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COVID-19, job loss, and underemployment: who is affected?

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This paper seeks to examine the short-term adverse effects of the labor market disruptions caused by the COVID-19 pandemic on employment by estimating and comparing the probability of job loss, underemployment, and employment gain in January, April, and July 2020. Using data from the Philippine Labor Force Survey, we find that the workers who were most vulnerable to job loss and underemployment amid the COVID-19 pandemic are male, less educated, and those working in sectors that are either with limited operational capacity or not allowed to open at all. On a positive note, the results also suggest that males and less-educated individuals are more likely to gain employment after being jobless in the previous quarter. A policy recommendation is to establish an institutionalized social insurance program, such as an unemployment insurance facility, to protect a wider range of workers from the negative shocks to the labor market.

JEL classification: J21, J60
Keywords: COVID-19, unemployment, underemployment

1. Introduction

This paper seeks to examine the short-term adverse effects of the labor market disruptions caused by the COVID-19 pandemic on employment. Several governments implemented containment measures to mitigate the spread of the virus, including school and workplace closures, mobility restrictions, travel bans, and suspension of public transportation. While restrictions on movement have eased months after the pandemic broke out,[1] the share of workers living in countries with some form of workplace closure remains high at more than 90 percent as of January 2021 [International Labour Organization (ILO) 2021]. This is because social distancing is still required even in the absence or the easing

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[1] Under the Oxford Coronavirus Government Response Tracker project, Hale et al. [2021] developed a daily index that quantifies the strictness of government policies. This is called the Stringency Index which has a range of 0 (least strict) to 100 (strictest). From a peak average of 79.6 in 184 countries on April 18, 2020, the average Stringency Index stands at only 56.5 as of March 1, 2021.

of lockdown policies—with the contact-intensive jobs being the most likely to be affected by social distancing measures [The ASEAN Secretariat 2020]. Global labor income is estimated to have fallen which could weaken private consumption, exacerbating the contraction in global aggregate demand (ILO [2021]; World Bank [2021]). On top of household income, business income has also been reduced by the economic downturn due to COVID-19 and lockdowns which can lead to the downsizing or closure of affected firms, reduced working hours, and retrenchment of workers [The ASEAN Secretariat 2020]. Finally, the disruptions in the supply chain affected the supply of inputs and led to lower operational capacity of factories which, in turn, can generate negative impact on labor [The ASEAN Secretariat 2020]. The ILO [2021] estimated that global working hours declined by 8.8 percent in 2020 relative to that in the fourth quarter of 2019, which is equivalent to a loss of 255 million full-time jobs.

Estimating the preliminary impact of containment measures and social distancing requirements on employment usually deals with identifying the individuals who can work from home (e.g., Boeri et al. [2020]; Delaporte and Peña [2020]; Dingel and Neiman [2020]; Hatayama et al. [2020]; Mongey et al. [2020]; Saltiel [2020]). These studies mostly find that it is the economically vulnerable groups who are less likely to work in jobs that are amenable to work-from-home arrangements and are more likely to work in high-contact jobs—i.e., the individuals with less education, with lower income even before the pandemic, working in the informal sector, and with little access to social insurance (Delaporte and Peña [2020]; Hatayama et al. [2020]; Mongey et al. [2020]; Saltiel [2020]). From a policy perspective, having the means to examine who are the workers that cannot work from home can be used to target the individuals who need social protection the most [Dingel and Neiman 2020]. However, it should be recognized that the existing estimates suggest that most of the jobs cannot still be completely done at home,[2] and limited access to technology can constrain how much work can be performed at home. Thus, the potential effect of the pandemic on employment prospects identified by these studies may be lower than the actual effect on the labor market.

Some studies are concerned with the effect of the current pandemic and lockdowns on actual labor market flows. Using the Australian Longitudinal Labor Force Survey, Guven et al. [2020] find that the COVID-19 pandemic and national lockdown reduced labor force participation, full-time employment, and weekly

[2] Dingel and Neiman [2020] estimate that only 37 percent of the jobs in the US can be completely performed at home. Boeri et al. [2020] observe that such share ranges from around 24 to 31 percent in Europe. Lower-income countries also appear to have a lower potential to do remote work. In their study of 23 Latin American and Caribbean countries, Delaporte and Peña [2020] estimate that the share of individuals who can work from home ranges from seven percent in Guatemala to 16 percent in Bahamas. Using the World Bank's Skills Toward Employability and Productivity (STEP) survey in ten low- and middle-income countries, Saltiel et al. [2020] find that the share of individuals that can work from home ranges from 5.5 percent in Ghana to 23 percent in China.

working hours, as well as increased unemployment and underemployment. The negative effects on labor force participation and working hours appear to be smaller for workers who have longer tenure, have more education, and are employed in jobs suitable for work-from-home (WFH) arrangements. In contrast, immigrants, those who cannot work from home, and those who have shorter tenure are more likely to be unemployed because of the lockdown. In Italy, Casarico and Lattanzio [2020] observe that the workers who had heavily suffered from the previous recession—the young, temporary, and low-skilled workers—are also the ones who are more likely to lose their jobs due to the current pandemic. Similar implications are obtained by Kikuchi et al. [2021] in Japan in which the negative shocks of the current pandemic are stronger for the pre-pandemic economically disadvantaged groups, particularly the women, the contingent workers, the low-skilled individuals, and those engaged in social and non-flexible jobs.

Although preliminary estimates on the potential of the labor force to perform WFH arrangements were carried out for the Philippines (e.g., Generalao [2020]; Gaduena et al. [2020]), to our knowledge, this is the first paper that attempts to empirically test and determine the characteristics of the individuals who are more vulnerable to job loss and underemployment associated with the COVID-19 pandemic, lockdown policies, and disruptions in labor markets. We ask the following questions: Who are more likely to lose their jobs during the pandemic? Who are more likely to become underemployed? Lastly, who are more likely to gain employment after experiencing unemployment? The Philippines has arguably implemented one of the strictest COVID-19-related containment measures in the world. As of March 22, 2021, only 15 out of 184 countries reached the highest level of Hale et al.'s [2021] COVID-19 Stringency Index. This includes the Philippines which posted a score of 100 for 40 days from March 22, 2020 to April 4, 2020.[3] The enhanced community quarantine (ECQ) was first implemented in Luzon, including the National Capital Region (NCR), in March 17, 2020 amid the increases in COVID-19 cases in the country. In the following weeks, the rest of the Philippines has been placed under a community quarantine of varying degrees depending on the geographic area. In terms of guidelines which have been varying over time, the modified general community quarantine (MGCQ) is the least strict and the ECQ is the strictest level of community quarantine. In the middle of the spectrum are the general community quarantine (GCQ) and the modified enhanced community quarantine (MECQ). The general idea of the quarantine guidelines is that sectors that are deemed essential by the government face looser restrictions to limit the impediments to the flow of basic needs of the people in the middle of a lockdown. On the other hand, the sectors identified as non-essential are imposed with more austere measures to sustain social

[3] The other 14 countries are Argentina (34 days), Cuba (38 days), Dominican Republic (20 days), El Salvador (26 days), Georgia (27 days), Honduras (79 days), India (27 days), Jordan (34 days), Kuwait (21 days), Libya (41 days), Oman (2 days), Serbia (31 days), Sri Lanka (22 days), and Suriname (4 days).

distancing. The COVID-19 pandemic, lockdown measures, and reduced economic activity are linked to the steep increase in the unemployment rate to 17.6 percent and the historically low labor force participation rate at 55.7 percent in April 2020. In the same month, the Philippine Statistics Authority estimated that 88.1 percent of the inactive unemployed[4] cited the ECQ, the lockdown, or the COVID-19 pandemic as the reason for not looking for work.

Nonetheless, even with the easing of the community quarantine in the second half of 2020, economic activity has remained low. By June 2020, most parts of the country had already been transitioned to the less stringent GCQ but, according to the Google Mobility Trends data, the mobility of people was still much muted relative to the period before the pandemic.[5] There was still a large discrepancy between the pre-pandemic average capacity utilization rate for manufacturing and what was observed in the past year. The Purchasing Managers' Index also suggested that contraction in business conditions of the manufacturing, services, retail and wholesale had remained almost throughout 2020.

Using the data from the Labor Force Survey conducted in January, April, and July 2020, we estimate and compare the probability of job loss, underemployment, and gaining employment between the survey round right before the pandemic and the two survey rounds corresponding to the first months of the pandemic. We find that the workers who were most vulnerable to job loss and underemployment amid the COVID-19 pandemic are males, the less educated, and those who had been working in sectors that are either with limited operational capacity or not allowed to open at all. On a positive note, the results also suggest that the males and the less-educated individuals are more likely to gain employment after being jobless in the past quarter.

