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Effects of the COVID-19 Pandemic on Employment and Wages in the Philippines

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PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

June 2023

Abstract

This study examines the impact of the COVID-19 pandemic on the Philippine labor market, focusing on employment and real wages and their respective outcomes across sectors and various worker characteristics. To analyze the pandemic's impacts on employment outcomes at various stages of the crisis, we estimate changes in the probability of employment through a set of logit and multinomial logit regressions, and measure changes in daily working hours using ordinary least squares (OLS) regressions. We also estimate the effects on real daily wages through OLS regressions on subsamples of wage and salary workers. The empirical analyses reveal several important observations. First, the immediate impact of the pandemic crisis was much larger on employment than on real wages, in contrast to findings for previous crises which found the reverse to be true. Second, workers in contact-intensive sectors experienced the worst effects in terms of wage declines and employment losses. As many of these sectors were male-dominated, male workers—especially older men with less education and in middle-skill jobs—suffered the most initially. Third, the recovery a year into the pandemic was uneven in terms of employment. Real wage trends during this period were generally less favorable for women, particularly young females and those in middle-skill and high-skill jobs. In contrast, male workers saw a recovery in real daily pay a year after the lockdowns, with the increase largely driven by outcomes in the rural sector—reflecting an uptick in real wages in agriculture. Our findings provide support for active labor market policies such as worker reskilling and training programs for the unemployed, as well as for social protection for vulnerable workers. The heterogeneous labor market effects of a crisis such as the pandemic also highlights the need for a focused fiscal response, targeting sectors and worker subgroups who are most likely to face the harshest impacts.

Keywords: COVID-19 pandemic, labor market, employment, working hours, wages

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Effects of the COVID-19 Pandemic on Employment and Wages in the Philippines

*Margarita Debuque-Gonzales, Ma. Christina F. Epetia, and John Paul P. Corpus**

1. Introduction

As it did in many parts of the world, the emergence of the COVID-19 virus presented large negative shocks to the Philippine economy. Social distancing and stringent mobility restrictions designed to prevent the spread of the virus were adopted, and the country experienced its deepest postwar recession. The country also saw its highest rate of unemployment during the initial phase of the pandemic in 2020, with nearly a fifth of the labor force temporarily without jobs after virtual lockdowns.

The pandemic evidently had a radical impact on the labor market. With the labor market often identified as the major source of influence in recent crises in the Philippines, especially on poverty and distribution (e.g., Habib 2010), its role in transmitting the effects of a pandemic crisis through employment and labor earnings may be even greater. Past crises primarily affected production sectors vulnerable to a slump in external demand such as manufacturing, with exports being the primary channel of transmission, while the more current COVID-19 crisis had effects that were of wider scope, involving business shutdowns even in the historically resilient services sector, which accounts for the largest portion of the economy (about three-fifths of GDP and employment).

This offers enough motivation to investigate developments in the labor market during the COVID-19 crisis and to look at both employment and wages, as past studies have so far mostly focused on job patterns and their determinants during the pandemic (e.g., Epetia 2021). The impact on wages had been less studied and the direction of impact harder to anticipate, as the pandemic involved constraints to both labor supply (because of the quarantines and social distancing) and labor demand (due to an overall slowdown in economic activity), aside from having different effects on sectors, depending on the nature of output produced (i.e., complements or substitutes). Analyses of both job and real wage outcomes can therefore add much to the understanding of how the pandemic crisis has affected the economy, particularly its workforce.

Given the nature of the COVID-19 crisis, this research estimates the impact of the pandemic and related public health measures on the labor market based on industry sector, in addition to measuring variations across individual characteristics of workers. However, following the literature (e.g., Lim 2000, Rodgers and Menon 2012) our research continues to provide a gender-based perspective, on account of distinct differences observed between sexes and the greater clarity provided by such an approach to the empirical analysis.

In this study, we analyze the effects on employment in terms of working status and daily working hours. We apply a set of logit and multinomial logit regressions to estimate the probability of employment and determine how much this probability has changed annually at various stages of the pandemic. For a more nuanced analysis, employment data is disaggregated by sector, skill level, and class of work in the estimations. Additionally, we use ordinary least squares (OLS) regression to explore whether the duration of working time had changed over the pandemic across

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urbanization type, age, education, sector, skill level, and class of work. To measure the effects on wages, we similarly use OLS regressions on subsamples of wage and salary workers disaggregated by individual characteristics as well as industry sector. While our main regressions are based on subsamples, we also run full-sample regressions with interaction terms as a robustness check, to confirm our findings.

Our results show a deeper impact of the pandemic crisis on employment rather than real daily wages, in contrast to earlier research which revealed a sharper effect on wages. The immediate outcome had been a huge decline in the probability of employment on aggregate (by 11.2%) and across industry sectors, occupational skill level, and class of work. This was found to be most prominent in high-contact sectors, in medium-skill occupations, and in wage jobs, with men, urban residents, and middle-aged individuals observed to be more vulnerable at the onset of the pandemic. The decline in the probability of employment was accompanied by a decline in daily working hours. Employment conditions improved a year into the pandemic, but the recovery had been uneven.

Movement in real daily wages meanwhile had not been as severe, with a moderate decline seen on aggregate at the start of the pandemic (by 3.3%), and cuts in real daily pay observed for only a certain number of sectors. These include contact-intensive services such as accommodation and food; services likewise hinged on mobility such as domestic (wholesale and retail) trade, and transport and storage; and high-contact jobs in industry such as construction. With many of the affected sectors being male-dominated fields, outcomes for men drove the overall results with older and less educated males in middle-skill occupations bearing the brunt of the pandemic crisis in its initial phase.

Wage impacts fell mostly on women a year later, however. Real daily wages declined sharply for younger females and those in medium-skill and high-skill jobs. They particularly worsened for women in education, manufacturing, public administration, and domestic trade. In contrast, real wages for males in rural areas and in agriculture recovered in the later phase of the crisis. Agriculture had been the only sector where both employment and wages were able to simultaneously rise eventually, indicating robust demand. Such resilience likely owes to agriculture's dual nature, by being both a low-contact and essential sector; to possible substitution effects from non-food to food consumption of households; and to hefty support it received from both government and private business.

The main contribution of this study to the literature is the complete view it provides regarding the impact of the COVID-19 crisis, analyzing the effects on employment as well as on real daily pay of Filipino workers during the initial phase and in a later stage, when recovery started. Few researchers, if any, have empirically documented what happened in the Philippine labor market from this wider angle and during this rare period, when many sectors were closed and domestic workers unable to leave their homes. This study also offers a better understanding of the nature of a pandemic crisis while helping identify those most vulnerable to such a crisis, certainly valuable information for policymakers in designing labor market policies.

The rest of the paper is organized as follows. Section 2 discusses the changes in macroeconomic conditions as a result of the COVID-19 pandemic and presents models to help form reasonable hypotheses to improve the analysis of the empirical results. Section 3 describes the data and method used in the study, while Sections 4 and 5 discuss the results of the employment and wage regressions, respectively. Section 6 provides concluding remarks.

2. Macroeconomic conditions and conjectures[1]

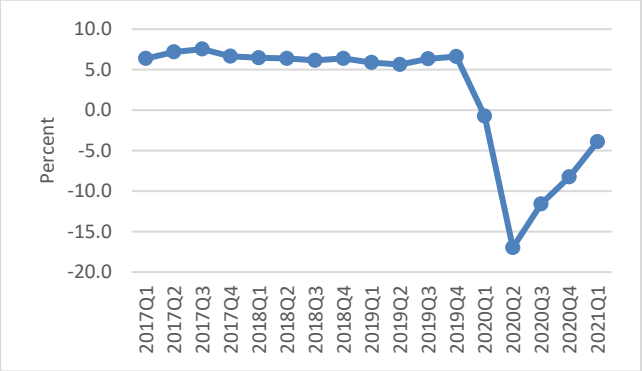
The COVID-19 pandemic and local mobility restrictions designed to contain the spread of the virus led to the Philippines' deepest recession since the 1950s, with output shrinking by nearly a tenth in 2020 (by 9.5% annually). GDP had already begun to fall by the first quarter of 2020 as investment declined (Figure 1), with COVID-induced border closures and travel bans across countries slowing the world economy, apart from a volcano eruption damaging a key production area (CALABARZON region) at the start of the year. A virtual lockdown (enhanced community quarantine or ECQ) was imposed in Metro Manila (the country's capital) and nearby regions in mid-March, and this lasted for a period of over 2 months.[2] ECQs restricted the movement of people and required temporary closure of nonessential businesses.

With stringent public health measures in the country's key economic regions, GDP fell by 16.9 percent during the second quarter of 2020 and continued to decline year-on-year for the next 3 quarters (until the first quarter of 2021) as the country's capital and other areas remained in general community quarantine (GCQ, milder than ECQ).[3] The peak of the pandemic crisis saw a sharp decline in investment coupled with a rare collapse in household spending on the demand side and an unprecedented fall in services on the supply side. The hardest hit were contact-intensive sectors such as entertainment and recreation and accommodation and food services, and sectors hinged on mobility such as transport and storage and domestic (wholesale and retail) trade. Industrial activity also faltered, particularly in construction and manufacturing. International trade, however, contributed positively to growth as imports fell faster than exports at the peak of the COVID-19 crisis.[4]

In its simplest depiction, a pandemic crisis features a combination of negative supply and demand shocks as businesses cease to operate and consumers, who may also face job and income loss, socially distance, whether voluntarily or because of public health restrictions (Mankiw, 2020). These disturbances also tend to have mixed effects on prices. In the Philippines, inflation during the COVID-19 crisis fell in sectors facing diminished demand (such as those involving restaurants and hotels, recreation and culture, clothing and footwear, and education), but rose for transport services where public health rules continued to limit operations and constrict supply. Overall, depressed demand in certain sectors at home and abroad (with world oil prices freefalling until April) helped limit the country's headline inflation in 2020, keeping it within the target range of the central bank (3% +/- 1 percentage point) (Figure 2). Unrelated supply-side factors including the African Swine Flu and typhoons that damaged agriculture areas started to push prices upward by the end of the year, with inflation breaching the official target band by 2021Q1.[5]

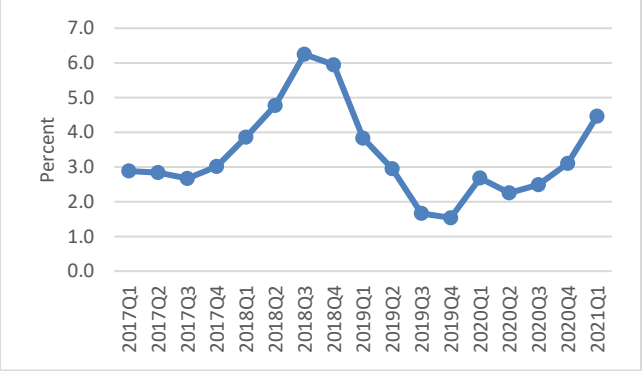
[1] This section draws from Debuque-Gonzales (2022).
[2] Apart from the National Capital Region, ECQs were imposed on Region III (Central Luzon comprising Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac, and Zambales) and Region IV-A (CALABARZON comprising Cavite, Laguna, Batangas, Rizal and Quezon provinces). These three regions together accounted for about three-fifths of GDP.
[3] Stringent public health measures were intermittently reimposed in August of 2020 and mid-April to mid-May of 2021. GDP started to recover by 12.1 percent in the second quarter of 2021 and around 7.0 to 8.0 percent until the first quarter of 2022. We do not include this latter period in the current study, however, given the unavailability of detailed labor market data for our regressions (as of time of writing).
[4] The current account surplus during the time traced to a drop in oil imports (as economic activity waned due to mobility restrictions and business closures and oil prices fell due to weak global demand) and to a decline in purchases of machinery and equipment as investment decisions were postponed or cancelled.
[5] Price pressures in food and transport mounted during the latter period due to a sharp reversal of global commodity prices tracing to a recovery in economies able to control the virus and/or launch a strong stimulus response (e.g., China and the United States respectively).

