The Impacts of COVID-19 on Migrants, Remittances, and Poverty in China: A Microsimulation Analysis

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Abstract

Chinese migrant workers are very exposed to the shocks caused by the COVID-19 pandemic. Falling remittances adversely affect their families who rely on remittance incomes. The impacts of COVID-19 on migrants and remittance-receiving households are assessed using a nationally representative household dataset and a microsimulation model. We found about 70 percent of migrant workers lost part of their wage income during the pandemic lockdown period and rural migrants working in small and medium enterprises were affected the most. This led to about 50 percent of remittance-receiving households being affected adversely by falling remittances, and the average decline in such income was more than 45 percent. Nearly 13 percent of pre-pandemic nonpoor remittance-receiving households could fall into poverty, raising the poverty rate among remittance-receiving households by 4 percentage points. Many households that were poor prior to the pandemic became more impoverished. The results indicate that social protection programs targeting vulnerable migrants and their families at home are important.

Keywords: China, COVID-19, microsimulation, migrants and remittances, poverty

JEL Codes: O15, O53, P25

I. Introduction

The COVID-19 pandemic has had an unprecedented impact on many countries’ economies, businesses, households, and livelihoods, and China was the first country

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affected by the pandemic. Chinese state and local governments adopted a series of stringent policies to contain the spread of the virus, including a mandatory lockdown in late January 2020, the suspension of public transport nationwide, and travel restrictions, particularly in cities. Many factories were shut down, nonessential businesses were closed in most cities, and market activities were restricted in rural areas. These policies successfully contained the spread of the virus (Tian et al., 2020), but the closure of businesses and restrictions on the mobility of people and goods largely shut down much of the Chinese economy in late January and February 2020. China’s GDP dropped sharply, by 6.8 percent in the first quarter of 2020 compared with the same period of 2019 (NBS, 2020a). Many industries, including construction, manufacturing, trade, transportation, and hotel and catering services, were more negatively impacted. Starting in early March 2020, with the spread of COVID-19 largely under control, China gradually reopened the economy. The GDP grew by 3.2 percent, 4.9 percent, and 6.5 percent in the second, third, and fourth quarters of 2020, respectively, and the annual GDP growth rate was 2.3 percent in 2020 (NBS, 2021a). China’s economy continued a steady recovery in the first six months of 2021, with a year-on-year increase of 12.7 percent in this period using constant prices, with a two-year average growth rate of 5.3 percent (NBS, 2021b).

The disruption to economic activity in the early months of 2020 affected household incomes but on a smaller scale than its effect on GDP, given that employees in the public sector and large state-owned enterprises continued to be paid during the lockdown. According to the NBS, The average per capita disposable income fell by 3.9 percent nationwide in the first quarter of 2020 (NBS, 2020a). The recovery in the growth in residents’ income correlated with the broad economic recovery from the second quarter of 2020, and per capita disposable income grew at 2.1 percent annually in 2020. Urban residents’ per capita disposable income grew more slowly than that of rural residents in 2020, with annual real growth rates of 1.2 percent in urban areas and 3.8 percent in rural areas, respectively. This was mainly because rural households’ business income increased in 2020, while it fell among urban households (NBS, 2021c). In the first six months of 2021, Chinese residents’ per capita disposable income increased by 12.6 percent compared with that in 2019, and the average 2-year growth in 2020 and 2021 was 5.2 percent in this period (NBS, 2021b). However, these averages do not reflect the heterogeneous impact of the economic lockdown on individual households, and income losses for the households working in non-public sector, and non-state-owned enterprises can be much larger than the national average.
Zhang and Liu (2020) looked at the impact of COVID-19 on the Chinese labor market based on the tracking survey data of over 5,000 employees in the first half of 2020, and found that 20 percent of them lost their jobs by the middle of June. Among these, 11 percent were unemployed, 4 percent were waiting for work to resume, and 5 percent were insufficiently employed during the COVID pandemic. The average monthly earnings of all employees were reduced by 15 percent. Wang et al. (2021) conducted three rounds of interviews with informants from 726 villages in seven provinces, and they found that 31 percent of rural workers who had jobs in 2019 were not working by late April of 2020. The heterogenous effect of COVID-19 across households motivates us to use microdata at the household level to assess such effects.

Against this background, this paper focuses on the impacts of COVID-19 on migrants and their families. It is well known that China’s sustainable and rapid economic growth has been accompanied by large-scale rural-to-urban migration in the past four decades (Cai and Wang, 2008; Tombe and Zhu, 2019). Migrant workers accounted for close to 38 percent of the total labor force in 2019, and the number of migrant workers was about 290 million, of which 170 million were rural migrants who left their rural hometowns to work in cities (NBS, 2020c). Large-scale rural–urban migration has contributed not only to China’s rapid economic growth but also to a reduction in rural poverty (Ravallion and Chen, 2004; Du et al., 2005). Remittance incomes from rural migrants also helped to narrow the urban–rural income gap and improve income distribution (Luo et al., 2020).

However, rural migrants face many challenges that urban resident workers are unlikely to have. For example, rural migrants are excluded from access to subsidies on urban housing and often need to pay extra fees for their children to access public schools in cities. Institutional barriers caused by the hukou system can also lead to migrants falling into poverty (Huang and Tao, 2015; Li and Liu, 2018), particularly due to lack of access to health insurance and medical care (Gao et al., 2012). With relatively low wage earnings and high spendings on housing, health, and children’s schooling, migrants have been more vulnerable to external shocks, particularly during the COVID-19 pandemic. Impacts on migrants’ wages also affect their family members living in hometowns when migrants cannot save and send enough remittances back home to help their families cope with unexpected shocks (Cui et al., 2015; Zhang et al., 2016). Migrants are highly susceptible to the COVID-19 pandemic everywhere in developing countries (Food and Agriculture Organization, 2020; International Labour Organization, 2020; World Bank, 2020a), and this is also true for migrants in China. Their vulnerability is compounded by three factors.
First, travel and movement restrictions between late January and mid-March in 2020 disproportionately affected rural migrants, who were stuck in rural areas during the Chinese New Year, which was in late January in 2020. Because they were unable to return to the cities where they worked, they continued to lose income, even after their firms started to reopen. Many migrants working in small and medium-sized enterprises (SMEs) were unable to return to their previous work, as these firms were unable to meet COVID-related safety requirements set by local governments and hence were unable to resume operation. Most cities also required migrants to self-quarantine for 14 days after they managed to return, imposing a significant financial burden on workers and their companies, ultimately leading companies to reduce the number of migrant workers brought back to work. According to the National Bureau of Statistics of China (NBS, 2020a), migrant workers who returned to their work in cities declined by 30 percent at the end of February 2020 compared with the same period in 2019.