This paper is organized as follows: Section 2 compares the economic and labor statistics before and during the first year of the pandemic. Section 3 discusses the methodology applied in this paper. Section 4 presents the results. Section 5 concludes the paper.

2. Aggregate economic and labor statistics: pre-pandemic vs. pandemic data

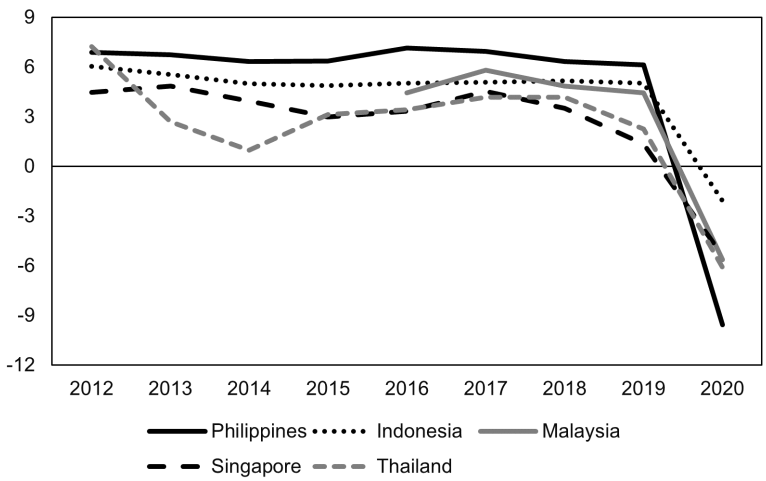
The COVID-19 pandemic has unprecedented impact on the Philippine economy and labor market. Comparing the Philippines with the other large ASEAN countries, real gross domestic product (GDP) had been growing at the fastest rate since 2013 until right before the pandemic year (Figure 1). The robust growth of the Philippine economy in the past years was gravely interrupted by the pandemic

[4] The inactive unemployed refers to the people without jobs who are not looking for work but are available for work should a job opportunity arrive. In contrast, the active unemployed refers to the people without jobs who are looking and are available for work.

[5] This is based on the "COVID-19: Google Mobility Trends" which can be accessed online at https://ourworldindata.org/covid-google-mobility-trends.

with the country exhibiting the sharpest decline in real GDP growth. Disruptions in economic production had been evident since April 2020 (Table 1). While the monthly production volume of manufacturing has been showing negative growth since early 2019, it decreased by 64.8 percent in April 2020 and by as much as 72.8 percent in July 2020. Also, the average capacity utilization rate for manufacturing fell to 46.3 percent in April 2020 from an average of around 70 percent in the past year, before picking up in the second half of 2020. It is not just the manufacturing sector that suffered when the pandemic broke out. The Purchasing Managers' Index (PMI) for services and wholesale and retail fell to below 50, indicating pessimism in business conditions. The PMI increased in later months but still suggested, albeit lower degree of, pessimism. In the World Bank's survey of firms in July 2020, Piza and Lee [2020] find that 40 percent of firms reported temporary suspension of operations, while 15 percent reported permanent closure. It also seems that the micro, small, and medium-sized enterprises (MSMEs), in particular, have been heavily affected by the lockdown policies and the slow recovery in the business environment [Shinozaki and Rao 2021].

FIGURE 1. GDP growth rate (%)—selected ASEAN countries



Source: Author's calculations using data from www.ceicdata.com.

TABLE 1. Selected monthly indicators of economic activity

Indicator	2019				2020			
	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct
Volume of production index, y-o-y growth rate (%)	3.4	-2.0	-48.3	-2.0	-3.4	-64.8	-72.8	-25.4
Average capacity utilization rate for manufacturing (%)	72.5	72.7	72.0	70.6	72.6	46.3	61.5	60.0
Purchasing Managers' Index (PMI)								
Overall	54.9	53.8	53.0	53.6	55.0	27.5	44.9	47.2
Manufacturing	53.9	52.6	51.6	51.7	54.6	30.6	48.8	47.3
Services	57.3	54.5	54.4	55.9	56.4	23.7	42.4	48.9
Retail and wholesale	53.1	52.6	51.1	50.8	54.6	31.2	45.1	44.8

Sources of data: Philippine Statistics Authority for the production index and capacity utilization rate data, Bangko Sentral ng Pilipinas for the PMI data.

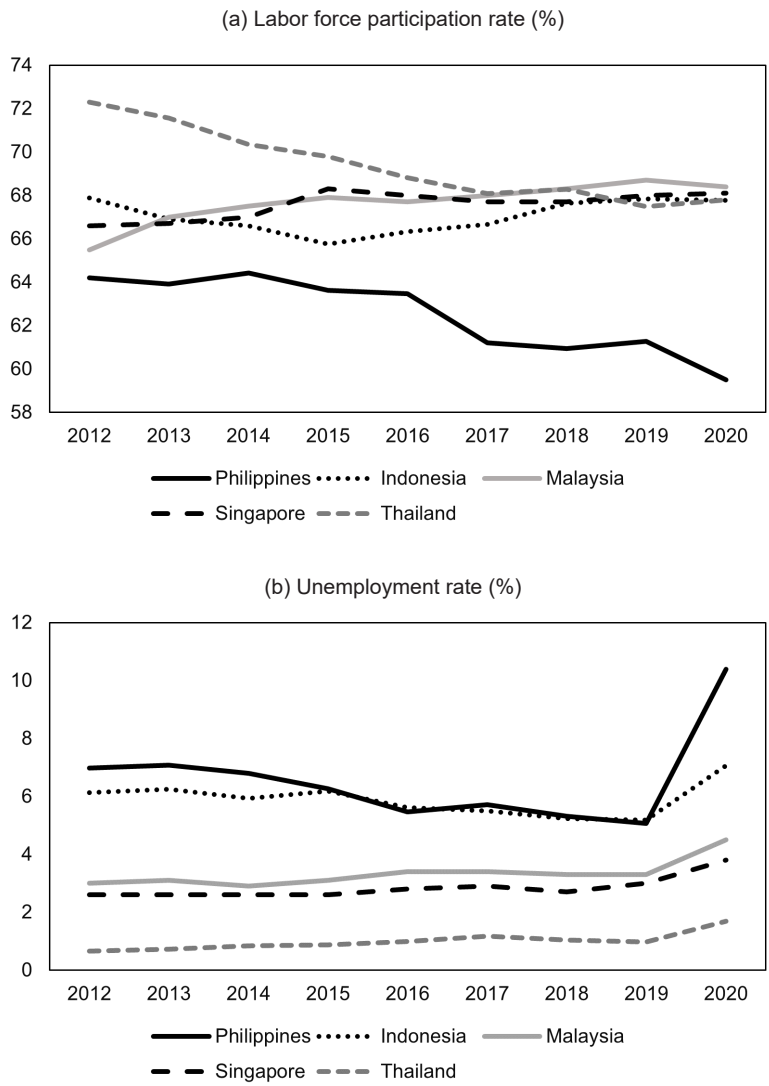
The effect of the pandemic on economic output and activities coincided with the more severe deterioration of labor market outcomes in the country. Between 2012 and 2020, aside from showing the lowest labor force participation rates and the highest unemployment rates in the past decade among the largest member countries of the Association of Southeast Asian Nations (ASEAN), the Philippines exhibited the most prominent decline in the labor force participation rate and increase in the unemployment rate in 2020 (Figure 2). The deterioration in economic conditions led the government to reduce the economic growth target from 7-8 percent to 6.5-7.5 percent and to raise the unemployment rate target from 3-5 percent to 7-9 percent by 2022.[6]

Figure 3 shows a more detailed trend in the quarterly labor force participation rate, unemployment rate, and underemployment rate from January 2007 to October 2020, covering the period of the 2007-2008 Global Financial Crisis, the high-growth years in the mid-2010s, and the first year of the current pandemic. The labor force participation rate had been mostly following a declining trend since April 2014, but the dip in April 2020 was too pronounced such that it was assessed as the lowest in the history of the Philippine labor market [PSA 2020, November 11]. Although the labor force participation rate seemingly recovered in July 2020 amid the relaxation of the community quarantine in several parts of the country, the 2.2-percentage-point decline in October 2020 may imply that the decision of the working-age population to participate in the labor market has yet to stabilize. Aside from the historically low labor force participation rate, the unemployment rate surged to double digits at 17.6 percent in April 2020. Even during the 2007-2008 Global Financial Crisis and eurozone debt crisis in which external demand considerably slowed down, the unemployment rate remained at

[6] Based on the "Updated Philippine Development Plan 2017-2022" in http://pdp.neda.gov.ph/wp-content/uploads/2021/02/20210218-Pre-publication-copy-Updated-Philippine-Development-Plan-2017-2022.pdf.