Figure 1. Real GDP growth rate



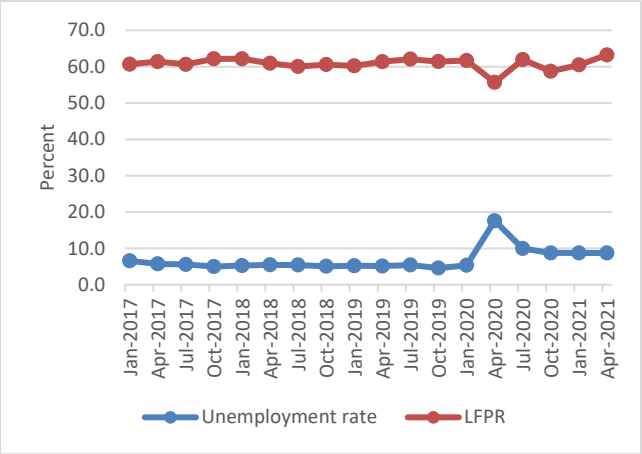
Source: Philippine Statistics Authority (2022b).

Figure 2. Inflation rate



Source: Philippine Statistics Authority (2021a).

Figure 3. Unemployment and labor force participation



Source: Philippine Statistics Authority (2021c, 2021e).

2.2. Labor market conditions during the pandemic

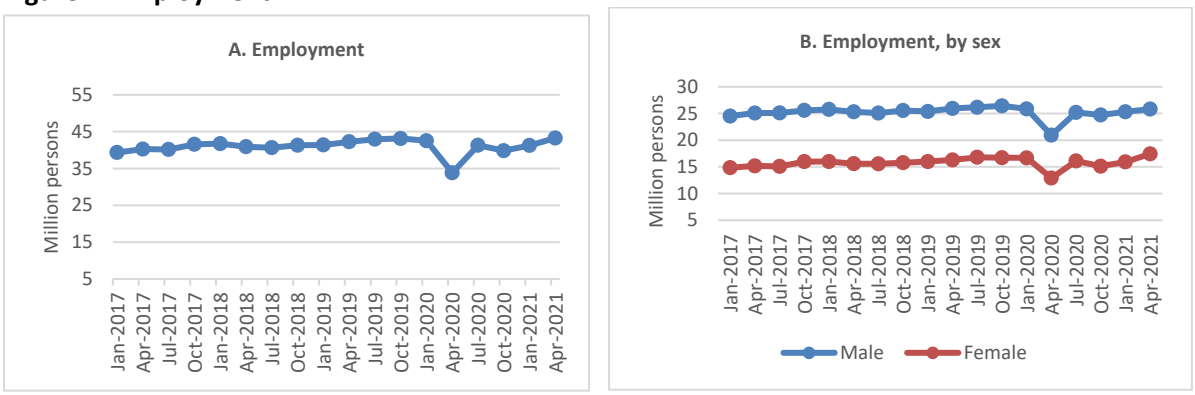
The COVID-19 crisis had severe repercussions on the labor market, with the unemployment rate rising to its highest point historically (to 17.6%) by April 2020, about a month after the ECQs were imposed (Figure 3). This was also partly due to labor force participation dipping during the period.

The uncertain path of the COVID-19 virus and delays in meeting vaccination targets continued to fuel job and income insecurity, as the domestic economy remained closed under prolonged community quarantines and with social distancing becoming prevalent. The unemployment rate remained elevated even a year after the lockdowns, despite labor force participation rebounding.

One can find the corresponding dent in the raw employment figures, with the number of employed persons falling by nearly 9 million between January and April of 2020 (Figure 4, Panel A). The drop appears to be deeper and the recovery slower for men compared to women, though male employment continued to exceed female employment (Figure 4, Panel B).

Viewing the data across industrial sectors, one can anticipate large employment declines in areas requiring high social contact, especially in services and industry. There is a sharp drop in employed men in both services and industry but not in agriculture, where the number rises to above pre-pandemic levels (Figure 5, Panel A). A drop in employed women can be observed only for services, with minimal fluctuations in other industries (Figure 5, Panel B). Female employment in services rebounded more strongly than corresponding male employment, with numbers of the latter only barely returning to levels seen prior to the COVID-19 crisis.

Figure 4. Employment



Source: Authors' calculations using Labor Force Survey public use files (Philippine Statistics Authority 2021d).

Figure 5. Employment, by industrial sector and sex

Source: Authors' calculations using Labor Force Survey public use files (Philippine Statistics Authority 2021d).

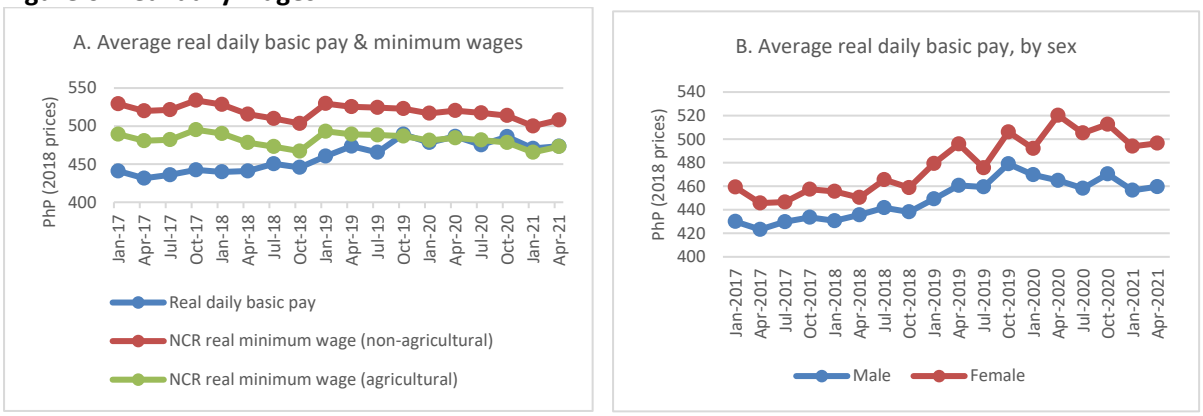
The pandemic had a less visible impact on real daily wages, with nominal minimum wages kept fixed during the period under study and real minimum wages moving in line with inflation (Figure 6, Panel A). Yet the overall figure reflects different trends for men and women. Real daily pay of males had dipped from October 2019 to July 2020, rising only briefly in October 2020 (Figure 6, Panel B). Real daily pay of females, which was generally higher than that of males, had been

fluctuating but trending upward in the year prior to the COVID-19 crisis, trending downward only after April 2020, a few months after the ECQs.

Figure 7 shows the decline in the real daily pay of males largely reflects their real wages in the services sector, while the brief uptick during the pandemic reflects real wage movement in industry (Figure 7, Panel A). Fluctuations in the real daily pay of females reflect real wage volatility in both services and industry, while the post-lockdown decline largely reflects real wage development in services (Figure 7, Panel B). Real daily wages in agriculture remained relatively stable for both men and women, though there had been a noticeable decline in daily pay for women in the latter months of the pandemic after momentarily rising in October 2020.

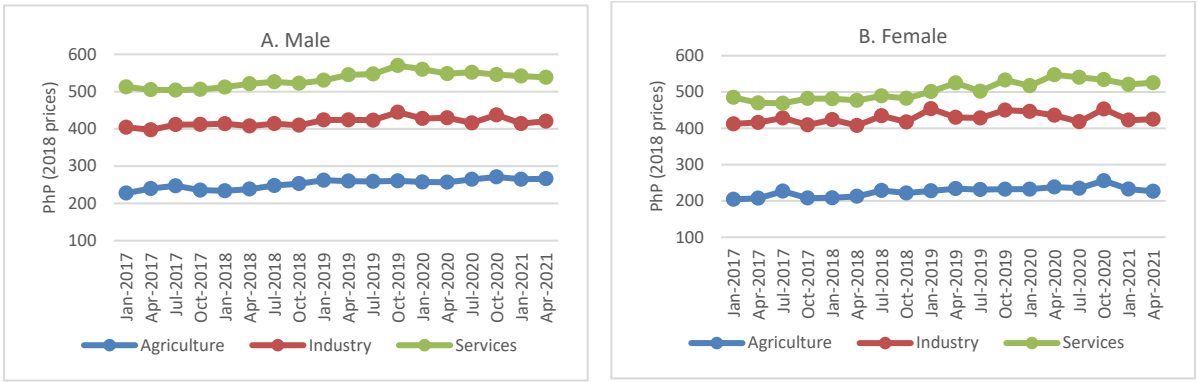
So far, the evidence seems to differ widely from observations made of the food and fuel crisis and global financial crisis (GFC) that occurred between 2008 and 2009, where the effects of the economic turmoil on wages were more obvious than the effects on employment (Rodgers and Menon, 2012). Based on this crisis episode, previous research concluded that downturns in countries such as the Philippines were more likely to result in lower earnings rather than open unemployment (Habib et al., 2020).

Figure 6. Real daily wages



Source: Authors' calculation using Labor Force Survey public use files (Philippine Statistics Authority 2021d).

Figure 7. Average real daily wages, by industrial sector and sex



Source: Authors' calculation using Labor Force Survey public use files (Philippine Statistics Authority 2021d).

2.3. *Crisis transmission through the labor market*

The trends in employment and real wages indicate even greater importance of the labor market in a crisis. Using a micro-simulation approach to study the impact of the GFC of 2008/2009 on poverty and income distribution in the Philippines, Habib et al. (2010) note the critical role of the labor market, as the effects of the GFC largely transmitted through employment loss in particular sectors, mainly manufacturing, and lower labor earnings in an output slowdown. Predominant channels in the past traced back to external demand shocks, such as through exports and remittances, and commodity price spikes (Rodgers and Menon, 2012).

While these channels also play a role in the COVID-19 crisis, they seem to be of lesser importance.[6] Rather, the effects of the pandemic in the country emerge from severe weakening of contact-intensive and related sectors and business closures and downsizing. These tend to lower employment, but hypothetically, the impact on wages may go either way.

In the theoretical literature, Guerrieri et al. (2020) present a model of Keynesian supply shocks, which can trigger aggregate demand changes that are larger than the initial disturbances, in the context of the COVID-19 pandemic where sector shutdowns, firm exits, and worker layoffs are distinct features. Briefly stated, negative supply shocks can have negative demand spillovers in an economy where goods are mostly complements, ultimately resulting in a demand-deficient recession, where employment and wages are pushed downward. However, in an economy where goods have substitutes, a recession in one sector generates a boom in another, raising employment and wages in such sectors.