Second, a considerable number of migrants are low-skilled workers with a high level of informality in their jobs. One NBS survey conducted in 2016 shows that only 35 percent of migrant workers have a written employment contract (China Labor Bulletin, 2020). Without employment contracts, many migrant workers are treated as temporary employees without a job and income security and are unable to access employment protections (Qian and Li, 2013). A report published by the Ministry of Human Resources and Social Security (MOHRSS) shows that only 17 percent of migrant workers had unemployment insurance in 2017, compared with 44 percent for urban resident workers (MOHRSS, 2018).

Third, migrants work primarily in construction, manufacturing, hotel, catering, and other services, the sectors that have been disproportionately affected by COVID-19-related policy restrictions (NBS, 2020c). The value-added of construction and manufacturing contracted by 17.5 percent and 10.2 percent, respectively, in the first quarter of 2020 (NBS, 2020b). The most labor-intensive service sectors, such as wholesale and retail, and hotels and restaurants, with a total of 55 million migrant workers in 2019, saw an unprecedented decline in output in the first quarter, 17.8 percent and 35.3 percent, respectively, for wholesale and retail, hotels, and restaurants. While manufacturing and the service sectors have shown signs of recovery in the second quarter, the wholesale and retail, hotels and restaurants, and manufacturing sectors continued to contract, and their value added declined by 8.1 percent, 26.8 percent, and 1.4 percent, respectively, in the first six months of 2020 (NBS, 2020b).
The COVID-19 pandemic affects not only migrant workers but also their families who rely on remittances as an important source of income, especially in rural areas. Hu and Shi (2013) estimated that migrants have typically sent home about 50–70 percent of their earnings since the 1990s. The China Family Panel Studies (CFPS) data used in this study indicated that remittances accounted for about 30 percent of total household income for the households with migrants in 2018. Remittances are also an important factor for keeping some rural households out of poverty. Cai and Du (2006) showed that the poverty incidence for households receiving remittance income reduced from 67.1 percent to 49.2 percent (using rural household survey data from four poor counties in western China). It can be expected that some rural households could fall back into poverty due to reductions in remittances caused by the pandemic.

The challenge, when trying to understand the economic impact of the pandemic beyond aggregate GDP and total unemployment, is the lack of available microdata. Information is often only available with a long time lag. The NBS has conducted a survey of rural migrant workers for 2020 and published a summary report. The report shows that the number of migrant workers decreased by 1.8 percent year-on-year in 2020 (NBS, 2021d). However, the data from this survey at the individual or household level are not available to the public. Because of the lack of such official data, we assessed the impacts of COVID-19 on China’s migrant workers and their households using a microsimulation model. This paper complements the macro-level assessments of the shocks resulting from COVID-19 (Zhang et al., 2020). Unlike existing studies in the literature on COVID-19 impacts in China, the most important innovation in our paper is to focus on the differential and distributional impacts of COVID-19 across individual migrant workers and their families in hometowns using a national representative survey dataset. We found that about 70 percent of Chinese migrants were affected adversely, and rural migrants working in micro, small, and medium enterprises were mostly affected. This indicates that nearly 50 percent of households that received remittances were affected, and their remittances fell by more than 45 percent during the lockdown period. Negative income effects from falling remittances led to a rise in the poverty rate among remittance-receiving households, making households that were already poor before the pandemic more impoverished. Social protection programs that can target vulnerable households are very important. The rest of the paper is organized as follows. Section II describes the data used in the study. Section III presents the microsimulation model and scenarios. Section IV discusses the model’s results, and Section V concludes with a discussion of policy implications.
II. Profiles of China’s migrants and remittances – description of the data

The data from which a microsimulation model was developed for this study were part of a dataset of the CFPS, conducted by the Institute of Social Science Survey, Peking University. The CFPS is a nationally representative household panel survey conducted since 2010, and data from the latest round of the survey in 2018 are used for this study. One unique merit of the CFPS is that questionnaires cover information at both household and individual levels, which includes detailed information about employment location, sector, type of job, and wage income of each member within the surveyed households. The CFPS sampled 14,960 households and 33,221 individuals in rural and urban areas. The survey covers 25 provinces, which represent 95 percent of China’s population (Xie et al., 2017). The household questionnaires also provide employment profile information on their migrated family members. Based on such information, we identified a sample of 5,869 households with 3,391 rural migrants and 2,605 urban migrants.

Table 1 presents the major characteristics of migrant workers captured by the CFPS. Migrants are classified into four categories of employees: (i) interprovincial migrants; (ii) intraprovincial and cross-city migrants; (iii) intraprovincial and cross-county migrants, and (iv) within-county migrants. As shown in Table 1, within-county migration dominates both rural and urban migrants, while rural migrants are more likely to undertake interprovincial jobs than urban migrants. Intraprovincial and cross-city and cross-county migrants account for 14 percent of total rural migrants respectively. More urban migrants are cross-county migrants than cross-city migrants. More than two-thirds of rural migrants are male, while less than two-thirds of urban migrants are male.

Only about one-third of rural migrants and 43 percent of urban migrants have signed employment contracts. Migrants work predominantly for micro and small private enterprises including individual or family-owned businesses.