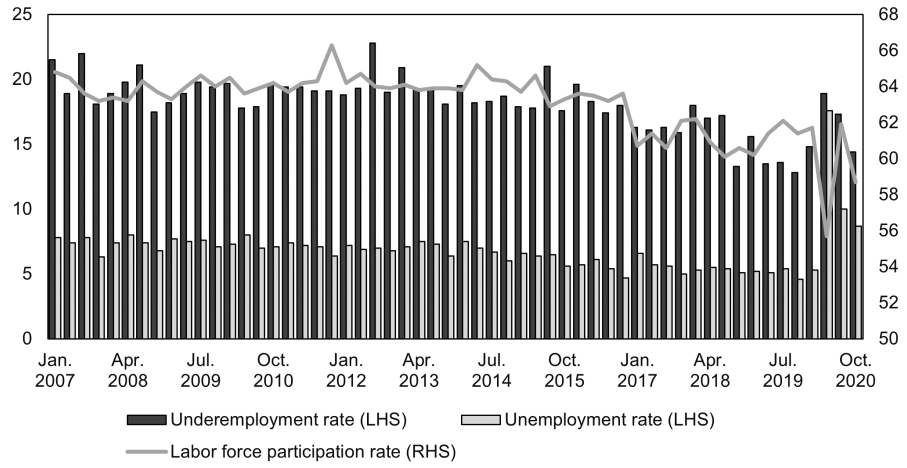
one-digit levels. The striking drop in the labor force participation rate and the rise in the unemployment rate in April 2020 suggest that the extent and the rate of job loss during the pandemic is much more severe than in the previous global recession. Furthermore, the underemployment rate rose to nearly 20 percent in April 2020 when it had registered some improvements a year before the pandemic occurred.

FIGURE 2. Labor market statistics—selected ASEAN countries



Source: Author's calculations using data from www.ceicdata.com.

FIGURE 3. Labor force participation rate, unemployment rate, and underemployment rate
(January 2007 – October 2020, %)



Note: LHS means left-hand scale. RHS means right-hand scale.
Sources of data: Philippine Statistics Authority.

Another way to look at aggregate job loss is to calculate employment growth. Table 2 presents the year-on-year growth of employment by major occupational group in 2020. The decline in employment is observed in all occupations, but the extent greatly varies. The most severely hit occupation during the onset of the lockdown appears to be the craft and related trades workers whose employment contracted by 36.2 percent. What is striking is that even the higher-skilled occupations—i.e., managers, professionals, and technicians and associate professionals—were not spared by the pandemic. The least hit is the occupation of skilled agricultural, forestry, and fishery workers which recorded a fall of only 1.5 percent in April. It is also the only civilian occupation that posted an expansion in the next two quarters, which could be attributed to the essential production of food.

Employment growth is also disaggregated by sector in Table 3. Similar to what is observed in the occupational breakdown, double-digit negative growth can be seen in almost all sectors—even in the high-employment-growth sectors prior to the pandemic like utilities and accommodation and food service activities. The sector that is most severely hit by the pandemic is the arts, entertainment, and recreation sector, which can be understood as largely non-essential. The least affected ones appear to be the agriculture, human health,

and social work activities sectors, which are the least-restricted sectors by the community quarantine policies given their role in food production and health and emergency frontline services, respectively. Seemingly contrary to what is commonly found in work-from-home literature, the sectors that are expected to have a large share of jobs that can be done at home also exhibited significant declines in employment, including information and communication, financial and insurance activities, and professional, scientific and technical activities.[7]

While the impact of the pandemic on employment outcomes is observed across the board, the degree of susceptibility appears to vary which we aim to estimate in the succeeding sections.

TABLE 2. Employment growth by occupation between 2019 and 2020 (y-o-y)

Occupation	Jan	Apr	Jul	Oct
Managers	-21.7	-31.4	-23.8	-25.6
Professionals	6.6	-13.0	-9.6	-7.1
Technicians and associate professionals	-10.6	-25.7	-22.6	-4.0
Clerical support workers	11.0	-16.3	-5.8	-11.0
Service and sales workers	18.4	-20.5	-2.7	-1.8
Skilled agricultural, forestry, and fishery workers	8.8	-1.5	16.0	13.1
Craft and related trades workers	-5.2	-36.2	-9.8	-11.8
Plant and machine operators and assemblers	8.9	-23.9	5.2	-8.7
Elementary occupations	5.9	-14.4	1.9	-7.0
Armed forces occupations	23.2	-12.2	27.1	26.7

Note: According to the Philippine Statistics Authority, the population projections based on the 2015 Population Census has been adopted in estimating labor statistics since January 2020. Hence, the 2019 estimates based on the 2015 Population Census were used in the calculations.
Sources of data: Author's calculations using data from the Philippine Statistics Authority's Labor Force Survey statistical tables.

[7] Dingel and Neiman [2020] estimate that 80 percent, 76 percent, and 72 percent of the jobs in the professional, scientific and technical services, finance and insurance, and information, respectively, can be completely done at home.

TABLE 3. Employment growth by sector between 2019 and 2020 (y-o-y)

Sector	Jan	Apr	Jul	Oct
Agriculture	9.2	-3.4	11.7	0.7
Mining and quarrying	1.0	-3.9	19.2	-3.2
Manufacturing	-1.4	-24.4	-8.9	-17.0
Electricity, gas, steam, and air conditioning supply	10.6	-42.8	12.2	-14.5
Water supply; sewerage, waste management and remediation activities	-20.9	-29.5	-5.0	23.2
Construction	-2.6	-33.3	0.3	-4.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	7.3	-23.8	4.0	-0.7
Transportation and storage	-0.5	-27.1	-10.2	-18.9
Accommodation and food service activities	11.1	-35.3	-36.0	-33.2
Information and communication	-9.5	-41.8	-28.8	5.0
Financial and insurance activities	6.4	-20.2	-0.4	-6.7
Real estate activities	-18.3	-13.8	-17.2	-25.7
Professional, scientific and technical activities	-16.2	-21.9	-19.6	-6.9
Administrative and support service activities	4.5	-14.2	-11.6	2.5
Public administration and defense; compulsory social security	7.4	-9.5	-9.2	-11.4
Education	7.0	0.01	-6.7	5.2
Human health and social work activities	8.2	-18.7	10.8	1.8
Arts, entertainment, and recreation	0.5	-54.8	-73.0	-38.2
Other service activities	-3.4	-15.7	-13.1	-5.6

Note: According to the Philippine Statistics Authority, the population projections based on the 2015 Population Census has been adopted in estimating labor statistics since January 2020. Hence, the 2019 estimates based on the 2015 Population Census were used in the calculations.
Sources of data: Author's calculations using data from the Philippine Statistics Authority's Labor Force Survey statistical tables.

3. Methodology

3.1. Data and sample

This study uses the Labor Force Survey (LFS) conducted by the Philippine Statistics Authority every first month of the quarter until the end of 2020.[8] It is a household-based survey which samples more than 40,000 households, collecting both demographic and socioeconomic information at the individual level. Demographic information includes age, sex, relationship to the household head,

[8] In February 2021, the Philippine Statistics Authority started conducting the monthly LFS in between the quarterly rounds to generate more frequent national-level labor market statistics amid the COVID-19 pandemic. The original quarterly rounds of the survey are used to produce representative data both at the national and regional level.

marital status, and highest educational attainment. The socioeconomic variables help determine the employment status of working-age individuals, describe the nature of the job of individuals who had a job during the reference week, and indicate the job search efforts and availability for work of individuals who did not have a job during the reference week. Moreover, to identify the experienced unemployed, individuals that did not have work during the reference week were asked to report their last occupation if applicable. The reference week refers to the seven days preceding the date of the visit of the enumerator to the household. The LFS also gathers data on whether the individual had a job during the preceding quarter and, if he or she did have a job, the sector where the individual belonged to. In the absence of longitudinal labor market data, we utilize the information on the activity in the preceding quarter to the survey period to determine the possible flow from employment to non-employment and vice-versa. The sample used in this study consists of individuals aged 15 to 64 years old and who are not employed in the armed forces.

We choose the first three survey rounds in 2020 to compare the employment pattern before and during the first months of the COVID-19 pandemic. The January round provides the employment pattern right before the pandemic occurred. The April round covers the period wherein the Philippines entered a technical recession and the most stringent containment measures were put in place by the government as the immediate response to the rising COVID-19 cases in the country. By the July round, the ECQ imposed in many parts of the country, including NCR, had already been lifted, but economic growth remained at two-digit contraction.