In another multi-sector model that looks at aggregate supply and demand in the COVID-19 crisis, Baqaee and Farhi (2020) highlight the coexistence of tight and slack labor markets during a pandemic, as some sectors may be supply-constrained, and some may be demand-constrained. Lockdowns and social distancing, for example, serve to limit capacity and create upward wage pressure. Meanwhile, household demand declines may directly and indirectly (i.e., through the supply chain) lead to reductions in nominal spending, pulling down employment and labor pay. In short, negative sectoral supply shocks tend to be stagflationary, leading to job loss and price acceleration, while negative sectoral demand shocks tend to be deflationary, leading to job loss and price deceleration.

In the Philippines, we also see a sector-based story, though slightly different given a developing country setting, where there is a relatively larger pool of unemployed labor to begin with and smaller fiscal stimulus packages to stoke demand. With the pandemic leading to sector shutdowns and public health measures severely constraining or weakening firms, one can reasonably expect the general direction of employment and wages in the country to be downward. A strategy for local firms to survive may be to cut wages to retain workers and preserve jobs. Unavoidable business closures could create a surplus of workers, especially in contact-intensive sectors, and they may need to find alternative work in open sectors, which also puts downward pressure on wages. It would be rare to find labor demand curves shifting to the right and bolstering wages in this setting, except for specialized sectors that allow for substitution across goods and services.

Clearly, the impact of the COVID-19 pandemic crisis on the labor market, notably the effect on employment and wages in various sectors of the economy, needs to be empirically investigated. At the minimum, the above models and conjectures on the Philippines can help inform this study's

[6] Overseas workers' remittances declined in 2020 by only less than a percentage point, and quickly rebounded the following year. While exports sharply declined at the peak of the pandemic, they appeared to be on a recovery path by 2021Q1. Inflation remained moderate during the coverage of this study.

econometric analysis, which also presents a gender angle on account of its importance in the literature (Lim, 2000; Rodgers & Menon, 2012).

3. Data and Methods

This study uses the April quarterly round of the Philippine Labor Force Survey (LFS) in 2019, 2020, and 2021 to analyze the impact of the pandemic on employment and wages. Conducted by the Philippine Statistics Authority, the LFS is a household-based survey used to produce nationally representative labor market data and generate the country's official labor statistics.

For employment regressions, the base sample used consists of the working-age population—i.e., aged 15 years old and above—excluding the armed forces. The impact on employment is investigated using two measures of labor supply: employment status and daily working hours. To estimate the probability of employment, the following labor supply equation is specified:

$$y_{it} = \alpha + \gamma P_t + \beta X_{it} + e_{it} \qquad (1)$$

where y_{it} is the dependent variable, which indicates the employment status of individual i at quarter t. We look at four distinct aspects of employment status. The first is reflected by a simple indicator stating whether an individual is employed or not. The other three further identify the labor market to which an individual belongs if employed, with aggregate employment broken down as follows: (1) by sector,[7] (2) by skill level,[8] and (3) by class of work.[9] Examining the probability of employment in specific labor markets enables us to gain insight on the heterogenous impact of the COVID-19 pandemic. To tie the employment findings with the effect of the pandemic on wages, we also estimate the probability of wage employment in given sectors using the subsample of wage workers and the non-employed.

On the right-hand side of the equation, the variable of interest is P_t, a period dummy variable which equals 1 if t refers to the quarter in the current year and 0 if the same quarter in the previous year. Thus, the marginal effect of P_t is interpreted as the year-on-year change in the probability of employment. Two sets of estimates of the marginal effect of P_t are obtained: (1) the difference between April 2019 and April 2020, and (2) the difference between April 2020 and April 2021. The first set provides the estimates of the immediate impact of the pandemic, while the second set shows whether there has been an improvement in or worsening of employment prospects since the onset of the pandemic.

The vector X_{it} denotes the set of controls that can influence labor supply decisions including sex, age, educational attainment, urbanization, region of residence, and household head indicator, while e_{it} represents the error term. We apply logit regression and multinomial logit regression to estimate the labor supply equation with the binary dependent variable and multi-categorical dependent variable, respectively.

To see if there is a statistically significant change in daily working hours among the employed, the notations for y_{it} and X_{it} in Equation (1) are modified. The dependent variable y_{it} becomes the

[7] The sectors are defined according to the 2009 Philippine Standard Industrial Classification (PSIC 2009).
[8] Occupational skill levels are distinguished according to the International Standard Classification of Occupations 2008 (ISCO-08).
[9] The classes of work are wage employment, self-employment, and unpaid family work. Wage employment refers to employment in a private household, the private sector, the government or government-controlled corporations, or paid family work. Self-employment includes the self-employed and the employers.

normal working hours per day as reported by individual i at quarter t. The set of controls denoted by X_{it} includes the same set of controls except for the household head indicator. The variable of interest is expressed similarly as in the previous employment equation, but the coefficient of P_t in this case signifies the year-on-year change in daily working hours. The employed sample is further split by the variables in X_{it}, as well as by sector, class of work, and skill level, to determine which groups show a statistically significant change in daily working hours during the pandemic. We utilize ordinary least squares (OLS) to estimate this equation.

For both employment status and working hours equations, we generate separate estimates for men and women. This allows us to explore whether there were gender differences on employment outcomes during the pandemic.

Meanwhile, to measure the pandemic's impact on wages, we perform wage regressions on a subsample comprising only wage earners and similarly produce two sets of estimates comparing observations for April 2019 and April 2020, and for April 2020 and April 2021. Using OLS, we estimate the following wage equation:

$$w_{it} = \alpha + \beta X_{it} + \delta P_t + e_{it} \quad (2)$$

where w_{it} denotes the natural logarithm of real daily basic pay, derived by deflating the nominal amount by the consumer price index (CPI); X_{it} represents a set of controls similar to that used in the above working hours regression; P_t represents the dummy variable indicating the pandemic period of interest, as defined above; and e_{it} denotes the error term.

The parameter of interest, δ, captures the average year-on-year percentage change in real daily wages among the wage-employed after controlling for other factors that influence a person's wage level. To uncover the pandemic's impact on wages for different subgroups of wage earners, we run regressions on subsamples defined by sex and by categories of age group, education, urbanization, skill, and industry.[10] We check the robustness of our results on differences in impact based on individual characteristics through regressions that use the complete sample and captures the interactions between period changes and the various characteristics.

4. Employment

4.1. Probability of employment

Table 1 reports the estimates of the marginal effects of the explanatory variables on the probability of employment. We find that the immediate impact of the COVID-19 crisis was a huge decline in the likelihood of employment, by 11.2 percent, in April 2020. We also see that men, rural residents, older people (except those at the expected retired age group), and the more educated people were more likely to be employed than women, urban residents, younger people, and those who did not have education, respectively.

The negative effect of the pandemic on employment appeared to be more severe among men than among women. The probability of employment among men was lower by 13.5 percentage points in April 2020 compared to that in April 2019, while that among women was lower by 8.9 percentage

[10] The specification is similar to that of Rodgers and Menon (2012), but additionally measures the effects of skill and industry and controls for regional differences.

points. Thus, we can infer that although men were still more likely to be employed than women (by 17.3 percentage points), the difference in their employment rates could have narrowed during the onset of the pandemic.

Table 1. Marginal effects of the explanatory variables on the probability of employment

Explanatory variable	All sexes		Males		Females	
	Apr. 2019 and Apr. 2020	Apr. 2020 and Apr. 2021	Apr. 2019 and Apr. 2020	Apr. 2020 and Apr. 2021	Apr. 2019 and Apr. 2020	Apr. 2020 and Apr. 2021
Current quarter (base: previous quarter)	-0.112*** (0.002)	0.118*** (0.002)	-0.135*** (0.002)	0.125*** (0.002)	-0.089*** (0.003)	0.112*** (0.002)
Male (base: female)	0.173*** (0.002)	0.156*** (0.002)	-	-	-	-
Urban (base: rural)	-0.041*** (0.002)	-0.052*** (0.002)	-0.058*** (0.003)	-0.069*** (0.003)	-0.021*** (0.003)	-0.033*** (0.003)
Age group (base: 15 – 24)						
25 – 44	0.321*** (0.003)	0.331*** (0.002)	0.343*** (0.004)	0.339*** (0.004)	0.281*** (0.003)	0.301*** (0.003)
45 – 64	0.282*** (0.003)	0.297*** (0.003)	0.245*** (0.005)	0.242*** (0.005)	0.304*** (0.004)	0.329*** (0.004)
65 and over	-0.084*** (0.004)	-0.069*** (0.004)	-0.159*** (0.006)	-0.148*** (0.006)	-0.018*** (0.005)	-0.005 (0.004)
Education (base: no grade)						
Elementary level	0.083*** (0.007)	0.087*** (0.007)	0.102*** (0.009)	0.105*** (0.009)	0.052*** (0.010)	0.059*** (0.010)
High school level	0.021*** (0.007)	0.025*** (0.007)	0.019** (0.009)	0.020** (0.009)	0.023** (0.009)	0.033*** (0.010)
Post-secondary level	0.064*** (0.008)	0.069*** (0.008)	0.017 (0.011)	0.039*** (0.011)	0.109*** (0.012)	0.100*** (0.012)
College level or higher	0.096*** (0.007)	0.088*** (0.007)	0.013 (0.010)	0.012 (0.009)	0.169*** (0.010)	0.159*** (0.010)
Number of observations	239,784	255,559	120,065	127,929	119,719	127,630

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a dummy variable which indicates whether an individual is employed or not. Each entry on the table reports the marginal effect for the respective group relative to the base group. Other controls are region and household head indicator. Standard errors are in parentheses.
Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

The likelihood of employment improved after a year, with people more likely to be employed by 11.8 percentage points in April 2021 than in April 2020. This also suggests that the employment losses in April 2020 had been offset by the gains seen in April 2021.

The gains, however, appear uneven if we examine the probability of employment by gender. Men's likelihood of employment was higher by 12.5 percentage points in April 2021 compared to that in April 2020, but this did not seem sufficient to completely counter the fall during the previous year. In contrast, women's likelihood of employment increased by 11.2 percentage points in April 2021, which was larger than the decline in April 2020. These results are consistent with the estimated marginal effect of sex on employment wherein men were more likely to be employed than women by a smaller degree (by 15.6 percentage points). This finding implies that men still had the employment advantage, but this advantage further contracted a year into the pandemic.

4.1.1. Probability of employment by sector

Table 2 reports the marginal effect of the period dummy variable on the probability of employment in given sectors, which indicates how much the probability of employment in each sector changed

from the previous year to the current year of observation. The probability of employment in nearly all sectors fell from April 2019 to April 2020, showing that the initial impact of the pandemic had been widespread.