Figure 1 presents the sector distribution of migrant and nonmigrant employees. Compared with nonmigrants, migrants are disproportionally concentrated in manufacturing and construction, the two primary sectors that have been badly adversely affected by the COVID-19 shocks. With regard to those working in hotels and catering, transportation, and household services, which were also hit badly by the COVID-19 shocks, the proportion of workers who were migrants is also higher than the proportion who were nonmigrants.

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1The website of the project can be found at https://opendata.pku.edu.cn/dataverse/CFPS (online; cited October 6, 2021).
Table 1. Characteristics of migrant workers in China (%)

| Working locations of migrants          | Rural | Urban | National |
|---------------------------------------|-------|-------|----------|
| Interprovince                         | 19    | 13    | 16       |
| Intraprovince and cross-city          | 14    | 13    | 13       |
| Intraprovince and cross-county        | 14    | 17    | 15       |
| Intracounty                           | 53    | 58    | 55       |

| Gender | Rural | Urban | National |
|--------|-------|-------|----------|
| Female | 32    | 36    | 34       |
| Male   | 68    | 64    | 66       |

| Age     | Rural | Urban | National |
|---------|-------|-------|----------|
| Below 20| 5     | 4     | 4        |
| 21–30   | 33    | 32    | 33       |
| 31–40   | 25    | 24    | 25       |
| 41–50   | 22    | 22    | 22       |
| Above 50| 15    | 18    | 16       |

| Highest level of education            | Rural | Urban | National |
|---------------------------------------|-------|-------|----------|
| Primary                               | 44    | 32    | 40       |
| Junior high                           | 40    | 39    | 40       |
| Senior high/vocational                | 13    | 20    | 16       |
| College and above                     | 3     | 8     | 5        |

| Whether there is a contract           | Rural | Urban | National |
|---------------------------------------|-------|-------|----------|
| Yes                                   | 35    | 43    | 39       |
| No                                    | 65    | 57    | 61       |

| Size of employers                     | Rural | Urban | National |
|---------------------------------------|-------|-------|----------|
| Micro                                 | 39    | 41    | 40       |
| Small                                 | 42    | 39    | 40       |
| Medium                                | 12    | 11    | 12       |
| Large                                 | 7     | 9     | 8        |

| Type of employers                     | Rural | Urban | National |
|---------------------------------------|-------|-------|----------|
| Government departments                | 2     | 2     | 2        |
| Public institution                    | 2     | 3     | 3        |
| State-owned enterprise                | 6     | 9     | 8        |
| Private enterprise                    | 74    | 71    | 72       |
| Other enterprise                      | 6     | 8     | 7        |
| Individual/family-owned business      | 10    | 7     | 8        |

Source: Authors’ own calculation using data from the China Family Panel Studies (2018 wave).
Note: Microfirms are those with 1–10 employees, small firms are those with 11–100 employees, medium firms are those with 101–300 employees, and large firms are those with more than 300 employees.
Figure 2 displays the percentages of national, rural, and urban households with migrants or remittance incomes by income quintiles. At the national level, 42 percent of households either have migrants as family members or received remittance incomes. The share is much higher for rural households (54 percent) than for urban households (30 percent). Figure 2 also shows that rural households with migrants or remittances tend to be concentrated in the low-income (Q2) and middle-income quintiles (Q3), in which more than 60 percent of rural households have migrants or remittance income. The share is low for the poorest quintile (Q1), at 37 percent. Urban households have a similar pattern – i.e. households belonging to low- and middle-income quintiles have higher shares of migrants or remittance incomes than households in the poorest quintiles. Migrants and remittance incomes may be an important factor keeping many rural and urban households out of poverty.

Figure 3 displays the percentage of poor and low-income households in total households compared with remittance-receiving households. We define the poor by relative poverty and use RMB7,500 per year as the poverty line, which is half of the median annual per capita income for national total households. With this definition, almost all households in the lowest income quintile (Q1) are poor. At the national level, remittance-receiving households are slightly less poor than households as a whole, and this is particularly true for rural remittance-receiving households, which are much less poor than rural households as a whole. The poverty rate is 32 percent for rural households as a whole, while it is 21 percent for remittance-receiving rural households.
The poverty rate among low-income households is similar between total households and remittance receivers for the country as a whole and for rural households.

Figure 2. Distribution of households with migrants or remittance incomes by income quintiles

![Figure 2](image)

Source: Authors’ own calculation using data from CFPS (2018).

Figure 3. Distribution of poor and low-income households: total versus remittance-receiving households

![Figure 3](image)

Source: Authors’ own calculation using data from the China Family Panel Studies (2018 wave).
Note: The total population of each household group = 100.

Figure 4 indicates that remittances are an important income source for remittance-receiving households. Remittances account for about 30 percent of total incomes for
remittance-receiving households nationwide. The share is high among rural low-income households in quintile 2 (30.5 percent), but it is higher for urban poor households in quintile 1 (34.9 percent). Remittances could thus be an important factor enabling rural households to stay out of poverty. Falling remittances due to the effects of COVID are therefore expected to have a significant poverty impact for rural low-income households.

Figure 4. Percentage of remittance income in total income for remittance-receiving households by income quintile

Source: Authors’ own calculation using data from the China Family Panel Studies (2018 wave).

III. Methodology and scenario design

1. Methodology

Simulation techniques are important tools for understanding the possible impacts of shocks or crises on the economy or households when actual data are not available. Macrosimulation models such as social accounting matrix (SAM) multiplier models or computable general equilibrium (CGE) models are often used to assess the economy-wide impacts of shocks and policies on the aggregate economy. Microsimulation models are often used in combination with macro models to capture the transmission of macro-level or economy-wide impacts at the micro-level across individual households and to assess the distributional effects. Moreover, outcome data for individual households are not easily obtained without a household survey after the shock, limiting its timeliness. In practice, macro–micro simulation models are used widely in poverty assessments of various policies and external shocks. These macro–micro simulation tools are quite diverse and vary depending on the objective of the study, the availability of data,
and the compatibility of microdata with the macro data applied (Estrades, 2013). In the literature, macro–micro simulations are applied widely to analyze the impacts of policies, public investments, and demographic changes (among others) on household income distribution and poverty reduction (Zhang et al., 2013; Wang et al., 2016).