3.2. Estimation strategy

With the immediate contraction in employment amid the decline in aggregate demand, the community quarantine, and the social distancing measures associated with the on-going COVID-19 pandemic, we seek to answer the following questions. Who are more likely to lose their jobs during the pandemic? Who are more likely to become underemployed? Finally, who among the unemployed are likely to gain employment? As we have seen in the previous section, a large share of the working-age population became unemployed and had dropped out of the labor force as soon as the pandemic broke out and the ECQ was implemented in Luzon. Nonetheless, we also have to consider the improvements in the labor market observed when the ECQ measures were lifted and replaced by less stringent quarantine rules. The tendency to become underemployed is another aspect that we look into given the surge in the underemployment rate. We recognize that the severity of the effect of the labor market disruptions on employment will likely be heterogenous given the varying degrees of demand to goods and services produced by labor type, restrictions applied to different sectors, risks of physically reporting to work, and capacity to do remote work.

Given the objectives of the study, three equations will be estimated: the probability of job loss, the probability of underemployment, and the probability of gaining employment. Equation 1 is estimated to analyze the determinants of the probability of job loss.

$$\begin{aligned} jobloss_i = {} & \beta_0 + \beta_1 survey_i + \beta_2 male_i + \beta_3 male_i \times survey_i + \beta_4 age_i + \\ & \beta_5 age_i \times survey_i + \beta_6 urban_i + \beta_7 urban_i \times survey_i + \beta_8 educ_i + \\ & \beta_9 educ_i \times survey_i + \beta_{10} skill_i + \beta_{11} skill_i \times survey_i + \beta_{12} tele_i + \\ & \beta_{13} tele_i \times survey_i + \beta_{14} capacity_i + \beta_{15} reg_i + \beta_{16} sec_i + u_i \end{aligned} \quad (1)$$

$jobloss_i$ is a binary variable that is equal to 1 if individual i was unemployed during the reference week but had a job in the previous quarter. On the other hand, it is equal to 0 if individual i was employed during the reference week and had a job in the previous quarter. We note that individuals who reported that they did not have a job in the previous quarter are excluded from the sample for Equation 1, so the probability of job loss during the reference week is conditional on being employed in the previous quarter.

$survey_i$ pertains to the survey round which individual i participated in. $male_i$ is a dummy variable equal to 1 if individual i is male and 0 if female. age_i refers to age bracket dummies:15-24 (base group), 25-34, 35-44, 45-54, and 55-64. $educ_i$ refers to the education dummies: lower than junior high school (base group), junior high school graduate, senior high school graduate, incomplete post-secondary, post-secondary graduate, incomplete college, and college graduate. $urban_i$ is a dummy variable equal to 1 if the individual lives in an urban area and 0 if in a rural area. reg_i refers to the region dummies.

$skill_i$ denotes the category of skill level attached to the one-digit occupational code that is based on the 2012 Philippine Standard Occupational Classification (PSOC). The 2012 PSOC is compliant with the methodology of the 2008 International Standard Classification of Occupation (ISCO-08) which assigns skill levels 1 (lowest) to 4 (highest). Using the ISCO-08's classification, "managers", "professionals", and "technicians and associate professionals" are identified as high-skilled occupations; "clerical support workers", "services and sales workers", "skilled agricultural, forestry, and fishery workers", "craft and related trades workers", and "plant and machine operators and assemblers" as medium-skilled occupations; and "elementary occupations" as low-skilled occupation. If individual i was employed during the reference week, then occupation refers to the current primary occupation of this individual. If individual i did not have a job during the reference week, we utilize the data on previous occupation.

$tele_i$ refers to the potential teleworkability of individual i's occupation which is equal to 1 if it is teleworkable and 0 if not. We apply Dingel and Neiman's [2020] job classification. However, the jobs in their classification are generated based on O*NET's codes, so we need to match the occupations to the 2012 PSOC

definition. First, we matched the O*NET's codes with ISCO-08's codes and then matched ISCO-08's codes with the 2012 PSOC codes. Second, the occupations in Dingel and Neiman [2020] are defined at the four-digit level while the codes in the LFS are defined at the two-digit level, so we aggregated the four-digit codes to two-digit codes. If more than 50 percent of the jobs in the four-digit level under the same two-digit occupational code are classified as teleworkable, we mark that two-digit occupational code as potentially teleworkable; otherwise, potentially non-teleworkable.

$capacity_i$ denotes the operational capacity of the two-digit sectoral code of the 2009 Philippine Standard Industrial Classification (PSIC). Operational capacity refers to the degree to which workers are allowed to physically report to work. Three classifications are applied here: (1) fully open if all workers are allowed to physically report to work, (2) limited capacity if only a percentage of workers are allowed to physically report to work, and (3) fully closed if the establishment is not allowed to operate and thus no workers will report on-site. We based the assignment of operational capacity on the official guidelines published by the government and the level of community quarantine implemented in each region. The Memoranda from the Executive Secretary dated March 16[9] and 18,[10] 2020 were used for the April 2020 LFS round, and the Omnibus Guidelines on the Implementation of Community Quarantine in the Philippines with Amendments as of July 2, 2020[11] was used for the July 2020 LFS round. We relied on the description of the industries in the official guidelines in matching the two-digit PSIC code with the applicable operational capacity classification, so the matching process is subject to our assessment. Furthermore, in cases where the level of community quarantine is different in certain provinces or cities in a region, we apply the level that conforms to the greater part of the region. Since there is no community quarantine in place before the pandemic, all sectors were characterized as fully open in January 2020.

sec_i denotes the sections in the 2009 PSIC. Mining and quarrying; manufacturing; electricity, gas, steam and air-conditioning supply; water supply, sewerage, waste management and remediation activities; and construction are merged under the industry sector. If individual *i* was employed during the reference week, then sec_i refers to the sector where he or she is currently working in. If individual *i* did not have a job during the reference week, we utilize the data on the sector where he or she was working in the previous quarter.

We interacted certain variables with the survey round dummies to test whether the predicted probability significantly differs between the pre-pandemic data

[9] See https://www.officialgazette.gov.ph/downloads/2020/03mar/20200316-MEMORANDUM-FROM-ES-RRD.pdf.

[10] See https://www.officialgazette.gov.ph/downloads/2020/03mar/20200318-MEMORANDUM-FROM-ES-RRD.pdf.

[11] See https://www.officialgazette.gov.ph/downloads/2020/06jun/20200702-omnibus-guidelines-on-the-implementation-of-community-quarantine-in-the-philippines.pdf.

and ECQ data, and between pre-pandemic data and post-ECQ data. The variables $capacity_i$, reg_i, and sec_i are not interacted with the survey round dummies to avoid perfect collinearity. u_i is the error term.

Equation 2 is estimated to analyze the determinants of the probability of underemployment.

$$\begin{aligned} underemp_i = {} & \alpha_0 + \alpha_1 survey_i + \alpha_2\, male_i + \alpha_3 male_i \times survey_i + \alpha_4 age_i + \\ & \alpha_5 age_i \times survey_i + \alpha_6 urban_i + \alpha_7 urban_i \times survey_i + \alpha_8 educ_i + \\ & \alpha_9 educ_i \times survey_i + \alpha_{10} skill_i + \alpha_{11} skill_i \times survey_i + \alpha_{12} tele_i + \\ & \alpha_{13}\, tele_i \times survey_i + \alpha_{14} capacity_i + \alpha_{15}\, prevjob_i + \alpha_{16}\, prevjob_i \times survey_i + \\ & \alpha_{17}\, reg_i + \alpha_{18}\, sec_i + e_i \end{aligned} \tag{2}$$

$underemp_i$ is a binary variable that is equal to 1 if individual i is considered underemployed during the reference week and 0 if not. The definition of the independent variables is the same as in Equation 2, except that $skill_i$, $capacity_i$, and sec_i refer to their current employment arrangements, as the sample in this equation consists of employed individuals only. $prevjob_i$ denotes whether individual i had a job in the previous quarter or not. e_i is the error term.

Equation 3 is estimated to analyze the determinants of the probability of employment.

$$\begin{aligned} employ_i = {} & \gamma_0 + \gamma_1 survey_i + \gamma_2 male_i + \gamma_3 male_i \times survey_i + \gamma_4 age_i + \\ & \gamma_5 age_i \times survey_i + \gamma_6\, urban_i + \gamma_7\, urban_i \times survey_i + \gamma_8 educ_i + \\ & \gamma_9 educ_i \times survey_i + \gamma_{10} reg_i + v_i \end{aligned} \tag{3}$$

$employ_i$ is binary variable that is equal to 1 if individual i did not have a job in the previous quarter but became employed during the reference week. It is equal to 0 if individual i did not have a job in the previous quarter and was considered unemployed during the reference week. Hence, the probability of employment is conditional on not having a job in the previous quarter. The same definition of variables in Equation 1 is applied here.