The adverse effect on employment can be traced back to the stringent lockdown measures that practically closed the economy to curb the surge of COVID-19 cases. Some sectors, however, were affected more severely than the others. At the aggregate, employment loss largely came from the wholesale and retail trade and repair sector wherein people were less likely to be employed (by 2.8 percentage points). The other gravely affected sectors were construction, transportation and storage, and manufacturing. There are two major reasons for the vulnerability of these sectors to the pandemic and lockdown measures. For one, these sectors can be considered high-contact sectors, so social distancing guidelines can affect their operations more negatively. For another, their business operations mostly require onsite reporting of workers. As such, the physical closure of establishments during the first few months of the pandemic could generate income losses for firms and lead to worker layoffs. The latter explanation is aligned with the findings of Epetia (2021) which showed that people working in sectors that were either operating at limited capacity or fully closed were more susceptible to job loss.

Among men, the probability of employment fell the most in construction (by 4.3 percentage points), followed by transportation and storage, wholesale and retail trade and repair, and manufacturing. Among women, the gravely affected sectors include services, where largest declines in probability were found in wholesale and retail trade and repair (by 3.8 percentage points), followed by accommodation and food and other services. There had not been a statistically significant decline in the probability of employment in the industry sector among women, unlike in the case of men, except in manufacturing.

The probability of employment in many sectors exhibited a statistically significant increase from April 2020 to April 2021. The prominent increase can be observed in the wholesale and retail trade and repair sector, where people were more likely to be employed (by 4.2 percentage points) in April 2021. This gain was more than enough to offset the decline estimated in April 2020, and this observation can be inferred not just for aggregate employment but for both male and female employment in the wholesale and retail trade and repair sector. Among men, the probability of employment in construction and manufacturing also appeared to be promising, with males more likely to be employed in these sectors (by 3.8 and 1.2 percentage points, respectively). Among women, the probability of employment in other services was also relatively higher by nearly a percentage point.

Although stringent community quarantine measures were reimposed in some parts of the country in April 2021 because of another surge in COVID-19 cases, the results suggest that the labor market somehow adjusted progressively to the restrictions because of the pandemic. One example of such adjustment is the increased utilization of digital platforms in performing transactions that had been otherwise done through face-to-face means. It could have also helped that the community quarantine guidelines by that time allowed some partial physical operations even in some high-contact and non-essential sectors. It should be noted, however, that the rise in the probability of employment in a few sectors, particularly accommodation and food, and administration and support, albeit significant, remained muted in April 2021 compared to the corresponding decline in April 2020.

Table 2. Marginal effect of the period dummy on the probability of employment in given sectors

Sector	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
Agriculture	0.003**	0.025***	0.005**	0.026***	0.001	0.025***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Mining and quarrying	-0.001***	0.001***	-0.001***	0.002***	-0.00004	0.0003**
	(0.0002)	(0.0002)	(0.0004)	(0.0004)	(0.0001)	(0.0001)
Manufacturing	-0.012***	0.008***	-0.016***	0.012***	-0.008***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Electricity, gas, steam, and AC supply	-0.0004***	0.0001	-0.001***	0.00004	0.000007	0.0001
	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0001)	(0.0001)
Water supply, sewerage, and waste management	-0.0002*	0.0001	-0.0003	0.0001	-0.0001	0.0001
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Construction	-0.022***	0.019***	-0.043***	0.038***	-0.0002	0.0002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.0002)	(0.0002)
Wholesale and retail trade and repair	-0.028***	0.042***	-0.018***	0.027***	-0.038***	0.057***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Transportation and storage	-0.013***	0.005***	-0.026***	0.009***	-0.0004	0.0004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.0003)	(0.0003)
Accommodation and food	-0.009***	0.001***	-0.007***	-0.00002	-0.010***	0.003***
	(0.001)	(0.0005)	(0.001)	(0.001)	(0.001)	(0.001)
Information and communication	-0.002***	0.001***	-0.003***	0.001***	-0.002***	0.001***
	(0.0003)	(0.0002)	(0.0004)	(0.0004)	(0.0003)	(0.0003)
Finance and insurance	-0.002***	0.001***	-0.002***	0.001***	-0.002***	0.001**
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0005)	(0.0005)
Real estate	-0.001***	0.001***	-0.001***	0.0004*	-0.001***	0.001**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0003)
Professional, scientific, and technical	-0.001***	0.001***	-0.001***	0.0002	-0.001***	0.001***
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Administration and support	-0.004***	0.001***	-0.005***	0.002**	-0.002***	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Public administration	-0.006***	-0.001	-0.005***	-0.001	-0.007***	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	-0.002***	0.003***	-0.001***	0.001	-0.003***	0.004***
	(0.0005)	(0.0005)	(0.001)	(0.001)	(0.001)	(0.001)
Human health and social work	-0.002***	0.002***	-0.001***	0.001***	-0.002***	0.002***
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.001)	(0.001)
Arts, entertainment, and recreation	-0.003***	0.001***	-0.004***	0.001*	-0.002***	0.001***
	(0.0002)	(0.0002)	(0.0004)	(0.0003)	(0.0003)	(0.0003)
Other services	-0.007***	0.006***	-0.004***	0.004***	-0.010***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of observations	239,784	255,559	120,065	127,929	119,719	127,630

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed in one of the 19 sectors or is not employed. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

Another major finding is that the employment situation in the agriculture sector turned out to be quite different from that of the non-agriculture sectors. The probability of employment in agriculture was, although by a small extent, increased even during the onset of the pandemic. Also, the probability of employment in this sector among men was higher by half a percentage point in April 2020 compared to that in April 2019.

The growth in agriculture employment seemed to have been sustained a year into the pandemic, since people were more likely to be employed in the sector by 2.5 percentage points in April 2021 than in April 2020. This time, the increase in the probability of employment in agriculture among women was also statistically significant like it was among men. Given that lower likelihood of employment in the non-agriculture sectors during the onset of the pandemic coincided with higher likelihood of employment in the agriculture sector, it is possible that some of the employment losses in the non-agriculture sector had been partially cushioned by the agriculture sector.

The resilience of agriculture employment amid the pandemic may be explained by its duality of being both a low-contact and essential sector. Being a low-contact sector means that social distancing is already being practiced by default. Economic activities that are deemed essential by the government−which include but are not limited to the activities that are related to health services and the production and transport of food and medicines−have been imposed with looser community quarantine measures, if any.

4.1.2. Probability of employment by class of work and by occupational skill level

Tables 3 and 4 report the marginal effect of the period dummy on the probability of employment in given skill levels and classes of work, respectively. The marginal effect has the same interpretation as in Table 2. Looking into these aspects of employment allows us to gauge if there had been a variation in the quality of the jobs held during the pandemic.

The probability of employment in all skill levels fell from April 2019 to April 2020, but the marked decline was found in medium-skill occupations where people were less likely to be employed in such occupations by 5.3 percentage points. This observation was more apparent among men as they were less likely to be employed in medium-skill occupations by 6.8 percentage points. The decrease in the probability of employment in high-skill occupations was also relatively large. Among women, the probability of employment in high-skill occupations was lower by 3.8 percentage points in April 2020 compared to the probability in April 2019, while in low-skill occupations, the likelihood was lower by only 1.1 percentage points.

In terms of class of work, the employment loss appeared to be mostly due to wage employment. People faced a lower likelihood of wage employment by 7.9 percentage points in April 2020 than in April 2019. The negative effect on wage employment seemed to be larger among men than among women. Moreover, the fall in the probability of unpaid family work observed among men was not significant, while that seen among women was significant but quite small.

Table 3. Marginal effect of the period dummy on the probability of employment in given skill levels

Skill level	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
Low	-0.021***	0.042***	-0.030***	0.050***	-0.011***	0.033***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Medium	-0.053***	0.066***	-0.068***	0.069***	-0.039***	0.064***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
High	-0.038***	0.010***	-0.037***	0.006***	-0.038***	0.015***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
Number of observations	239,784	255,559	120,065	127,929	119,719	127,630

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed in one of the three occupational skill levels or is not employed. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.
Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

Table 4. Marginal effect of the period dummy on the probability of employment in given classes of work

Class of work	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
Wage employment	-0.079***	0.059***	-0.106***	0.084***	-0.052***	0.034***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Self-employment	-0.030***	0.044***	-0.028***	0.033***	-0.032***	0.055***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Unpaid family work	-0.003***	0.016***	-0.001	0.009***	-0.004***	0.023***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of observations	239,784	255,559	120,065	127,929	119,719	127,630

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed in one of the three classes of work or is not employed. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.
Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

The probability of employment in all skill levels was higher in April 2021 compared to that in April 2020. The expansion in low-skill and medium-skill employment seemed to be large enough to offset the decline in the likelihood of being employed in these occupations in the previous year. However, the increase in the probability of employment in high-skill occupations had been subdued compared to what was observed in other skill levels. Among men, the probability of being employed in high-skill occupations was higher by only around half a percentage point. The increase was a bit higher among women at 1.5 percentage points.

The probability of employment in all classes of work Similarly rose between April 2020 and April 2021. Among men, the largest increase was seen in the probability of wage employment, followed by self-employment. Among women, the largest increase was found in the probability of self-employment, followed by wage employment. Nonetheless, the higher likelihood of unpaid family work among women in April 2021 (up by 2.3 percentage points) may also be considered substantial, since the fall in the probability of unpaid family work in April 2020 was barely half a percentage point. It can be gleaned that there had been relatively faster growth in low-skill

employment than in high-skill employment among men and women, as well as in non-wage employment than in wage employment among women, a year into the pandemic.

Table 5. Marginal effect of the period dummy on the probability of employment depending on characteristics

Characteristics	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
All	-0.112***	0.118***	-0.135***	0.125***	-0.089***	0.112***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Sex						
Male	-0.138***	0.123***	-	-	-	-
	(0.002)	(0.003)				
Female	-0.086***	0.113***	-	-	-	-
	(0.003)	(0.003)				
Urbanization						
Urban	-0.120***	0.102***	-0.143***	0.108***	-0.099***	0.098***
	(0.002)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Rural	-0.105***	0.134***	-0.128***	0.141***	-0.080***	0.126***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Age group						
15 – 24	-0.099***	0.098***	-0.115***	0.115***	-0.080***	0.080***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
25 – 44	-0.137***	0.140***	-0.168***	0.147***	-0.105***	0.132***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)
45 – 64	-0.108***	0.121***	-0.128***	0.114***	-0.088***	0.128***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)
65 and over	-0.066***	0.089***	-0.073***	0.097***	-0.061***	0.083***
	(0.006)	(0.003)	(0.010)	(0.009)	(0.007)	(0.005)
Education						
No grade completed	-0.119***	0.155***	-0.141***	0.157***	-0.102***	0.155***
	(0.013)	(0.013)	(0.019)	(0.018)	(0.018)	(0.018)
Elementary level	-0.113***	0.135***	-0.137***	0.140***	-0.081***	0.129***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)
High school level	-0.110***	0.118***	-0.141***	0.127***	-0.079***	0.110***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Post-secondary level	-0.111***	0.120***	-0.119***	0.135***	-0.105***	0.105***
	(0.008)	(0.009)	(0.011)	(0.012)	(0.012)	(0.013)
College level or higher	-0.116***	0.100***	-0.123***	0.100***	-0.109***	0.101***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Number of observations	239,784	255,559	120,065	127,929	119,719	127,630

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a dummy variable which indicates whether an individual is employed or not. All explanatory variables (characteristics) are interacted with the period dummy. Thus, each entry on the table reports how much the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year depends on individual characteristics. Other controls are region and household head indicator. Standard errors are in parentheses.