A SAM multiplier model was used to assess the potential economy-wide impacts of COVID-19 on China’s economy in an earlier study (Zhang et al., 2020). In this paper, we focus on the micro-level impacts of COVID-19 and develop a microsimulation model for this purpose. Similar shocks imposed in the SAM multiplier model in Zhang et al. (2020) are applied to the microsimulation model but at a much more diverse level across different types of household groups. We first provide a highlight of the SAM multiplier model and its analysis in Zhang et al. (2020) in the subsection below, followed by a more detailed discussion about the microsimulation model and simulation design in the current study.

(I) The macrosimulation model

A SAM is a matrix that shows the full economic circular flow of goods and services around the economy, corresponding incomes, and expenditures of all economic actors. The SAM integrates the input–output accounts with the national income and product accounts. In Zhang et al. (2020), China’s most recent SAM for 2017 is used to assess the economy-wide impact of COVID-19 on China’s economy. The 2017 SAM has 149 economic sectors, while it includes only two aggregate households (rural and urban). The original 2017 SAM has only a single aggregate account for labor, while Zhang et al. (2020) disaggregate it into two types of labor: skilled and less-skilled labor.

Like most commonly used SAM multiplier models, there are two key assumptions in modeling COVID-related economywide impacts on production, sectoral, total GDP, and employment. First, intermediate input demand is in fixed proportion to sectoral output (i.e. all input–output coefficients are fixed), and technology and preferences are linear. Second, prices are fixed and adjustments to shocks work through changes in quantities, not prices. Exogenous shocks are also imposed on the demand side of the SAM to generate the endogenous effects through the multiplier linkages on the supply side. These assumptions, while strong, are reasonable for an analysis of the impact of the COVID-19 pandemic. The shocks we observed are working through the economy in weeks or months, not years. In such a short period, it is unlikely that production technologies are changed significantly by the pandemic. In the short run, the pandemic will not cause significant changes in relative prices or wages of employed labor. There appear to be some price increases as a result of profiteering but they have not acted as incentives to stimulate production because, in the short run, the shocks inhibit the
ability of markets to adjust to a new equilibrium through endogenous price adjustment processes. The multiplier models provide “what if” projections of a variety of economic indicators given a specified scenario. The results of the scenario analysis are not “forecasts” of the future and should be explained as a counterfactual comparative statics exercise against a normal situation without COVID-19. A consistent empirical model is useful for conducting such counterfactual assessment as it provides a disciplined framework for analysts, which can support coherence in policy debates.

In Zhang et al. (2020), there are four scenarios designed to assess the impacts of COVID-19 on China’s economy in three periods of 2020: (i) the lockdown period between the last week of January and the first week of March; (ii) a period of economic reopening and recovery defined for the remaining weeks of March through the middle of the third quarter; and (iii) a period of returning to normal where the economy almost recovered to its pre-COVID situation for the remaining time in 2020. In the third period, given the uncertainty of global export demand due to the spread of COVID-19, two scenarios are considered: one with export demand remaining at a low level and the other with export demand recovering at a similar pace to domestic demand to near the pre-COVID level.

(2) The microsimulation model
In this paper, we further assess the impacts of COVID-related shocks modeled in Zhang et al. (2020) on China’s household income distribution using a microsimulation model. The analysis focuses specifically on households with migrants and remittance incomes. There are many ways to link a microsimulation model to results from a macro-level model in the literature. Two approaches are usually used. The first approach treats the two models as two layers, and the second approach integrates the two models completely (Davies, 2004, 2009). The fully integrated models yield important insights and are theoretically appealing, whereas the layered models can be better able to capture the peculiarities of real-world behavior and constraints, especially in the short run. The approaches should thus be viewed as complements rather than substitutes (Davies, 2004).

In this study, a top-down approach is used for the microsimulation model to capture the impacts of COVID-19 on individual households and the changes in income distribution and poverty. The results from the SAM multiplier model in Zhang et al. (2020) are fed into the microsimulation model as exogenous shocks. As there are only two aggregate rural or urban households with incomes from economy-wide aggregate factors in the SAM model, the macro results of changes in household income are less relevant to the current microsimulation study, which emphasizes heterogeneity in sources of household incomes and the types of enterprises where family members are employed. Thus, declines in labor demand at the sector level due to the disruption of
sectoral production in the SAM multiplier model are applied to enterprises belonging to these sectors as shocks on the wage incomes of their employees. Figure 5 illustrates the link from the macro model to the microsimulation model in assessing the impacts of COVID-19 on China’s economy and households.

