
Education-Child Interaction (ref: Less than HS, no child)	[0.033]	[0.033]	[0.070]
High school, no child			0.069
			[0.091]
More than high school, no child			0.175*
Gender-Child Interaction (ref: Men with child)			[0.105]
Female, no child			0.016
Education-Gender-Child Interaction(ref: Less than HS men with child)			[0.110]
High-school female, no child			-0.006
			[0.142]
More than high school female, no child			-0.034
Employment Type in February			[0.153]
Informally Employed	0.118**	0.119**	0.122**
	[0.049]	[0.049]	[0.050]
Self Employed	-	-	-
February Sector (ref: sevices)			
Construction	0.033	0.049	0.051
	[0.069]	[0.070]	[0.071]
Industry	-0.025	-0.026	-0.026
	[0.035]	[0.035]	[0.035]
Observations	1,217	1,217	1,217
R-squared	0.026	0.030	0.034

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[22] The regression results for wage earners are in line with that for all workers.

Appendix Table 9: Decline in working hours among self-employed

	Reduced workinghours	Reduced workinghours	Reduced workinghours
15-19	-0.653***	-0.645***	-0.616***
	[0.073]	[0.074]	[0.083]
20-24	-0.231	-0.243	-0.292
	[0.215]	[0.214]	[0.219]
45-64	-0.098*	-0.099*	-0.095*
	[0.055]	[0.055]	[0.056]
65+	-0.114	-0.110	-0.089
Marital status (ref: Married)	[0.135]	[0.133]	[0.135]
Single	0.016	0.018	0.001
Schooling (ref: Less than high school)	[0.072]	[0.072]	[0.074]
High school	-0.032	-0.050	-0.099
	[0.057]	[0.061]	[0.078]
More than high school	0.047	0.072	-0.063
gender(ref: Male)	[0.077]	[0.087]	[0.125]
Female	-0.029	-0.065	0.026
Education-Gender Interaction (ref:Less than HS-			
male)	[0.065]	[0.125]	[0.215]
High school female		0.099	-0.116
		[0.156]	[0.253]
More than high school female		-0.045	-0.055
Child (ref: Child)		[0.173]	[0.284]
No Child	-0.075	-0.076	-0.175**
Education-Child Interaction (ref: Less than HS, no			
child)	[0.056]	[0.057]	[0.082]
High school, no child			0.101
			[0.122]
More than high school, no child			0.267
Gender-Child Interaction (ref: Men with child)			[0.168]
Female, no child			-0.089
Education-Gender-Child Interaction(ref: Less than HS men with child)			[0.262]
High-school female, no child			0.350
			[0.321]
More than high school female, no child			-0.061
Employment Type in February			[0.358]
Informally Employed	0.084	0.087	0.096
	[0.060]	[0.060]	[0.061]
Self Employed	-	-	-
February Sector (ref: sevices)			
Construction	-0.376*	-0.380*	-0.399**
	[0.202]	[0.196]	[0.183]
Industry	-0.147**	-0.140*	-0.143*
	[0.072]	[0.073]	[0.073]
Observations	405	405	405
R-squared	0.053	0.055	0.069