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

4.1.3. Marginal effect of the pandemic by individual characteristics

Finally, we investigate which groups of people had faced relatively more adverse effects on employment during the pandemic. To answer this, we interacted the explanatory variables with the period dummy and estimated how the marginal effects of the period dummy depend on individual characteristics. Table 5 reports these marginal effects with the dependent variable being the binary indicator of employment status.

The following can be observed. First, the employment of rural residents appeared to have fared better during the pandemic. Compared to urban residents, rural residents showed a smaller decline in the probability of employment from April 2019 to April 2020 and still faced a larger improvement in the probability of employment from April 2020 to April 2021. This result is consistent with our finding of a higher probability of employment in agriculture during the pandemic since the agriculture sector is more prominent in rural areas than in urban areas.

Second, the middle-aged groups encountered larger declines in the probability of employment from April 2019 to April 2020 compared to the youngest and oldest age groups. However, the middle-aged groups were also the ones whose probability of employment rose the most from April 2020 to April 2021. Third, regardless of education, people experienced a steep fall in the likelihood of being employed from April 2019 to April 2020, although they faced an increased probability of being employed from April 2020 to April 2021. Fourth, we note that there is little difference in the estimates of the marginal effects of the period dummy by gender whether the pooled sample or split sample by gender was used.

4.2. Daily working hours

Table 6 reports the change in daily working hours from the previous year to the current year for each group of employed individuals.[11] As expected, there had been a significant fall in working hours from April 2019 to April 2020. Regardless of gender, the shorter working hours were observed across urbanization types, age groups, educational levels, classes of work, and occupational skill levels. On the other hand, there was some variation on the significance of the change in hours of work across sectors. For both men and women, there had been a statistically significant decline in working hours in agriculture, construction, wholesale and retail trade and repair, education, and other services. Shorter working hours in mining and quarrying, manufacturing, water supply, transportation and storage, professional activities, and administration and support can be observed only among men, while shorter hours in accommodation and food can be observed only among women.

As found in the previous subsection, the probability of employment both in the aggregate and in disaggregated terms declined from April 2019 to April 2020. Thus, aside from the fall in employment, those who remained employed worked for a shorter period on average during the onset of the pandemic. These results together provide further empirical evidence of a reduction of labor supply both at the intensive and extensive margins during the pandemic. Moreover, even people in the agriculture sector, whose probability of employment had not fallen, exhibited shorter working hours on average. We note, however, that workers in public administration showed a rise in average working hours.

[11] To conserve space, the numbers of observations corresponding to each entry are summarized in Table 1 of the Appendix.

Table 6. Year-on-year change in daily working hours by individual characteristics, sector, class of work, and skill level

Group	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
All	-0.375***	0.062***	-0.382***	0.091***	-0.366***	0.022
	(0.013)	(0.013)	(0.015)	(0.015)	(0.023)	(0.022)
Urbanization						
Urban	-0.280***	-0.057***	-0.275***	-0.029	-0.286***	-0.098***
	(0.017)	(0.018)	(0.021)	(0.021)	(0.029)	(0.029)
Rural	-0.440***	0.159***	-0.451***	0.183***	-0.425***	0.127***
	(0.018)	(0.018)	(0.021)	(0.021)	(0.034)	(0.033)
Age group						
15 – 24	-0.371***	-0.059*	-0.348***	0.029	-0.407***	-0.211***
	(0.033)	(0.034)	(0.040)	(0.040)	(0.059)	(0.061)
25 – 44	-0.363***	0.076***	-0.408***	0.116***	-0.292***	0.019
	(0.017)	(0.017)	(0.020)	(0.020)	(0.031)	(0.031)
45 – 64	-0.377***	0.107***	-0.352***	0.110***	-0.418***	0.111***
	(0.023)	(0.023)	(0.028)	(0.027)	(0.040)	(0.039)
65 and over	-0.423***	0.065	-0.368***	0.054	-0.508***	0.109
	(0.067)	(0.064)	(0.082)	(0.079)	(0.112)	(0.104)
Education						
No grade completed	-0.542***	0.349***	-0.625***	0.494***	-0.419**	0.090
	(0.099)	(0.097)	(0.109)	(0.112)	(0.201)	(0.185)
Elementary level	-0.486***	0.225***	-0.501***	0.243***	-0.447***	0.187***
	(0.027)	(0.026)	(0.029)	(0.029)	(0.058)	(0.056)
High school level	-0.392***	0.034*	-0.366***	0.064***	-0.440***	-0.015
	(0.020)	(0.020)	(0.023)	(0.023)	(0.040)	(0.039)
Post-secondary level	-0.342***	0.037	-0.406***	0.027	-0.280***	0.052
	(0.055)	(0.059)	(0.068)	(0.074)	(0.091)	(0.097)
College level or higher	-0.217***	-0.050**	-0.204***	-0.067**	-0.226***	-0.035
	(0.021)	(0.021)	(0.031)	(0.030)	(0.030)	(0.029)
Sector						
Agriculture	-0.341***	0.228***	-0.373***	0.201***	-0.248***	0.291***
	(0.025)	(0.023)	(0.028)	(0.027)	(0.050)	(0.046)
Mining and quarrying	-0.315*	-0.070	-0.321*	-0.030	0.548	-0.281
	(0.162)	(0.164)	(0.170)	(0.174)	(0.701)	(0.710)
Manufacturing	-0.198***	0.068*	-0.279***	0.133***	-0.085	-0.025
	(0.038)	(0.038)	(0.045)	(0.047)	(0.067)	(0.067)
Electricity, gas, steam, and AC supply	0.063	-0.001	0.056	-0.060	-0.003	0.687*
	(0.097)	(0.144)	(0.115)	(0.163)	(0.083)	(0.385)
Water supply, sewerage, and waste management	-0.897***	0.403	-1.169***	0.573**	0.762	-0.782
	(0.258)	(0.266)	(0.282)	(0.282)	(0.802)	(0.948)
Construction	-0.033***	-0.022	-0.026**	-0.022*	-0.407***	-0.035
	(0.012)	(0.013)	(0.012)	(0.013)	(0.119)	(0.157)
Wholesale and retail trade and repair	-0.460***	-0.002	-0.430***	0.060	-0.478***	-0.034
	(0.033)	(0.033)	(0.049)	(0.048)	(0.045)	(0.043)
Transportation and storage	-0.484***	-0.109**	-0.511***	-0.107**	0.141	-0.035
	(0.045)	(0.046)	(0.046)	(0.047)	(0.230)	(0.162)
Accommodation and food	-0.119**	-0.129*	0.120	-0.267***	-0.322***	-0.017
	(0.057)	(0.066)	(0.075)	(0.093)	(0.085)	(0.094)
Information and communication	0.034	-0.180*	-0.004	-0.151	0.208	-0.119
	(0.101)	(0.094)	(0.123)	(0.114)	(0.178)	(0.171)
Finance and insurance	-0.068	-0.033	-0.089	-0.084	-0.064	-0.001
	(0.053)	(0.055)	(0.081)	(0.087)	(0.071)	(0.073)
Real estate	0.186	-0.401*	0.437	-0.508	-0.090	-0.276
	(0.238)	(0.238)	(0.364)	(0.382)	(0.329)	(0.304)

Group	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
Professional, scientific, and technical	-0.206**	-0.001	-0.264*	-0.047	-0.149	0.043
	(0.082)	(0.093)	(0.141)	(0.160)	(0.091)	(0.108)
Administration and support	-0.099**	-0.084*	-0.145**	-0.097	-0.041	-0.057
	(0.046)	(0.043)	(0.065)	(0.062)	(0.055)	(0.051)
Public administration	0.201***	-0.218***	0.223***	-0.236***	0.173***	-0.201***
	(0.031)	(0.031)	(0.045)	(0.045)	(0.041)	(0.043)
Education	-0.360***	0.197***	-0.207***	0.069	-0.421***	0.253***
	(0.042)	(0.042)	(0.080)	(0.078)	(0.049)	(0.050)
Human health and social work	-0.027	0.012	-0.173	0.208	0.034	-0.073
	(0.078)	(0.077)	(0.141)	(0.159)	(0.094)	(0.087)
Arts, entertainment, and recreation	0.077	-0.450**	0.191	-0.335	0.063	-0.564**
	(0.177)	(0.183)	(0.242)	(0.248)	(0.263)	(0.280)
Other services	-0.310***	-0.057	-0.676***	0.116	-0.187**	-0.115
	(0.063)	(0.063)	(0.115)	(0.118)	(0.074)	(0.074)
Class of work						
Wage employment	-0.159***	-0.031**	-0.163***	-0.028*	-0.146***	-0.035*
	(0.012)	(0.012)	(0.015)	(0.015)	(0.021)	(0.021)
Self-employment	-0.621***	0.192***	-0.616***	0.204***	-0.645***	0.198***
	(0.027)	(0.026)	(0.030)	(0.029)	(0.051)	(0.048)
Unpaid family work	-0.231***	0.099**	-0.177**	0.025	-0.268**	0.163***
	(0.054)	(0.049)	(0.086)	(0.079)	(0.068)	(0.061)
Skill level						
Low	-0.338***	0.096***	-0.341***	0.141***	-0.341***	0.027
	(0.024)	(0.023)	(0.025)	(0.025)	(0.048)	(0.045)
Medium	-0.391***	0.108**	-0.399***	0.091***	-0.373***	0.142***
	(0.018)	(0.018)	(0.021)	(0.020)	(0.034)	(0.033)
High	-0.279***	-0.029	-0.289***	-0.005	-0.272***	-0.049
	(0.027)	(0.027)	(0.038)	(0.039)	(0.037)	(0.037)

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is daily working hours. Each entry on the table reports the coefficient of the period dummy, so each entry shows the partial effect for the respective quarter of the current year relative to the same quarter of the previous year. The value for each entry is estimated using a split sample for the specified group, sex, and period coverage. Controls include sex, urbanization, age, education, and region in whichever equation they are applicable. Standard errors are in parentheses.

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

Results are largely mixed on whether there was a statistically significant change in daily working hours from April 2020 to April 2021. On average, men worked for longer hours in April 2021 than in April 2020, but the change in daily working hours was not significant among women. Rural residents, middle-aged workers, those with high school education or less, the self-employed, the unpaid family workers, and those working in low- and medium-skill occupations generally worked for significantly longer periods. In contrast, female urban workers, female youth workers, and wage workers faced a further reduction in working hours.

Across sectors and among men, longer working hours were found in agriculture, manufacturing, and water supply. Among women, longer hours were seen in agriculture, power, and education. In contrast, shorter working hours were observed among men in construction, transportation and storage, accommodation and food, and public administration. Women meanwhile worked shorter hours in public administration, and the arts, entertainment, and recreation. We find that even though there had been an improvement in the probability of employment in most sectors and in all types of jobs from April 2020 to April 2021, a fall in average working hours could still be observed in certain parts of the labor market.