Figure 5. An illustration of macrosimulation and microsimulation models

2. Scenario design
Exogenous shocks in the macro (SAM-multiplier) model are imposed on final demand, including consumption and investment, which generates shocks on the supply side that capture both the direct and indirect effects through intersectoral linkages and linkages with different economic agents. Impacts on incomes of the two aggregate households in the SAM multiplier model are part of the endogenous results associated with declines in production that lower demand for labor and other factors. However, in the SAM multiplier model, there are only two aggregate household groups by rural and urban location and two aggregate labor categories defined by skills. To capture differential impacts in the microsimulation model across households, particularly among households with migrants and remittances, we need to use the sectoral level information from the SAM multiplier model fully in designing shocks in the microsimulation model; that is, labor demand falls differentially across sectors in the SAM multiplier model because the direct and indirect linkage effects in the multiplier model differ across sectors. Moreover, the household survey data used in the microsimulation model capture not only information related to the sectors in which a worker is employed, but also the type and size of the enterprise she or he works for – for example, state-owned or private firms; small, medium or large firms; and other variations in the types of employment and incomes. We transfer the differential sectoral-level results in labor demand from the SAM multiplier model as different shocks on wage incomes earned from different types and sizes of enterprises across different industrial and service sectors.
Specifically, in the microsimulation model, we assume that wage incomes of public-sector employees are not affected. We further assume that incomes for migrant workers working for state-owned enterprises and large firms are not affected. Many of these enterprises stopped operation during the lockdown, but their employees, including migrant workers, continued to receive salary payments. Only migrant workers working in micro, small, and medium-sized private enterprises in the affected sectors are assumed to have been adversely affected in terms of their incomes in the microsimulation model. The ESIEC survey showed that the outbreak of COVID-19 and the lockdowns took a heavy toll on SMEs. Eighty percent of SMEs were closed in February 2020. Most SMEs reopened by May 2020, but many firms were running at partial capacity. Their survey results also showed around 19 percent of incorporated enterprises and 25 percent of self-employed businesses had permanently closed. We further assume that migrant workers in micro-enterprises, which are defined as those with less than 11 employees, were affected the most, followed by those working in small enterprises with 11–100 employees, while a relatively modest shock is assumed for those working in medium-scale enterprises with 101–300 employees.

As in the SAM multiplier analysis in Zhang et al. (2020), we consider different impacts on household income distribution and poverty in the three different periods through 2020, which were introduced in subsection I.1. For the third period, with the microsimulation model, we only consider the scenario in which the economy will not fully recover due to export demand that is unlikely to return to normal with the global COVID-19 situation. We rename the second and third scenarios in the microsimulation model as slow-recovery and fast-recovery scenarios.

The detailed assumptions of the shocks under the three phases (scenarios) on different industrial and service sectors among the different-sized private enterprises are presented in Table 2. Only the sectors that are negatively affected are reported. These include a few service sectors such as hotel and catering, transportation, wholesale and retail, cultural, sport and entertainment, rent services, and household services, and three industrial sectors (i.e. mining, manufacturing, and construction). We also assign different weights of shocks by firm size. For microfirms in the affected sectors, the full shocks are imposed with a weight of 1.0, while the weights for small and medium private enterprises in the affected sectors are 0.9 and 0.7 respectively, i.e. the shocks are 10 percent and 30 percent lower for small and medium private enterprises, respectively, than for micro firms in the same sectors.

Shocks are directly imposed on the wage incomes of migrant workers working in the affected sectors and private enterprises (excluding large firms). Taking micro firms as an example, in the lockdown period, migrant workers’ incomes are assumed to have
fallen by 43 percent in hotel and catering, 39 percent in manufacturing, and 37 percent in construction – the three most affected sectors both in the SAM multiplier model and in the microsimulation. The negative income shocks in culture, sport, entertainment, transportation, rent services, household services, and mining range between 25 percent and 28 percent, and they are 20 percent for wholesale and retail. In the second phase of the slow recovery scenario, only two sectors, mining and rent services, are assumed to return to normal and hence incomes for migrants working in these two sectors return to the pre-lockdown level. For most other sectors, the recovery has started with shocks becoming smaller than in the lockdown period. In general, the negative shocks are 4–8 percent for the four service sectors, while the negative shocks are still as high as 18–27 percent for construction, manufacturing, and hotel/catering. In the third phase, with a fast recovery, wage incomes in five sectors have returned to normal. However, considering the uncertainty in global markets, negative shocks on incomes from manufacturing, construction, hotel and catering, culture, sport and entertainments still exist, ranging from 14 percent for manufacturing to 9 percent and 10 percent for construction and hotel and catering respectively. The survey data used for the analysis also report self-employed nonfarm businesses without identifying the sectors of such businesses. For such migrants, we assume their incomes fall by 30 percent during the lockdown, 10 percent in the second phase with slow recovery, and 5 percent in the third phase with faster recovery (not shown in Table 2).

Table 2. Exogenous shock assumptions in the three scenarios (percentage changes in migrant wage incomes in the affected sectors by firm size)

| Enterprise          | Micro-scale private enterprise | Small-scale private enterprise | Medium-scale private enterprise |
|---------------------|--------------------------------|--------------------------------|--------------------------------|
| Sector              | Phase 1 Lockdown | Phase 2 Slow recovery | Phase 3 Fast recovery | Phase 1 Lockdown | Phase 2 Slow recovery | Phase 3 Fast recovery | Phase 1 Lockdown | Phase 2 Slow recovery | Phase 3 Fast recovery |
| Mining              | −27               | 0                          | 0                          | −25               | 0                          | 0                          | −19               | 0                          | 0                          |
| Manufacturing       | −39               | −20                        | −14                        | −35               | −18                        | −13                        | −27               | −14                        | −10                        |
| Construction        | −37               | −18                        | −9                         | −33               | −16                        | −8                         | −26               | −12                        | −6                         |
| Transportation      | −27               | −4                         | 0                          | −24               | −3                         | 0                          | −19               | −3                         | 0                          |
| Wholesale and retails | −20              | −8                         | 0                          | −18               | −7                         | 0                          | −14               | −6                         | 0                          |
| Hotel and catering  | −43               | −27                        | −10                        | −38               | −24                        | −9                         | −30               | −19                        | −7                         |
| Rent services       | −25               | 0                          | 0                          | −22               | 0                          | 0                          | −17               | 0                          | 0                          |
| Household services  | −25               | −4                         | 0                          | −22               | −3                         | 0                          | −17               | −3                         | 0                          |
| Culture, sport, and entertainment | −28 | −5                         | −2                        | −25               | −4                         | −2                        | −20               | −3                         | −2                        |

Source: Authors’ own design.