A potential empirical concern in investigating the determinants of these three outcomes is the presence of sample selection bias, because we cannot observe the given outcomes of people who are not working or not in the labor force. To address this concern, the probit model with sample selection is applied in investigating the determinants of the given outcomes. The selection equation estimates the probability of working and is run against the following variables: survey period, gender, age, education, urban or rural, region, and the instrumental variable which is the presence of children aged less than five years old in the household where the individual belongs to. We hypothesize that the presence of young children in the household lowers the likelihood of working.

4. Results and discussion

4.1. Job loss

The estimates of the equation on the probability of job loss are presented on the second column of Table 4 and the average marginal effects are plotted in Figure 4. While there is no significant gender difference in job loss in January and July, men are more likely to lose their jobs in April. Older people are less likely to lose their jobs in all survey rounds, especially in April where the average marginal effects between the older age brackets and the youngest age bracket further widened. This may imply that longer labor market experience provides stronger job security amid negative shocks to the labor market. People living in urban areas are more likely to lose their jobs in July, but urbanity is not a significant determinant of job loss in January and April. There is mostly no significant difference in the probability of job loss in January and July between the least educated workers and the more educated workers, except the senior high school graduates and college graduates who faced a higher likelihood of job loss. However, in April, college graduates and post-secondary graduates became less likely to experience job loss, while those who have not finished their post-secondary studies were less likely to lose their jobs compared to the least educated workers.

Medium- and high-skilled workers were less likely to experience job loss than low-skilled workers in January. The probability of job loss in April and July is not significantly different from that of January for the medium-skilled workers. On the other hand, the difference in job loss between high-skilled workers and low-skilled workers increased from January to April. The potential teleworkability of one's own occupation is not significant in explaining job loss, but the operational capacity of a sector is. Workers in a fully closed sector are more likely to lose their jobs, more so in April.

It seems that the deviation from the probability of job loss from January, which is the pre-ECQ period, is mostly observed in April, the ECQ period. The affected workers in the ECQ period were likely males, the young, and those who worked in sectors that were not allowed to operate at all. In contrast, better-educated and high-skill workers were likely more secured in keeping their employment status during the ECQ period. Nonetheless, as expected, workers in fully closed sectors were shown to more likely experience job loss even in July, the post-ECQ period.

TABLE 4. Estimates of the probit models with sample selection

Variables	Job loss	Underemployment	Employment
Survey round (base: January)			
April	0.766***	-0.228***	-0.320***
	(0.051)	(0.058)	(0.091)
July	-0.182**	-0.013	0.189*
	(0.062)	(0.047)	(0.087)
Male	-0.004	0.183***	0.307***
	(0.046)	(0.022)	(0.081)
Male × Survey round			
April	0.081*	0.035	0.139*
	(0.032)	(0.022)	(0.058)
July	0.024	0.021	0.091
	(0.040)	(0.019)	(0.049)
Age group (base: 15-24)			
25-34	-0.350***	0.120***	-0.006
	(0.035)	(0.022)	(0.053)
35-44	-0.595***	0.170***	0.270***
	(0.040)	(0.022)	(0.067)
45-54	-0.613***	0.141***	0.183*
	(0.043)	(0.023)	(0.076)
55-64	-0.574***	-0.006	-0.010
	(0.052)	(0.025)	(0.112)
Age group × Survey round			
25-34 × April	0.183***	-0.028	-0.212**
	(0.042)	(0.032)	(0.073)
35-44 × April	0.327***	-0.024	-0.318***
	(0.046)	(0.032)	(0.086)
45-54 × April	0.265***	-0.020	-0.214*
	(0.050)	(0.030)	(0.094)
55-64 × April	0.295***	-0.067	0.091
	(0.059)	(0.036)	(0.078)
25-34 × July	0.106*	-0.015	0.089
	(0.051)	(0.030)	(0.061)
35-44 × July	0.178**	-0.033	0.075
	(0.056)	(0.030)	(0.070)
45-54 × July	0.139*	-0.064*	0.091
	(0.061)	(0.031)	(0.078)
55-64 × July	0.165*	-0.080*	0.027
	(0.073)	(0.034)	(0.094)
Urban	-0.012	-0.193***	-0.191***
	(0.027)	(0.014)	(0.045)
Urban × Survey round			
April	0.009	0.114***	0.047
	(0.030)	(0.019)	(0.057)
July	0.161***	0.189***	0.053
	(0.037)	(0.018)	(0.048)

TABLE 4. Estimates of the probit models with sample selection (continued)

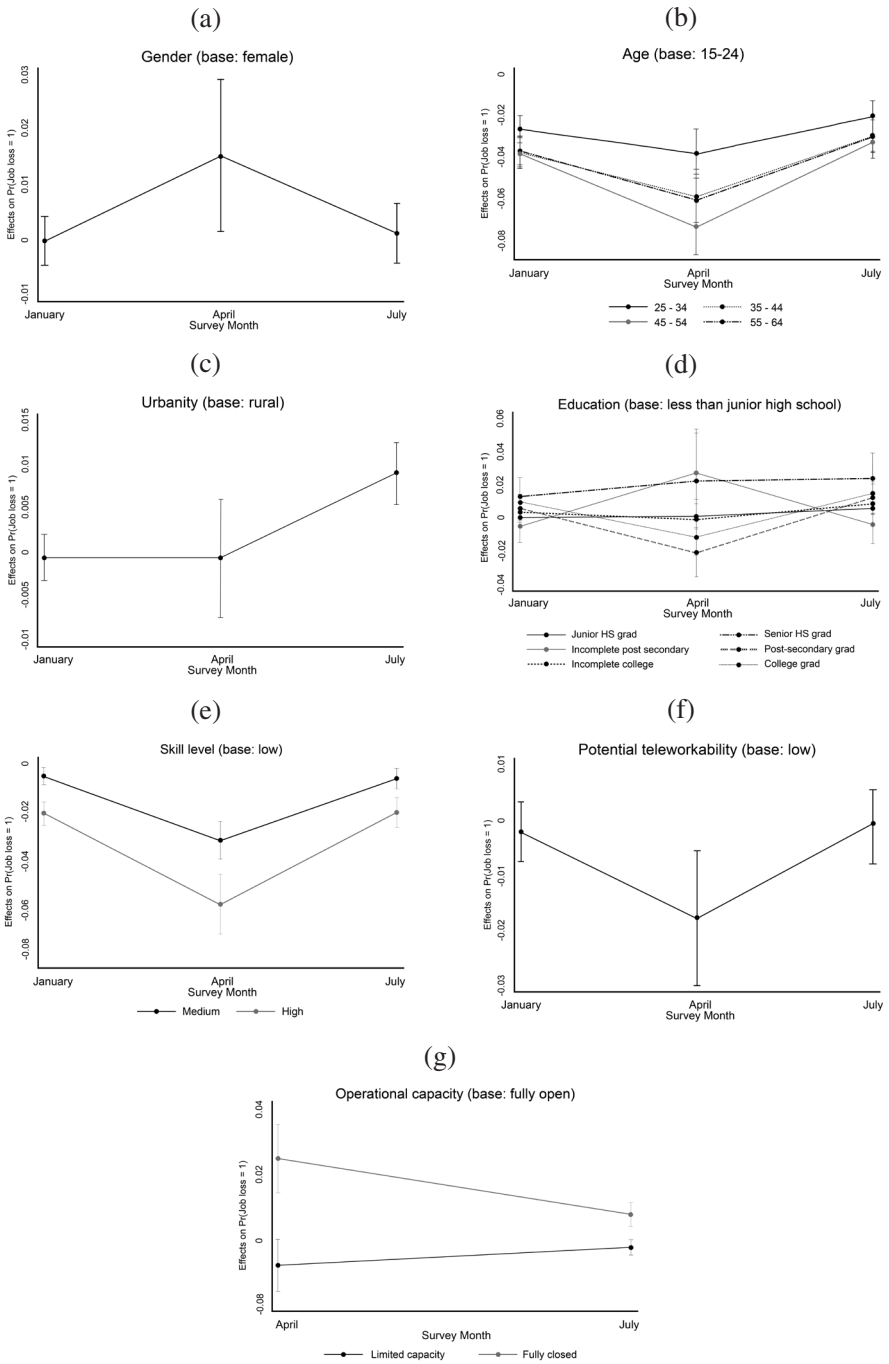
Variables	Job loss	Underemployment	Employment
Education (base: lower than junior high school)			
Junior high school graduate	0.014 (0.034)	-0.126*** (0.016)	-0.369*** (0.058)
Senior high school graduate	0.238** (0.088)	0.013 (0.060)	-0.287 (0.149)
Incomplete post-secondary	-0.121 (0.139)	-0.045 (0.060)	-0.129 (0.176)
Post-secondary graduate	0.118 (0.065)	-0.117*** (0.034)	-0.516*** (0.104)
Incomplete college	0.079 (0.049)	-0.203*** (0.025)	-0.556*** (0.075)
College graduate	0.184*** (0.046)	-0.285*** (0.024)	-0.457*** (0.073)
Education × Survey round			
Junior high school graduate × April	-0.008 (0.039)	0.071** (0.023)	0.091 (0.079)
Senior high school graduate × April	-0.131 (0.108)	-0.122 (0.079)	0.171 (0.182)
Incomplete post-secondary × April	0.249 (0.152)	0.058 (0.083)	-0.081 (0.225)
Post-secondary graduate × April	-0.226** (0.077)	0.090 (0.049)	-0.073 (0.150)
Incomplete college × April	-0.079 (0.056)	0.119*** (0.035)	0.210* (0.100)
College graduate × April	-0.243*** (0.052)	0.127*** (0.031)	-0.016 (0.089)
Junior high school graduate × July	0.102* (0.049)	0.054** (0.022)	0.221** (0.066)
Senior high school graduate × July	0.123 (0.123)	-0.053 (0.079)	0.104 (0.165)
Incomplete post-secondary × July	0.040 (0.200)	0.074 (0.082)	-0.294 (0.201)
Post-secondary graduate × July	0.097 (0.097)	0.029 (0.049)	0.060 (0.117)
Incomplete college × July	0.080 (0.067)	0.092** (0.033)	0.274*** (0.084)
College graduate × July	0.067 (0.063)	0.031 (0.031)	0.215** (0.073)
Skill level (base: low skill)			
Medium skill	-0.083** (0.030)	-0.037* (0.015)	-
High skill	-0.504*** (0.062)	0.065* (0.027)	-