4.3. Probability of wage employment by sector

To provide some context on the trend of wages during the pandemic that will be discussed in the next section, we also estimated the probability of wage employment in given sectors.[12] Table 7 reports the marginal effect of the period dummy on the probability of employment in a given sector. The understanding is the same as in Table 2, but the employed individuals in Table 7 are restricted to the wage workers.

Among men, the probability of wage employment in all sectors fell from April 2019 to April 2020. Among women, the probability of wage employment fell in most sectors, save for transportation and storage, and industry, where marginal effects were insignificant except in manufacturing. Nonetheless, the probability of wage employment in many sectors was higher in April 2021 compared to that in April 2020. Tables 2 and 7 present similar findings, except for the agriculture sector. The probability of wage employment in agriculture declined from April 2019 to April 2020, contrary to the gain observed for total employment in the sector. This suggests that the loss in wage employment in agriculture during the period was more than offset by the gain in non-wage employment.

[12] The probability of wage employment in given skill levels was also estimated. The pattern of the estimates between total employment and wage employment remains the same, so we did not report the results for wage employment in given skill levels anymore.

Table 7. Marginal effect of the period dummy on the probability of wage employment in given sectors

Sector	All sexes		Males		Females	
	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021	Apr. 2019 vs. Apr. 2020	Apr. 2020 vs. Apr. 2021
Agriculture	-0.004***	0.014***	-0.004**	0.019***	-0.005**	0.010***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Mining and quarrying	-0.001***	0.001***	-0.001***	0.002***	-0.0002	0.0004***
	(0.0002)	(0.0002)	(0.0005)	(0.0005)	(0.0001)	(0.0001)
Manufacturing	-0.013***	0.010***	-0.018***	0.016***	-0.007***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Electricity, gas, steam, and AC supply	-0.001***	0.0002	-0.001***	0.0002	-0.00001	0.0002
	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0001)	(0.0001)
Water supply, sewerage, and waste management	-0.0003**	0.0002	-0.001**	0.0002	-0.0001	0.0002*
	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0001)	(0.0001)
Construction	-0.029***	0.027***	-0.060***	0.055***	-0.0003	0.0003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.0003)	(0.0003)
Wholesale and retail trade and repair	-0.013***	0.015***	-0.013***	0.016***	-0.012***	0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Transportation and storage	-0.007***	0.005***	-0.015***	0.010***	0.0002	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.0003)	(0.0003)
Accommodation and food	-0.008***	0.0002	-0.008***	-0.001	-0.008***	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Information and communication	-0.002***	0.002***	-0.003***	0.002***	-0.002***	0.002***
	(0.0003)	(0.0003)	(0.001)	(0.001)	(0.0004)	(0.0003)
Finance and insurance	-0.002***	0.002***	-0.002***	0.002***	-0.002***	0.002***
	(0.0004)	(0.0004)	(0.001)	(0.001)	(0.001)	(0.001)
Real estate	-0.001***	0.0002	-0.001***	0.00004	-0.001**	0.0003
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0003)
Professional, scientific, and technical	-0.002***	0.001***	-0.002***	0.0003	-0.002***	0.001***
	(0.0003)	(0.0003)	(0.001)	(0.0004)	(0.0004)	(0.0004)
Administration and support	-0.005***	0.003***	-0.008***	0.003***	-0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Public administration	-0.010***	0.003***	-0.010***	0.003*	-0.010***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	-0.003***	0.005***	-0.002***	0.002***	-0.004***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Human health and social work	-0.003***	0.003***	-0.002***	0.001***	-0.003***	0.003***
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.001)	(0.001)
Arts, entertainment, and recreation	-0.003***	0.001***	-0.004***	0.0005	-0.003***	0.001***
	(0.0003)	(0.0002)	(0.0005)	(0.0003)	(0.0004)	(0.0003)
Other services	-0.009***	0.009***	-0.005***	0.004***	-0.013***	0.014***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Number of observations	189,073	198,994	90,200	96,050	98,873	102,944

Notes: ***p < 0.01, **p < 0.05, and *p < 0.10. The dependent variable is a multi-categorical variable which indicates whether an individual is employed as a wage worker in one of the 19 sectors or is not employed. Each entry on the table reports the marginal effect for the respective quarter of the current year relative to the same quarter of the previous year. Other controls are urbanization, age, education, region, and household head indicator. Standard errors are in parentheses.
Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

5. Wages

5.1. Impact on wages by individual characteristics

Table 8 reports the results of the wage regressions, which allow us to examine the movement of real daily wages in the Philippines during the COVID-19 crisis. Each entry shows the estimated coefficient on the pandemic dummy obtained from the regression of Equation (2) on the corresponding subsample shown in the leftmost column. These coefficients indicate how much real daily wages have changed across periods in each subsample. Robust standard errors are displayed below each coefficient estimate.[13]

Real daily wages significantly weakened during the initial months of the pandemic (immediately after the ECQs) based on full-sample regressions, declining by about 3.3 percent between April 2019 and April 2020. Estimates in Table 8 further show that real daily pay deteriorated on impact across urbanization type, age, and educational attainment. The results seem to be generally driven by outcomes for males during the period, with relevant parameters found to be negative and statistically significant for almost all related subsamples except for the youngest age group.

Real daily pay of men fell by 4.6 percent annually in April 2020, with real wages of urban and rural men dipping by 4.0 percent and 5.0 percent, respectively. Among women, real daily pay fell only for rural females, and by a smaller amount (by 2.6%) than for rural males. Declines in real daily wages were felt by men of age groups above 24 years and all levels of education, with the steepest drops experienced by those ages 65 and above (falling by 12.0%) and those with no grade completed (by 18.5%). Declines in real daily wages among women were observed only for a few subsamples (namely, those ages 25-44 and those with college-level education or higher).

Tying these results together with those from the earlier set of regressions, one finds older males to be the most negatively affected during the initial stage of the COVID-19 crisis, as they were more likely to experience both employment and wage losses. While men and women generally endured job losses across education levels during the pandemic, it had been the uneducated male who tended to suffer the deepest pay cut.

The overall decline in real daily wages seemed to be milder a year into the pandemic, falling by only 1.3 percent annually in April 2021. Women were now the ones more likely to experience real wage declines based on a full sample of females (by 4.0%) and for a greater number of subsamples, specifically across urbanization levels (with urban women rather than rural women facing a sharper real wage reduction this time), most age groups (save for the oldest), and subgroups of females who had high-school and college-level education. Among women of different ages, the youngest female workers endured the sharpest fall in earnings with their real daily pay falling by 9.0 percent.

In contrast, real daily pay of males showed signs of recovery in April 2021, with real wages of rural men rising by 2.6 percent. Less educated males saw a recovery of their daily earnings during the period, with the least educated benefitting from the sharpest raise in their pay (by 17.7%). Real daily wage declines were confined to the youngest set of male workers and college-educated men (by 2.5% and 2.4%, respectively).

[13] To conserve space, the numbers of observations corresponding to each entry are summarized in Table 2 of the Appendix.

Table 8. OLS regression estimates of the impact of the COVID-19 crisis on real daily wages

	April 2019 vs. April 2020			April 2020 vs. April 2021		
	All sexes	**Male**	**Female**	**All sexes**	**Male**	**Female**
Full sample	-0.033***	-0.046***	-0.011	-0.013***	0.003	-0.040***
	(0.005)	(0.006)	(0.009)	(0.005)	(0.006)	(0.009)
Urbanization						
Urban	-0.026***	-0.040***	-0.001	-0.024***	-0.011	-0.046***
	(0.007)	(0.008)	(0.011)	(0.007)	(0.008)	(0.011)
Rural	-0.040***	-0.050***	-0.026*	0.005	0.026***	-0.027*
	(0.008)	(0.009)	(0.015)	(0.008)	(0.009)	(0.015)
Age group						
Ages 15-24	-0.002	0.002	-0.009	-0.048***	-0.025*	-0.090***
	(0.011)	(0.013)	(0.019)	(0.011)	(0.013)	(0.019)
Ages 25-44	-0.040***	-0.053***	-0.020*	-0.01	0.006	-0.035***
	(0.007)	(0.008)	(0.012)	(0.007)	(0.008)	(0.012)
Ages 45-64	-0.029***	-0.062***	0.025	-0.007	0.014	-0.039*
	(0.011)	(0.012)	(0.020)	(0.011)	(0.013)	(0.020)
Ages 65 and over	-0.108**	-0.120**	-0.098	0.101**	0.089	0.088
	(0.043)	(0.057)	(0.069)	(0.043)	(0.057)	(0.064)
Education						
No grade completed	-0.110*	-0.185***	0.067	0.131**	0.177***	-0.223
	(0.057)	(0.056)	(0.142)	(0.062)	(0.057)	(0.208)
Elementary level	-0.035***	-0.040***	-0.014	0.019*	0.021*	0.009
	(0.010)	(0.011)	(0.021)	(0.010)	(0.011)	(0.022)
High school level	-0.033***	-0.053***	0.014	-0.01	0.012*	-0.062***
	(0.007)	(0.007)	(0.014)	(0.007)	(0.007)	(0.014)
Post-secondary level	-0.054***	-0.078***	-0.017	-0.009	-0.003	-0.019
	(0.019)	(0.022)	(0.034)	(0.021)	(0.024)	(0.038)
College level or higher	-0.026**	-0.031**	-0.024*	-0.033***	-0.024*	-0.039***
	(0.010)	(0.015)	(0.014)	(0.010)	(0.015)	(0.014)
Skill level						
Low-skilled	-0.014**	-0.023***	0.008	0.013*	0.022***	-0.014
	(0.007)	(0.008)	(0.014)	(0.007)	(0.008)	(0.015)
Medium-skilled	-0.031***	-0.047***	0.000	-0.027***	-0.010	-0.055***
	(0.006)	(0.008)	(0.011)	(0.007)	(0.008)	(0.011)
High-skilled	-0.003	-0.011	0.004	-0.041***	-0.028	-0.049***
	(0.013)	(0.020)	(0.017)	(0.014)	(0.022)	(0.018)

Notes: ***p<0.01, **p<0.05, *p<0.10. Each entry shows OLS estimates of the coefficient of the pandemic dummy, with robust standard errors in parentheses.

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

5.2. Impact on wages across skill level and industrial sectors

Medium-skilled workers experienced the biggest deterioration of real daily wages (by 3.1% annually) in the earlier phase of the COVID-19 crisis in April 2020, shortly after the lockdowns (Table 8). This outcome was driven by the trend among men in the subsample, whose real daily pay fell by 4.7 percent. The result matches our employment analysis and indicates a sharp fall in labor demand faced by medium-skilled males. Low-skilled workers also saw their real daily pay dip by 1.4 percent, with real wages of men in the subsample declining by 2.3 percent. They underwent an improvement by April 2021, however, with a rise in real wages during the period nearly offsetting the previous pay cut.

Medium-skilled and high-skilled female workers endured the largest decline in earnings in the latter phase of the pandemic crisis under study, with real daily pay falling annually by 5.5 percent and 4.9 percent. This result indicates that the employment gains experienced by medium-skilled and high-skilled women a year into the pandemic occurred at the cost of facing lower wages. In contrast, the average daily wage of high-skilled men had not shown statistically significant changes in both periods of observation even though they exhibited the same employment patterns as their female counterparts. This reflects greater downward flexibility of wages of high-skilled females, which could imply the lower bargaining power of women in the workplace even among the highly skilled.