Note: There is no shock on incomes of migrants employed by the public sector, state-owned enterprises, and large private enterprises.
Based on the shocks reported in Table 2, about 70 percent of migrant workers in the sample are adversely affected nationwide during the lockdown period, 65 percent in the second phase with slow recovery, and 50 percent in the third phase with fast recovery. Table 3 presents percentages of affected migrants by gender, age, level of education, and size and type of employers. As expected, more male migrants are affected than female migrants, and the less educated are affected more. Migrants in the 41–50-year-old age group are affected the most, whereas those in the 21–30-year-old group are affected the least.

Table 3. Distribution of affected migrants by gender, age, education, firm size, and type of employers under the three scenarios (%)

|                         | Lockdown phase | Slow recovery phase | Fast recovery phase |
|-------------------------|----------------|---------------------|---------------------|
|                         | Rural | Urban | Rural | Urban | Rural | Urban |
| Gender                  |       |       |       |       |       |       |
| Female                  | 65    | 62    | 61    | 59    | 43    | 41    |
| Male                    | 77    | 69    | 71    | 64    | 60    | 50    |
| Age                     |       |       |       |       |       |       |
| Below 20                | 68    | 66    | 68    | 66    | 40    | 37    |
| 21–30                   | 62    | 56    | 58    | 49    | 41    | 31    |
| 31–40                   | 75    | 75    | 71    | 70    | 54    | 51    |
| 41–50                   | 84    | 75    | 78    | 69    | 71    | 59    |
| Above 50                | 72    | 64    | 61    | 60    | 56    | 49    |
| Highest education       |       |       |       |       |       |       |
| Primary                 | 79    | 75    | 74    | 72    | 63    | 59    |
| Junior high             | 73    | 69    | 66    | 63    | 52    | 43    |
| Senior high/vocational  | 57    | 54    | 53    | 47    | 38    | 36    |
| College and above       | 41    | 31    | 41    | 30    | 21    | 18    |
| Enterprise size         |       |       |       |       |       |       |
| Micro                   | 84    | 78    | 78    | 72    | 63    | 55    |
| Small                   | 75    | 67    | 69    | 63    | 59    | 52    |
| Medium                  | 69    | 65    | 67    | 60    | 39    | 30    |
| Large                   | 0     | 0     | 0     | 0     | 0     | 0     |
| Employer type           |       |       |       |       |       |       |
| Government departments  | 0     | 0     | 0     | 0     | 0     | 0     |
| Public institution      | 0     | 0     | 0     | 0     | 0     | 0     |
| State-owned enterprise  | 0     | 0     | 0     | 0     | 0     | 0     |
| Private enterprise      | 82    | 80    | 75    | 74    | 57    | 53    |
| Foreign-owned enterprise| 45    | 43    | 38    | 35    | 38    | 32    |
| Other enterprise        | 74    | 17    | 68    | 17    | 51    | 11    |
| Individual/family-owned business | 93 | 94 | 93 | 94 | 93 | 94 |
| Total                   | 73    | 67    | 67    | 62    | 54    | 47    |

Source: China microsimulation model results.
In Figure 6 we compare the aggregate effects on migrants’ incomes from the microsimulations with the aggregate effect on household income from the results of the SAM multiplier analysis in Zhang et al. (2020). In the SAM multiplier model, household income declined by 24.3 percent nationwide during the lockdown, and 2.4 percent and 0.2 percent in the second and third periods, respectively (the scenario with the export demand being continuously lowered in the third period is presented). In the microsimulation model, we did not consider shocks on nonmigrant workers and hence only reported the aggregate effects on migrant workers in Figure 6. These are higher than the total impact on household incomes observed in Zhang et al. (2020). During the lockdown period, income for migrant workers as a whole fell by 30.8 percent, and their incomes continued to be 13.2 percent and 7.2 percent lower than the pre-lockdown situation in the second and third recovery phases, respectively. The larger negative effects on migrants’ incomes are understandable given that most migrants work in microenterprises and small private enterprises in the strongly affected industrial and service sectors, and they were more vulnerable to the shocks caused by the COVID-19 pandemic. According to NBS’s rural migrant workers survey, the number of migrant workers and their average wage rate decreased by 30.6 percent and 7.9 percent, respectively, in February of 2020, and decreased by 2.7 percent and 6.7 percent at the end of the second quarter of 2020. The number of migrant workers continued to decrease by 2.1 percent at the end of the third quarter of 2020, but the average wage rate increased by 2.1 percent (NBS, 2020c). Thus, the simulation results captured the pattern of changes reported by the NBS survey. In the next section, we discuss further the heterogenous impacts of COVID-19 on migrants’ incomes, household remittance incomes, and poverty using the microsimulation model.

Figure 6. Aggregate income effects from COVID-19

Source: China SAM multiplier model and microsimulation model results.

Note: This figure shows the comparison of total household income for the SAM multiplier model and aggregate migrant income for the micro simulation model.
IV. Discussions of the microsimulation results

1. The direct impacts on migrants’ incomes

Migrant incomes are directly impacted in the microsimulation model following the assumptions of shocks presented in Table 2. Thus, Figure 7 focuses on the heterogeneity across households caused by sector and firm variation where the migrants work. Figure 7 uses the cumulative effects of falling migrant incomes to demonstrate the heterogeneity in income distribution across households. The $x$-axis is the percentage decline in migrants’ income compared with the level prior to the lockdown, while the $y$-axis is the cumulative percentage of households with migrants ranging from 0 to 100. The two dashed lines in the figure represent the situation for 50 percent and 80 percent of households with migrants respectively. As shown by the lower dashed line (which cuts through 50 percent along the $y$-axis), 50 percent of households were affected by the fall in migrant incomes, which declined by more than one-third during the lockdown period. The upper dashed line (which cuts through 80 percent along the $y$-axis) shows that 80 percent of households were affected by the fall in migrant incomes of more than one quarter. With the economy starting to recover and many migrants returning to work in the recovery phases, the number of adversely affected migrant households started to fall as well as the magnitude of the negative income effects. In the second phase – the slow recovery scenario – the maximum decline in migrants’ income was 27 percent (instead of 43 percent during the lockdown) and 15 percent in the third, fast recovery scenario. In the second phase with slow recovery, about 50 percent of households’ migrant incomes fell by at least 17 percent (instead of one-third during the lockdown) and by at least 10 percent in the third phase with fast recovery. However, there is still 20 percent of households with migrant incomes falling by more than 20 percent in the second phase and 15 percent with incomes falling by 15 percent even in the third phase, indicating highly heterogenous impacts of COVID-19 shocks on households with migrants.