TABLE 4. Estimates of the probit models with sample selection (continued)

Variables	Job loss	Underemployment	Employment
Skill level × Survey round			
Medium skill × April	-0.065 (0.034)	-0.012 (0.022)	-
High skill × April	0.211** (0.062)	-0.093* (0.039)	-
Medium skill × July	-0.002 (0.043)	0.059** (0.021)	-
High skill × July	0.136 (0.087)	0.041 (0.039)	-
Potential teleworkability	-0.044 (0.058)	-0.075** (0.027)	-
Potential teleworkability × Survey round			
April	-0.049 (0.066)	0.027 (0.039)	-
July	0.024 (0.082)	0.025 (0.039)	-
Operational capacity (base: fully open)			
Limited capacity	-0.040 (0.021)	0.119*** (0.013)	-
Fully closed	0.120*** (0.026)	0.179*** (0.019)	-
Has previous job	-	-0.025 (0.051)	-
Has previous job × Survey round			
April	-	0.174*** (0.051)	-
July	-	-0.065 (0.039)	-
Region dummies	Yes	Yes	Yes
Sector dummies	Yes	Yes	No
Number of observations	161,714	167,068	18,525

***$p < 0.001$, **$p < 0.01$, and *$p < 0.05$. Standard errors are in parentheses.
Note: In the three regressions, the likelihood ratio test rejects the null hypothesis that the selection equation and outcome equation are independent of each other. The instrumental variable (presence of young child in the household) is significantly negative at the 0.1 percent level in all equations.

FIGURE 4. Average marginal effects with 95-percent confidence intervals—job loss



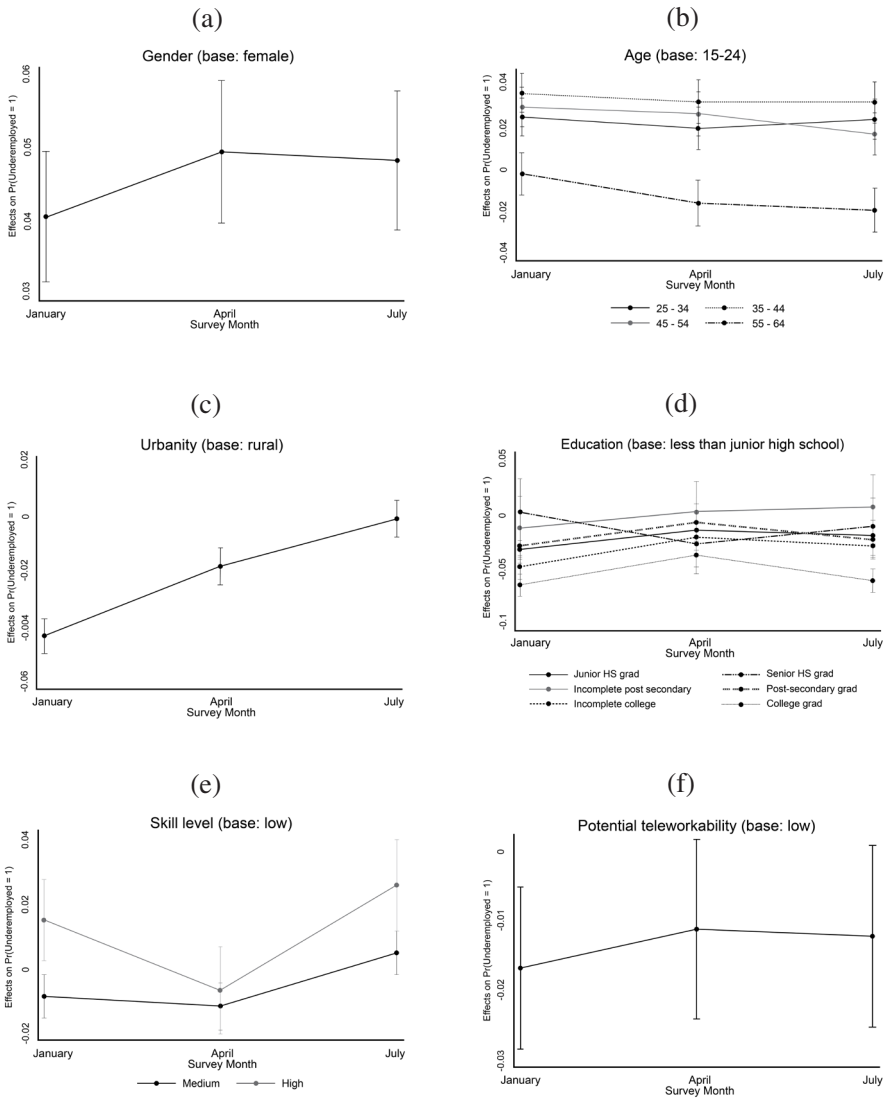
4.2. Underemployment

The estimates of the equation on the probability of underemployment are shown in the third column of Table 4 and the average marginal effects are plotted in Figure 5. Men were more likely than women to become underemployed before and during the pandemic, although the male probability of underemployment compared to that of females in April and July is not significantly different from what was seen in January. Except for the oldest age bracket, older workers tend to become underemployed, but in July, the oldest age bracket had become less likely to be underemployed and the probability of underemployment for workers aged between 45 and 54 years relative to that of the youngest age bracket declined. Workers in urban areas were less likely to become underemployed than those in rural areas in January and April, but the advantage of workers in urban areas in terms of lower likelihood of underemployment declined in April and was no longer significant in July. Better-educated workers were less likely to become underemployed compared to workers that have lower than junior high school education. However, the advantage of lower probability of underemployment of college graduates relative to the least-educated workers fell from January to April, while that of workers who did not finish college fell from January to April and July.

Medium-skilled workers were less likely to become underemployed than low-skilled workers in January and April, but the likelihood of probability of underemployment of medium-skilled workers relative to low-skilled workers was no longer significant in July. High-skilled workers, on the other hand, were consistently more likely to be underemployed than low-skilled workers. Those whose occupations are potentially teleworkable were less likely to be underemployed in January and this likelihood was not significantly different from what was observed in April and July. Furthermore, workers in sectors that were not fully operational were more likely to be underemployed, more so for those in fully closed sectors. In terms of employment continuity, we observe that having a job in the previous quarter is not significant in determining underemployment probability in January and July. However, workers who were surveyed in April and had a job in the previous quarter were more likely to be underemployed than those who did not have a job in the previous quarter. The April estimates are consistent with the aggregate labor statistics that the mean hours of work fell to less than 40 hours in this period, and a considerable share of the workers had a job but were not working.