Across industrial sectors, workers as expected generally experienced real daily wage declines in contact-intensive services sectors or those requiring community mobility (Table 9). These comprise transport and storage (where real daily pay fell by 11.3%), accommodation and food (4.7%), domestic (wholesale and retail) trade (4.5%), and other services (3.0%). Among industry subsectors, real daily wage cuts were seen in construction (2.2%) and mining and quarrying (8.6%). As described in Section 2, these were also the sectors that saw sharp falls in aggregate demand. The observed weakening of real wages largely reflects worsening pay of men, particularly in other services and manufacturing, and male-dominated fields in the list, such as transport and storage, and construction. Women, on the other hand, saw a deterioration of their pay in accommodation and food, administration and support, and real estate, and smaller female subsamples such as in construction, and information and communication.

Workers in accommodation and food (both men and women) and transport and storage services (mostly men) continued to confront real daily wage reductions a year into the pandemic, by 11.4 percent and 4.4 percent, respectively. Subsectors where real daily pay began to also fall include manufacturing (by 5.3%) and power (15.9%), the latter driven mostly by male outcomes. Subsectors where real daily wages of women started to worsen include education, manufacturing, public administration, and domestic trade, while their wages recovered in information and communication. Among men, real daily pay decreased in human health and social work and manufacturing subsectors, while it increased in agriculture, driving overall wage growth in the male-dominated sector.

Employment regressions in this study reveal that while total employment in agriculture generally grew immediately after the ECQs, wage employment there actually declined indicating that a growing number had moved to the rural sector and engaged in self-employment and unpaid work.[14] However, wage employment in the agriculture sector strongly rebounded by April 2021, at the same time that real daily pay increased. This indicates higher demand in the sector in the latter stage of the pandemic crisis that may be attributed to two possible factors. The agriculture sector

[14] This result also matches the earlier result which showed an increase in real daily wages of rural men in April 2021 (see Table 8).

received support from the private sector in the form of guaranteed purchases of agricultural products and installation of marketplaces where farmers, fisherfolks, and small- and medium-enterprises can sell their agricultural products (Poblador 2022). Reallocation from non-food to food consumption among households could have also occurred during the COVID-19 pandemic,[15] which would increase the demand for agricultural products and thus agricultural inputs, including labor.

Table 9. OLS regression estimates of the impact of the COVID-19 crisis on real daily wages

	April 2019 vs. April 2020			April 2020 vs. April 2021		
	All sexes	**Male**	**Female**	**All sexes**	**Male**	**Female**
Agriculture	-0.002	-0.01	0.033	0.023**	0.035***	-0.022
	(0.012)	(0.013)	(0.023)	(0.011)	(0.013)	(0.024)
Manufacturing	-0.001	-0.027*	0.03	-0.053***	-0.045**	-0.069***
	(0.013)	(0.015)	(0.023)	(0.014)	(0.018)	(0.024)
Mining & quarrying	-0.086*	-0.093*	0.022	0.035	0.05	-0.121
	(0.048)	(0.052)	(0.307)	(0.048)	(0.050)	(0.163)
Electricity, gas, steam & AC supply	0.05	0.065	-0.026	-0.159**	-0.159**	-0.183
	(0.072)	(0.080)	(0.483)	(0.072)	(0.077)	(0.173)
Water supply, sewerage, waste mgt.	-0.094	-0.146	-0.19	-0.092	-0.028	0.288
	(0.128)	(0.155)	(0.506)	(0.095)	(0.108)	(0.292)
Construction	-0.022***	-0.018***	-0.212**	0.01	0.007	0.097
	(0.007)	(0.007)	(0.084)	(0.007)	(0.007)	(0.064)
Wholesale & retail trade	-0.045***	-0.052***	-0.029	-0.011	0.015	-0.043**
	(0.012)	(0.014)	(0.018)	(0.012)	(0.015)	(0.019)
Transportation & storage	-0.113***	-0.130***	0.035	-0.044**	-0.034	-0.108*
	(0.021)	(0.022)	(0.066)	(0.022)	(0.024)	(0.062)
Accommodation & food	-0.047***	-0.031	-0.068**	-0.114***	-0.124***	-0.096***
	(0.018)	(0.022)	(0.029)	(0.020)	(0.026)	(0.030)
Information & communication	-0.005	0.102	-0.131*	0.024	-0.03	0.141**
	(0.051)	(0.065)	(0.071)	(0.047)	(0.058)	(0.068)
Financial & insurance	-0.036	-0.003	-0.041	-0.024	-0.001	-0.05
	(0.036)	(0.050)	(0.050)	(0.036)	(0.056)	(0.047)
Real estate	-0.09	0.083	-0.198*	-0.065	-0.15	-0.011
	(0.087)	(0.154)	(0.110)	(0.075)	(0.130)	(0.096)
Professional, scientific & technical	-0.04	-0.102	0.009	0.009	0.092	-0.061
	(0.052)	(0.088)	(0.071)	(0.050)	(0.071)	(0.073)
Administration & support	-0.021	-0.004	-0.049**	-0.021	-0.014	-0.034
	(0.015)	(0.019)	(0.025)	(0.015)	(0.019)	(0.025)
Public administration	-0.026	-0.047	0.006	-0.023	0.01	-0.060*
	(0.023)	(0.029)	(0.035)	(0.022)	(0.029)	(0.036)
Education	0.023	0.027	0.023	-0.077***	-0.044	-0.089***
	(0.018)	(0.038)	(0.020)	(0.018)	(0.039)	(0.021)
Human health & social work	-0.005	-0.026	-0.003	0.001	-0.089*	0.038
	(0.035)	(0.052)	(0.045)	(0.031)	(0.050)	(0.040)
Arts, entertainment & recreation	-0.091	-0.094	-0.059	-0.076	-0.094	-0.08
	(0.062)	(0.104)	(0.073)	(0.062)	(0.090)	(0.080)
Other services	-0.030*	-0.148***	0.001	0.018	0.065	0.006
	(0.017)	(0.039)	(0.018)	(0.017)	(0.042)	(0.019)

Notes: ***p<0.01, **p<0.05, *p<0.10. Each entry shows OLS estimates of the coefficient of the pandemic dummy, with robust standard errors in parentheses.

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

[15] Empirical evidence of this phenomenon is found in other countries (e.g., Cavallo et al. (2020), Chenarides et al. (2021), Hirvonen et al. (2021).

5.3. Interaction effects during the pandemic

Finally, we check the soundness of our results by incorporating interaction terms between the pandemic period of interest and individual characteristics in the main specification and estimating using the full sample for the country.[16] The estimates summarized in Table 10 generally support the findings from our previous regressions, which were based on (corresponding) subsamples.

While real daily wages fell in both urban and rural areas at the onset of the COVID-19 pandemic (in April 2020), the difference in the severity of the measured impact was not statistically significant. Our previous regressions showed that male workers experienced real wage reductions on impact, while female workers generally did not (except for rural women), and current regressions confirm this harsher effect on the real daily pay of men compared to women (by 4.9 percentage points). The youngest workers, earlier seen to be minimally affected in terms of pay by the pandemic and related public health restrictions, are proven to be less likely to have suffered a real wage loss than older workers, whose wages were earlier seen to decline in response to the pandemic during the initial stage. Meanwhile, real daily pay of men with the least amount of education are revealed to have fallen by a significantly greater amount than more highly educated men (by 10 to 15 percentage points), reinforcing our earlier finding about the uneducated male being the most badly hit by the pandemic crisis in the first few months of the pandemic.

There appear to be marked differences in wage impact in later stages of the COVID-19 crisis. Table 10 shows that urbanization mattered considerably in April 2021, with rural workers, particularly rural men, confirmed to be significantly better off than their urban counterparts. This matches the earlier finding of real wage increases for rural males during the period in our previous regressions. Previous regressions also showed that females rather than males generally experienced real wage reductions a year into the pandemic, with the difference in wage performance (at 3.3 percentage points) found to be statistically significant in current regressions. Meanwhile, the youngest workers are revealed to be generally worse off compared to older workers in terms of real daily pay, validating earlier results that showed significant wage declines primarily for workers of ages 15 to 24 in the later stage of the pandemic. Education, however, did not seem to be a consequential factor on average during this period. Overall, the finding that the youngest female workers suffered the biggest welfare losses as the pandemic crisis unfolded seems to be a robust result.

[16] We also check for possible selection bias that may come from changes in the composition of the wage-employed portion of the labor force. However, we found no practical difference among wage workers in terms of average age and gender/sex even across industry sectors.

Table 10. The COVID-19 pandemic, worker characteristics, and their interaction – impact on real daily wages

	April 2019 vs. April 2020 (Dummy: April 2020)			April 2020 vs April 2021 (Dummy: April 2021)		
Interaction	**All sexes**	**Male**	**Female**	**All sexes**	**Male**	**Female**
Urbanization						
Urban	0.004	0.005	0.011	-0.025**	-0.034***	-0.017
	(0.011)	(0.012)	(0.019)	(0.011)	(0.012)	(0.019)
Sex						
Male	-0.049***			0.033***		
	(0.011)			(0.011)		
Age group						
Ages 25-44	-0.034***	-0.053***	-0.002	0.043***	0.043***	0.044*
	(0.013)	(0.015)	(0.022)	(0.013)	(0.015)	(0.023)
Ages 45-64	-0.022	-0.061***	0.045	0.053***	0.053***	0.052*
	(0.016)	(0.018)	(0.029)	(0.016)	(0.018)	(0.029)
Ages 65 and over	-0.109**	-0.085	-0.082	0.120**	0.094	0.133*
	(0.048)	(0.058)	(0.078)	(0.047)	(0.057)	(0.075)
Education						
Elementary level	0.104*	0.146**	-0.043	-0.072	-0.095	0.024
	(0.054)	(0.060)	(0.119)	(0.065)	(0.076)	(0.123)
High school level	0.098*	0.125**	-0.018	-0.087	-0.091	-0.032
	(0.054)	(0.060)	(0.119)	(0.065)	(0.076)	(0.122)
Post-secondary level	0.069	0.105*	-0.062	-0.095	-0.110	-0.001
	(0.057)	(0.063)	(0.123)	(0.068)	(0.079)	(0.128)
College level or higher	0.092*	0.149**	-0.056	-0.096	-0.121	0.000
	(0.055)	(0.061)	(0.119)	(0.065)	(0.077)	(0.123)
Number of observations	64,145	39,852	24,293	62,719	38,473	24,246

Notes: ***p<0.01, **p<0.05, *p<0.10. The table shows the OLS estimates of the coefficients of the interaction terms formed between the pandemic dummy and the corresponding variables indicated in Column 1, with each column containing estimates from a single regression and with robust standard errors in parentheses.

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

6. Conclusion

This study aimed to analyze the impact of the COVID-19 crisis on the Philippine labor market, focusing on both employment and real wages and their outcomes across sectors and various worker characteristics. Apart from gaining a fuller understanding of the overall effects on the country's workforce, this allowed us to gauge the size of the labor market's role in transmitting the negative effects of the pandemic crisis, which had a broader influence on the country's production sectors than previous crises. For instance, affected sectors this time included services, which in the past three decades seemed relatively immune to a range of disturbances.