Migrants as a whole lost about 23 percent of their income during the lockdown compared with the level before lockdown. Rural migrants on average lost slightly more than 23 percent (23.4 percent), whereas urban migrants lost 22 percent (the first two columns of the last row in Table 4). The income losses for migrants became smaller during the recovery phases – about 10 percent in the second phase and 5 percent in the third phase (Table 4). Table 4 also reports the adverse income effects on migrants by gender, age, education, firm size, and type of employer. Consistent with Table 3, male migrants generally suffered more than female migrants during the lockdown. While the gap continued in the two recovery phases, the differences became narrower with economic recovery.
Figure 7. The cumulative distributional impacts of COVID-19 on migrants’ incomes under the three scenarios

Source: China microsimulation model results.

Note: Total households with affected migrants = 100.

Table 4. Impact of Covid-19 on migrants’ incomes under the three scenarios (% change from the base)

|                     | Lockdown phase | Slow recovery phase | Fast recovery phase |
|---------------------|----------------|---------------------|---------------------|
|                     | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban |
| **Gender**          |       |       |       |       |       |       |       |       |
| Female              | −20.9 | −20.6 | −9.1  | −9.1  | −4.8  | −4.6  |
| Male                | −24.6 | −22.9 | −10.4 | −9.6  | −5.8  | −5.3  |
| **Age**             |       |       |       |       |       |       |       |       |
| Below 20            | −20.8 | −19.6 | −9.4  | −9.2  | −4.4  | −3.5  |
| 21–30               | −19.4 | −16.9 | −8.4  | −6.9  | −4.4  | −3.5  |
| 31–40               | −24.4 | −24.1 | −10.4 | −10.5 | −5.7  | −5.7  |
| 41–50               | −27.5 | −24.9 | −11.9 | −10.7 | −6.8  | −6.1  |
| Above 50            | −22.8 | −23.3 | −9.1  | −9.8  | −5.1  | −5.4  |
| **Highest education level** |       |       |       |       |       |       |       |       |
| Primary             | −26.2 | −25.9 | −11.3 | −11.7 | −6.2  | −6.2  |
| Junior high         | −23.0 | −21.6 | −9.7  | −8.8  | −5.3  | −4.6  |
| Senior high/vocational | −17.0 | −17.8 | −7.2  | −7.2  | −3.9  | −4.1  |
| College and above   | −11.0 | −9.8  | −4.2  | −4.2  | −2.0  | −2.1  |
| **Employer type**   |       |       |       |       |       |       |       |       |
| Government departments | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Public institution  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| State-owned enterprise | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Private enterprise  | −26.3 | −26.3 | −11.6 | −11.6 | −6.4  | −6.2  |
| Foreign-owned enterprise | −15.7 | −11.6 | −7.2  | −5.2  | −5.2  | −3.5  |
| Other enterprise    | −22.2 | −6.8  | −9.6  | −2.7  | −6.4  | −1.4  |
| Individual/family owned business | −30.0 | −30.0 | −10.0 | −10.0 | −5.0  | −5.0  |
| **Total**           | −23.4 | −22.1 | −10.0 | −9.5  | −5.5  | −5.1  |

Source: China microsimulation model results.
2. The indirect impacts on households’ remittances and total income

Only remittance incomes received from migrant family members are recorded as part of household incomes in the CFPS survey. Based on the CFPS data reported by households, migrants sent about 73 percent of their wage incomes back to their hometown families. This means that migrant workers kept only about 27 percent of their income on average for their own living expenses in the locations where they worked, which is equivalent to about RMB666 per month, an amount lower than the officially guaranteed minimum living standards in cities like Nanjing, Beijing, and Shanghai, which are RMB700, RMB710, and RMB790 per month respectively. This seems to indicate that most migrants keep only a minimum level of their income for their own living expenses, and when their wage incomes are adversely affected, such as during the pandemic, migrants have little room to cut their own expenses and instead must first reduce the income sent back home to maintain their basic living standard in urban areas. Many factors affect migrants’ decisions about how much income to send back home, including the levels of migrants’ wage income, job security, their age, and level of education, as well as income and farmland size in their hometowns (Xu and Zhou, 2016). However, given that there is little literature analyzing migrants’ decisions regarding how much money to send home, we are unable to estimate the shocks on remittances when migrant incomes fall. Considering that, in the survey, migrants on average have already allocated a rather small portion of their wage income to their own living expenses and instead prioritized sending the majority of their incomes back to their families in their hometowns, in the simulations, we assume that migrant workers have to reduce remittances sent back home when their wage incomes are adversely affected by the shocks. Only when the declines in their wage incomes are more than the pre-shock level of remittance income sent back home, do migrants also have to cut their own living expenses. With this assumption, declines in migrants’ wage incomes cause remittances to fall disproportionally. That is, while the maximum decrease in migrants’ wage income is about 45 percent under the lockdown shock, remittances received by migrants’ families can fall as much as 100 percent.

We assess the heterogenous impacts of COVID-related shocks on remittances at the household level in Figure 8 by three cumulative distribution charts for the three scenarios. The model results indicate that about 46 percent of remittance-receiving households are adversely affected because of declines in migrants’ incomes. The remaining 54 percent of remittance-receiving households are not affected because their migrant family members work either in the public sector, for state-owned enterprises, or large private firms, for which we do not impose negative shocks, as described in Section III.2.
As shown in Figure 8, remittances fell by 100 percent for about 7 percent of households. The other 17 percent of households were still able to receive some remittances, but the amounts fell by more than 90 percent. For these households, their migrant family members often work in micro and small firms in the most affected sectors such as manufacturing, hotel/catering, or construction. These were the most vulnerable remittance-receiving households. In total, 50 percent of households with remittance income experienced declines of more than 45 percent, as indicated by the lower dashed line that cuts through 50 percent along the y-axis, and 80 percent of households with remittance income experienced declines of more than 25 percent (the upper dashed line that cuts through 80 percent along the y-axis) during the lockdown period.