The pattern of underemployment appears to be mostly the same across survey periods for certain worker types, including by gender, age, education, skills, and potential teleworkability. This result suggests that the workers who were vulnerable to underemployment prior to the pandemic were mostly the same workers who were also susceptible to such condition during the pandemic. Nonetheless, restrictions in operational capacity appeared to contribute to the likelihood of underemployment. Furthermore, it appears that while workers were able to retain their employment during the ECQ period, there was a higher tendency for these workers to be underemployed.

FIGURE 5. Average marginal effects with 95-percent confidence intervals—underemployment



4.3. Gaining employment

Following the loosening of community quarantine restrictions, the labor force participation rate rose, and the unemployment rate declined from April to July, so we also look at the workers who are likely to gain employment. The estimates of the equation on the probability of gaining employment are shown in the fourth column of Table 4 and the average marginal effects are plotted in Figure 6. While males were more likely to experience job loss, they were also more likely to gain employment during the reference week if they were jobless in the past quarter. This likelihood significantly increased from January to April. Middle-aged workers were more likely to gain employment than the youngest workers. Although this likelihood declined in April, it was not significantly different in July compared to January. Workers living in urban areas were less likely to be employed in January, and the difference in the likelihood in employment by urbanity is not significantly different across survey periods. Better-educated workers were less likely to gain employment in January, but the lower likelihood for those who reached college narrowed in July.

In which occupation, sector, and class of employment did these individuals obtain jobs? Table 5 shows the distribution of workers who gained employment in the current quarter from being jobless in the past quarter. The employment structure in the Philippines has always been skewed towards lesser skill jobs, and the occupations in which jobless individuals find employment are also evident of this pattern. Between January and July, the majority of jobless individuals had become employed in elementary occupations, and the share of these workers had even become more prominent in April. Services and sales workers, and skilled agricultural, forestry, and fishery workers were the other top occupations wherein people gain employment. By sector, the top ones which absorbed employment were the agriculture, industry, and wholesale and retail trade sectors. There was a surge of individuals obtaining employment in the agriculture sector in April, although this waned in July as the surge in gaining employment was observed in the industry sector. In terms of class of workers, the share of jobless individuals absorbed by private establishments sharply dropped in April, and there seems to be some shift towards working without pay in family-owned businesses. This may be attributed to the closure of most private establishments in April, especially in Luzon. Nonetheless, by July when quarantine guidelines were loosened, nearly 60 percent of the jobless individuals in the past quarter managed to obtain employment in private establishments. The share of previously jobless individuals becoming self-employed and working without pay in family-owned businesses also fell in July. Therefore, we can discern that the huge labor market disruptions in April led to people gaining employment in lower-quality jobs under more precarious working conditions. In spite of this, some improvements in labor market conditions can increase the opportunity of jobless individuals to gain employment in a more stable working environment.

FIGURE 6. Average marginal effects with 95-percent confidence intervals—employment

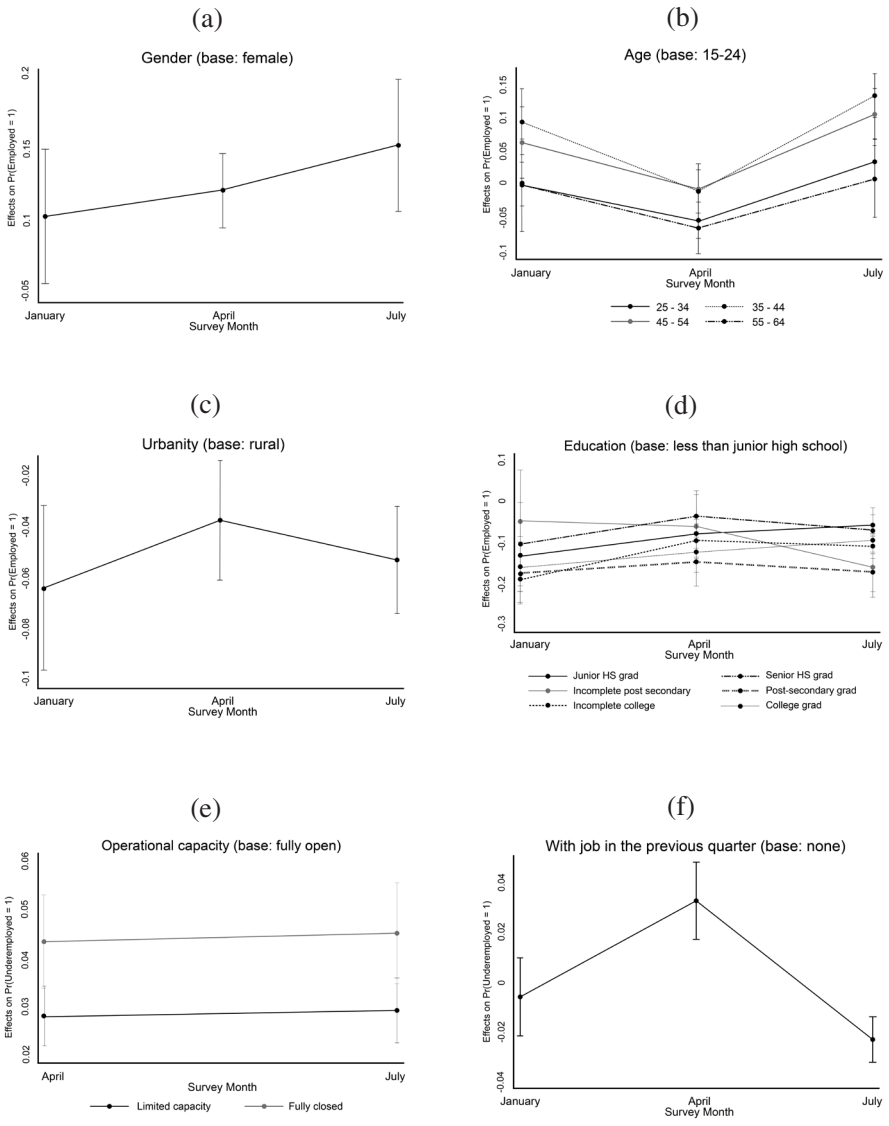


TABLE 5. Distribution of workers who gained employment in the current quarter from being jobless in the past quarter (share to total, %)

	January	April	July
Occupation			
Managers	10.0	7.6	7.6
Professionals	5.1	3.6	4.4
Technicians and associate professionals	3.7	2.4	3.0
Clerical support workers	5.5	5.2	5.9
Service and sales workers	17.3	15.1	19.4
Skilled agricultural, forestry, and fishery workers	11.5	14.0	7.3
Craft and related trades workers	6.8	5.2	10.1
Plant and machine operators and assemblers	4.8	4.9	8.8
Elementary occupations	35.2	42.1	33.5
Sector			
Agriculture	30.6	40.4	19.0
Industry	20.6	16.3	25.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	21.5	20.1	21.4
Transportation and storage	5.3	6.0	8.4
Accommodation and food service activities	4.3	2.0	5.3
Information and communication	0.8	0.8	1.0
Financial and insurance activities	1.0	0.8	1.3
Real estate activities	0.3	0.2	0.4
Professional, scientific and technical activities	0.8	0.3	0.8
Administrative and support service activities	1.9	2.6	3.2
Public administration and defense; compulsory social security	6.0	6.7	3.2
Education	2.8	1.5	2.8
Human health and social work activities	1.3	0.7	0.9
Arts, entertainment, and recreation	0.8	0.2	0.5
Other service activities	1.9	1.5	5.9
Class of worker			
Private household	0.5	0.5	3.6
Private establishment	54.8	45.1	59.4
Government	8.2	8.3	5.3
Self-employed	25.0	25.2	23.0
Employer	1.1	1.4	1.5
With pay in family-owned business	0.2	0.2	0.3
Without pay in family-owned business	10.1	19.4	7.0

Source: Author's calculations based on the Labor Force Survey.

5. Conclusion

This paper seeks to determine the workers that were more severely affected by the COVID-19 pandemic and the containment measures implemented in the Philippines by analyzing the probability of job loss, underemployment, and employment in January 2020 (data right before the pandemic), April 2020 (data right after the pandemic broke out and when the strictest containment measures were in place), and July 2020 (data when containment measures were loosened to some degree and some improvements in the labor market were observed). Our findings can be summarized as follows. First, the workers who were more heavily affected by job loss during the ECQ period were males and younger individuals. In contrast, the better-educated and high-skilled workers were more likely to be secured in keeping their employment status. Second, workers who tend to become underemployed prior to the pandemic were also mostly the same workers vulnerable to underemployment during the first months of the pandemic. These are males, older workers, the lesser educated, and those working in occupations that are not likely to be teleworkable. Third, the restrictions in operational capacity placed on establishments in response to the COVID-19 pandemic have increased the probability of both job loss and underemployment. For instance, although the probability of job loss by worker characteristic is not significantly different in July compared to January, workplace restrictions can still contribute to job loss. Fourth, taking the implications of the job loss and underemployment results together, the most vulnerable workers to the labor market disruptions due to the pandemic appear to be males, the lesser-skilled workers, and those working in sectors either with limited operational capacity or those that are not allowed to open at all. Fifth, the results also suggest that males and the less-educated individuals were more likely to gain employment after being jobless in the past quarter.