Our empirical estimations allow us to make several important observations. First, the immediate impact of the pandemic crisis, characterized by stringent quarantines in its initial phase (in April 2020), turned out to be much larger on employment than on real wages, in contrast to findings for previous crises which found the reverse to be true. Second, because of the nature of the COVID-19 crisis, contact-intensive sectors felt the deepest economic pain, in terms of wage as well as employment losses. Since many of these sectors were male-dominated fields, the men—especially older men with lesser education and in middle-skill occupations—suffered the most initially. Third, while the recovery a year into the pandemic was patchy in terms of employment, the trend in real wages during this period was generally less favorable for women, particularly young females who had just entered the workforce and those with middle-skill and high-skill jobs, as they had to endure real wage cuts. Male workers, on the other hand, saw a recovery of their real daily pay a year after the lockdowns, with the increase largely driven by outcomes in the rural sector, which in turn largely reflected an uptick in real wages in the agriculture sector.

The experience of agriculture during the COVID-19 crisis had evidently been a unique one in the Philippines, with the sector's employment share increasing, temporarily interrupting a declining trend that had persisted over the last 15 years (IMF 2021). Rather than productivity and wage differentials, Cerutti and Li (2021) emphasize the role of education and transport infrastructure in driving agriculture employment outflows and labor reallocation from agriculture to non-agriculture sectors.

In our research, we saw the agriculture sector helping buffer employment losses in the non-agriculture sector during the initial phase of the pandemic crisis, absorbing workers particularly from construction and services, as originally observed in other studies such as Debuque-Gonzales (2022). However, our estimations additionally show that while the probability of agriculture employment generally rose at the onset of the pandemic, the probability of wage employment in the sector declined, indicating a growing number that had moved from urban to rural areas and shifted to nonwage employment, and ultimately engaged in either self-employment or unpaid farm work.

Interestingly, we also saw simultaneous recovery in wage employment and real daily wages in agriculture in the latter phase of the pandemic (by April 2021), revealing a rise in demand in the sector during the period. In addition to agriculture being a low-contact sector where social distancing is naturally observed and where essential items are produced, the sector also received fiscal support from government, whether directly or indirectly, through relief and stimulus packages (particularly under the Bayanihan I and II laws) and private sector support from large food corporations in the form of guaranteed purchases of agriculture products and provision of sales outlets. With many households practicing social distancing, the agriculture sector also seemingly benefited from household budget substitutions, away from nonfood and toward greater food consumption.

The Philippine government's labor market policy responses to the COVID-19 crisis included broad social protection programs to help displaced workers;[17] efforts to encourage a private-sector-led economic recovery through lower corporate taxes and improvements in the business environment; and institutionalization of the National Employment Recovery Strategy (NERS), which serves as the government's masterplan for revival of the labor market (World Bank 2021). The NERS, which was conceived in early 2021, aims to create a policy environment that encourages job creation and entrepreneurship; improve the employability and productivity of workers; and provide support to existing and emerging businesses (Bureau of Labor and Employment 2022). Its framework entails restarting economic activity; restoring confidence in the economy; upskilling and reskilling the workforce; and easing labor market access.

Findings of this study clearly support these goals, as the deepest economic scars created by the COVID-19 pandemic crisis have been on the country's human capital. There is undoubtedly a need for active labor market policies to reskill workers, especially the long-term unemployed, and run livelihood and training programs amid widespread job losses; and to provide social protection for vulnerable workers, including the informally employed, given the sharp rise in self-employment. Scarring effects can also be reduced through better sector reallocation of workers, which would also entail investments in education and infrastructure, based on pre-pandemic labor trends in the Philippines (Cerutti and Li 2021).

In the event of another pandemic (or similar disaster), meanwhile, policy implications of this study are that the heterogeneous effects of such a crisis would certainly warrant a more focused fiscal response. This would entail targeting specific sectors and types of individuals, who are most likely to face the harshest labor market conditions, marked by the deepest employment and wage falls. While greater insurance for the unemployed may seem desirable under such scenarios, any such mechanism would have to be carefully designed and weighed against its fiscal cost.

[17] From the *Bayanihan I* law, social protection included the Social Amelioration Program that provided cash aid to low-income households, thus covering unemployed and informal sector workers; programs meant to prevent unemployment from swelling because of the lockdowns, such as the COVID-19 Adjustment Measures Program (CAMP) and the Small Business Wage Subsidy for vulnerable workers implemented by the Social Security System; and off-budget credit guarantees for small businesses and support for the agriculture sector. The *Bayanihan II* law meanwhile included expansion of the labor department's cash-for-work program called TUPAD (*Tulong Panghanapbuhay sa Ating Disadvantaged/Displaced Workers*), implementation of the Emergency Repatriation Program for overseas workers, and hiring and training of contact tracers by the Department of Interior and Local Government.

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Appendix

Table A1. Number of observations in the daily working hours regressions

Group	All sexes		Males		Females	
	Apr. 2019 and Apr. 2020	Apr. 2020 and Apr. 2021	Apr. 2019 and Apr. 2020	Apr. 2020 and Apr. 2021	Apr. 2019 and Apr. 2020	Apr. 2020 and Apr. 2021
All	124,717	133,736	6,569	80,470	48,148	53,266
Urbanization						
Rural	69,090	71,033	43,852	44,140	25,238	26,893
Urban	55,627	62,703	32,717	36,330	22,910	26,373
Age group						
15 - 24	17,934	19,468	11,586	12,518	6,348	6,950
25 - 44	58,095	61,170	36,428	37,555	21,667	23,615
45 - 64	41,909	45,319	24,714	26,108	17,195	19,211
65 and over	6,779	7,779	3,841	4,289	2,938	3,490
Education						
No grade completed	1,877	2,073	1,248	1,355	629	718
Elementary level	32,748	33,788	22,955	23,304	9,793	10,484
High school level	52,113	55,425	33,582	34,995	18,531	20,430
Post-secondary level	6,950	5,804	3,938	3,297	3,012	2,507
College level or higher	31,029	36,646	14,846	17,519	16,183	19,127
Sector						
Agriculture	35,139	39,223	26,575	28,935	8,564	10,288
Mining and quarrying	617	709	562	633	55	76
Manufacturing	8,480	8,698	5,112	5,290	3,368	3,408
Electricity, gas, steam, and AC supply	263	246	223	194	40	52
Water supply, sewerage, and waste management	168	172	143	142	25	30
Construction	10,804	11,139	10,591	10,901	213	238
Wholesale and retail trade and repair	23,728	27,509	8,719	10,068	15,009	17,441
Transportation and storage	9,113	8,634	8,786	8,270	327	364
Accommodation and food	4,724	4,177	2,214	1,925	2,510	2,252
Information and communication	987	1,012	647	662	340	350
Finance and insurance	1,522	1,678	650	731	872	947
Real estate	469	513	214	223	255	290
Professional, scientific, and technical	736	779	362	354	374	425
Administration and support	4,666	4,892	2,938	3,021	1,728	1,871
Public administration	9,818	9,861	5,056	5,130	4,762	4,731
Education	3,736	4,414	991	1,143	2,745	3,271
Human health and social work	1,580	1,762	501	552	1,079	1,210
Arts, entertainment, and recreation	868	672	496	350	372	322
Other services	7,299	7,646	1,789	1,946	5,510	5,700
Class of work						
Wage employment	74,006	77,171	46,704	48,591	27,302	28,580
Self-employment	41,839	45,545	26,334	27,586	15,505	17,959
Unpaid family work	8,872	11,020	3,531	4,293	5,341	6,727
Skill level						
Low	33,878	37,951	22,039	24,329	11,839	13,622
Medium	65,486	71,140	43,226	45,597	22,260	25,543
High	25,353	24,645	11,304	10,544	14,049	14,101

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).

Table A2. Number of observations in wage regressions

Group	All sexes		Males		Females	
	April 2020	April 2021	April 2020	April 2021	April 2020	April 2021
All	64,145	62,719	39,852	38,473	24,293	24,246
Urbanization						
Urban	36,201	36,609	21,794	21,786	14,407	14,823
Rural	27,944	26,110	18,058	16,687	9,886	9,423
Age group						
Ages 15-26	36,201	36,609	21,794	21,786	14,407	14,823
Ages 25-46	27,944	26,110	18,058	16,687	9,886	9,423
Ages 45-66	17,014	16,850	10,374	10,081	6,640	6,769
Ages 65 and over	1,062	1,130	636	625	426	505
Education						
No grade completed	389	365	303	275	86	90
Elementary level	11,646	10,531	8,689	7,782	2,957	2,749
High school level	26,307	24,925	18,292	17,378	8,015	7,547
Post-secondary level	4,132	3,037	2,476	1,868	1,656	1,169
College level or higher	21,671	23,861	10,092	11,170	11,579	12,691
Occupation group						
Managers	1,847	1,668	1,017	875	830	793
Professionals	6,433	6,790	2,151	2,219	4,282	4,571
Technicians & associate professionals	3,465	3,470	1,876	1,876	1,589	1,594
Clerical support workers	6,892	7,114	2,817	2,969	4,075	4,145
Service & sales workers	11,952	11,704	6,309	6,226	5,643	5,478
Craft & related trades workers	7,004	6,064	6,244	5,461	760	603
Plant & machine operators & assemblers	4,184	3,733	3,609	3,185	575	548
Elementary occupations	22,340	22,145	15,803	15,636	6,537	6,509
Skill level						
Low-skilled	22,340	22,145	15,803	15,636	6,537	6,509
Medium-skilled	30,060	28,646	19,005	17,867	11,055	10,779
High-skilled	11,745	11,928	5,044	4,970	6,701	6,958
Sector						
Agriculture	6,866	6,571	5,500	5,241	1,366	1,330
Manufacturing	6,216	5,742	3,970	3,715	2,246	2,027
Mining & quarrying	387	390	355	354	32	36
Electricity, gas, steam & AC supply	260	235	222	185	38	50
Water supply, sewerage, waste mgt.	156	142	132	118	24	24
Construction	10,467	10,124	10,267	9,915	200	209
Wholesale & retail trade	7,584	7,698	4,048	4,178	3,536	3,520
Transportation & storage	2,840	2,699	2,604	2,419	236	280
Accommodation & food	3,440	2,789	1,799	1,429	1,641	1,360
Information & communication	820	837	547	544	273	293
Financial & insurance	1,393	1,490	601	647	792	843
Real estate	236	228	109	98	127	130
Professional, scientific & technical	645	632	300	270	345	362
Administration & support	4,539	4,636	2,866	2,883	1,673	1,753
Public administration	6,800	6,533	3,663	3,548	3,137	2,985
Education	3,645	4,213	962	1,092	2,683	3,121
Human health & social work	1,429	1,538	467	492	962	1,046
Arts, entertainment & recreation	504	358	266	177	238	181
Other services	5,918	5,864	1,174	1,168	4,744	4,696

Source: Authors' calculations using public use files of the Labor Force Survey (Philippine Statistics Authority 2021d).