The policy responses of the government to the rising unemployment rates and business closures have included wage subsidies for critically-affected businesses, the self-employed, and the repatriated overseas Filipino workers (OFWs); financial assistance to micro-, small- and dedium-sized stablishments (MSMEs); cash-for-work programs; and seminars on shifting to online businesses [ILO 2020]. These discretionary policies, however, are subject to inside lags. Therefore institutionalized measures to protect the welfare of workers from labor market disruptions, such as unemployment insurance, should be highly considered. Currently, one-time payment to members of the Social Security System and monthly payments of up to six months to public-sector employees are given to those who are involuntarily separated from employment. These existing measures would not be enough amid a recession of this magnitude, especially when the public-sector share is small relative to total employment and around a quarter of the workers are self-employed. Moreover, the advantage of an unemployment insurance facility is that it will provide quick relief to displaced workers even in the absence of discretionary policies.

A limitation of the study is the absence of information on when—or at least the reason why—people changed or lost their jobs. The data indicates that nearly four percent of the surveyed individuals in the LFS have changed industries from the past quarter to the reference week. On the one hand, if these individuals managed to gain employment shortly after losing their jobs because of the pandemic, then the probability of job loss due to the pandemic might be underestimated. On the other hand, if these individuals lost their jobs before the pandemic occurred, then the probability of job loss due to the pandemic might be overestimated.

We also emphasize that the results only infer the short-term adverse effects of the pandemic on employment. Longer unemployment spells, which are not explored here, can lead to the deterioration of skills and labor market productivity, making reemployment more difficult for the severely affected individuals. This is especially true in the current recession for at least two reasons. First, currently, there is little sign of the economy recovering and getting back to pre-pandemic levels in the near term, which will hamper the improvement in labor demand and business conditions. Second, flexible work arrangements could likely remain for a while amid the persistently high COVID-19 cases and continued implementation of containment measures in the country. Hence, aside from establishing a social insurance system that has wider coverage of workers, improvement in the capacity to perform remote work can also be considered.

References

Bank of Thailand [2021] *Labour Force* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Not in Labour Force* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Unemployment Rate: Whole Kingdom* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Boeri, T., A. Caiumi, and M. Paccagnella [2020] "Mitigating the work-safety trade-off", *Covid Economics, Vetted and Real-Time Papers* 2:60-66.

Casarico, A. and S. Lattanzio [2020] "The heterogenous effects of COVID-19 on labor market flows: evidence from administrative data", *Covid Economics, Vetted and Real-Time Papers* 52:152-174.

Central Bureau of Statistics (Indonesia) [2021] *Gross Domestic Product: SNA 2008: 2010p* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Labour Force Participation Rate* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Unemployment Rate; Annual* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Delaporte, I. and W. Peña [2020] "Working from home under COVID-19: who is affected? Evidence from Latin American and Caribbean countries", *Covid Economics, Vetted and Real-Time Papers* 14:200-229.

Department of Statistics (Malaysia) [2021] *Gross Domestic Product (GDP): 2015p* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Labour Force Participation Rates* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Unemployment Rates* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Dingel, J. I. and B. Neiman [2020] "How many jobs can be done at home?", *Journal of Public Economics* 189:1-8.

Gaduena, A., C. E. Caboverde, and J. P. Flaminiano [2020] "Telework potential in the Philippines", *AIM RSN PCC Discussion Paper* 2020-004.

Generalao, I. N. A. [2020] "Measuring the teleworkability of jobs in the Philippines", Presented in the 58th Philippine Economic Society Annual Meeting and Conference (11 November 2020, online conference).

Guven, C., P. Sotirakopoulos, and A. Ulker [2020] "Short-term labor market effects of COVID-19 and the associated national lockdown in Australia: evidence from longitudinal labor force survey", *Covid Economics, Vetted and Real-Time Papers* 44:186-224.

Hale, T., N. Angrist, R. Goldszmidt, B. Kira, A. Petherick, T. Phillips, S. Webster, E. Cameron-Blake, L. Hallas, S. Majumdar, and H. Tatlow [2021] "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)", *Nature Human Behaviour*. doi: 10.1038/s41562-021-01079-8.

Hatayama, M., M. Viollaz, and H. Winkler [2020] "Jobs' amenability to working from home" *World Bank Policy Research Working Paper* 9241.

Kikuchi, S., S. Kitao, and M. Mikoshiba [2021] "Who suffers from COVID-19 shocks? Labor market heterogeneity and welfare consequences in Japan", *Journal of the Japanese and International Economies* 59, 101117.

International Labour Organization (ILO) [2020] "COVID-19 labour market impact in the Philippines: assessment and national policy responses", https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-manila/documents/publication/wcms_762209.pdf. Accessed June 2021.

International Labour Organization (ILO) [2021] "ILO Monitor: COVID-19 and the world of work. Seventh edition", https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms_767028.pdf. Accessed March 2021.

Ministry of Manpower (Singapore) [2021] *Labour Force: Unemployment Rate* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Participation Rate: Resident* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Ministry of Trade and Industry (Singapore) [2021] *Gross Domestic Product (GDP): 2015p* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Mongey, S., L. Pilossoph, and A. Weinberg [2020] "Which workers bear the burden of social distancing policies?" *NBER Working Paper* No. 27085.

Office of the National Economic and Social Development Council (Thailand) [2021] *Gross Domestic Product: 2002p: Chain Volume Measures (CVM)* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Philippine Statistics Authority (PSA) [2020a] *April 2020 Labor Force Survey* [Public use file].

——— [2020b] *January 2020 Labor Force Survey* [Public use file].

——— [2020c] *July 2020 Labor Force Survey* [Public use file].

——— [2020, August 7a] *TABLE 4 Percent Distribution of Employed Persons by Major Industry Group January 2019 and January 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20January%202020. Accessed 10 June 2021.

——— [2020, August 7b] *TABLE 5 Percent Distribution of Employed Persons by Major Occupation Group January 2019 and January 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20January%202020. Accessed 10 June 2021.

——— [2020, November 11a] *Employment situation in April 2020*, https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20April%202020. Accessed March 2021.

——— [2020, November 11b] *TABLE 4 Percent Distribution of Employed Persons by Major Industry Group APR 2019 and APR 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20April%202020. Accessed 10 June 2021.

——— [2020, November 11c] *TABLE 5 Percent Distribution of Employed Persons by Major Occupation Group APR2019 and APR2020.xls* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20April%202020. Accessed 10 June 2021.

——— [2020, December 3a] *TABLE 4 Percent Distribution of Employed Persons by Major Industry Group October 2019 and October 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20October%202020. Accessed 10 June 2021.

——— [2020, December 3b] *TABLE 5 Percent Distribution of Employed Persons by Major Occupation Group October 2019 and October 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20October%202020. Accessed 10 June 2021.

——— [2021, February 5a] *Table 4 Percent Distribution of Employed Persons by Major Industry Group July 2019 and July 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20July%202020. Accessed 10 June 2021.

——— [2021, February 5b] *Table 5 Percent Distribution of Employed Persons by Major Occupation Group July 2019 and July 2020* [Statistical table]. https://psa.gov.ph/statistics/survey/labor-and-employment/labor-force-survey/title/Employment%20Situation%20in%20July%202020. Accessed 10 June 2021.

——— [2021] *GDP: 2018p* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Labor Force Participation Rate: International Labour Organization* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

——— [2021] *Unemployment Rate* [Statistics]. CEIC. https://www.ceicdata.com/. Accessed 10 June 2021.

Piza, S. F. A. and H. Lee [2020] "Results from the Philippines COVID-19 Firms Survey conducted in July 2020 (Presentation)", https://pubdocs.worldbank.org/en/213351605520149014/Results-from-the-Philippines-COVID-19-Firms-Survey-conducted-in-July-2020-Presentation. Accessed June 2021.

Saltiel, F. [2020] "Who can work from home in developing countries?", *Covid Economics, Vetted and Real-Time Papers* 6:104-118.

Shinozaki, S. and L. N. Rao [2021] "COVID-19 impact on micro, small, and medium-sized enterprises under the lockdown: evidence from a rapid survey in the Philippines" *ADBI Working Paper Series* No. 1216.

World Bank [2021] *Global Economic Prospects*, January 2021. Washington, DC: World Bank. doi: 10.1596/978-1-4648-1612-3.