Figure 8. The cumulative distributional impact of COVID-19 on households’ remittance incomes under the three scenarios

Source: China microsimulation model results.
Note: Total affected households with remittances = 100.

Figure 9 further disaggregates remittance-receiving households by rural and urban areas, and focuses on the lockdown period. Rural remittance-receiving households seem to have been affected more than urban households. More than 25 percent of rural remittance-receiving households saw remittance incomes fall by more than 90 percent, whereas less than 20 percent of urban households were in the same situation. Nearly 50 percent of rural remittance-receiving households saw their remittance income fall by more than 50 percent, whereas 50 percent of their urban counterparts saw remittance income fall by more than 40 percent (as shown by the dashed line in Figure 9).
Remittances account for different shares of the total income of remittance-receiving households. It is therefore necessary to assess the impacts of falling remittances on total household income to assess the actual income impact at the household level. Figure 10 displays the cumulative impacts of falling remittance on households’ total income under the three scenarios. The figure shows that about 10 percent of remittance-receiving households lost more than one-third of their total incomes. The other 15 percent of households lost more than a quarter of total income from falling remittances. For remittance-receiving households as a whole, 50 percent of them lost at least 15 percent of their total income and 80 percent experienced total income losses of at least 10 percent during the lockdown period. With economic recovery, the income losses for remittance-receiving households became smaller. However, even in the third phase, with fast recovery, 50 percent of remittance-receiving households still experienced income losses of more than 5 percent.

Figure 11 groups remittance-receiving households into national, urban, rural, and the five rural income quintiles, presenting the average declines in total income for each household group under the three scenarios. Nationwide, the total income of remittance-receiving households fell by 7.7 percent in the lockdown phase. Urban households’ income fell by 7.9 percent during the lockdown, which was more than the decline in rural household incomes (−7.5 percent). Among rural households, low- and middle-income household groups (Q2 and Q3) were most affected, while rich rural households (Q5) were affected the least during the lockdown period. Economic recovery reduced the negative shocks on
remittance-receiving households, and declines in their total income started to converge with the recovery. However, even with the fast recovery, total incomes among most household groups in both rural and urban areas are still 2–2.5 percent below the pre-shock level.

Figure 10. The cumulative distributional impacts of COVID-19 on remittance-receiving households’ total incomes under the three scenarios

Source: China microsimulation model results.
Note: Total affected remittance-receiving households = 100.

Figure 11. Declines in total household incomes among remittance-receiving households by household groups under the three scenarios

Source: China microsimulation model results.
Note: National refers to national households, Rural refers to rural households, Rural Q1 to Rural Q5 refer to rural household by income quantile where Rural Q1 is the lowest 20 percent and Rural Q5 is the highest 20 percent of rural households, Urban refers to urban households.
3. The impacts on household poverty

Using the concept of relative poverty, the poverty line is defined as half the median household income of the total population, which is RMB7,500 per year, equivalent to US$4.9 international purchasing power parity (PPP) dollars per day. This poverty line is higher than the international poverty line of US$3.2 PPP dollar per day for middle-income developing countries and lower than the one for upper middle-income developing countries (US$5.5/day) defined by the World Bank (World Bank, 2020b). Households in the lowest income quintile (Q1) are all the poor households. The second lowest income quintile (Q2) refers to the low-income households in our model, most of which were not poor prior to the pandemic. For the households that were already in poverty prior to the pandemic, falling remittance income made them more impoverished. However, the model results show that incomes fell disproportionally more among low- and middle-income rural households (Figure 10), indicating that the poverty rate is expected to rise, led by the remittance-receiving households who were not poor prior to the shock. Thus, our poverty assessment focuses on such households first.

Figure 12 presents the poverty rate among remittance-receiving households for national, rural, and urban groups prior to the pandemic and under the three scenarios. Those households that were low-income but not poor pre-shock are also presented as a separate group in the figure to assess the poverty impact on these households. At the national level, the poverty rate among all remittance-receiving households increased by 3.8 percentage points during the lockdown, rising from 17.1 percent in the base situation to 20.9 percent. The initial poverty rate was higher among rural remittance receivers (21.4 percent) than urban remittance receivers (11.5 percent) in the base situation, and the increase in the poverty rate was also more (4.0 percentage points) among rural households than in urban households (3.4 percentage points). About 4 percent of total rural remittance-receiving households that were not poor pre-shock fell into poverty during the lockdown. In the low-income household group, the percentages were as high as 20.5 percent, and most of them were rural households. Put differently, about 4.8 million remittance-receiving households and 14.4 million people fell into poverty during the lockdown, and among them, there were 3 million rural households with almost 9 million people.

Economic recovery helped many households return to their pre-shock, nonpoor situation. At the national level, the poverty rate was still slightly higher than the pre-shock level even with a fast recovery. This was particularly true for rural households. The poverty rate for rural remittance-receiving households was 1.1 percentage points higher under the fast recovery scenario than in the base scenario. For the low-income group, 3.9 percent of households that were poor prior to the pandemic continued to be stuck in poverty, of which, most were rural households. This finding indicates that
while many newly poor households were transitional in nature due to the temporary decline in remittance income, and poverty could be persistent for some of them. In total, there were about 1.3 million such households with about 4 million people, and most of them were in rural areas. Social protection and cash transfer programs should consider targeting these types of households.

Figure 12. The poverty impacts of COVID-19 on remittance-receiving households

COVID-19 further impoverished those households that were poor pre-shock. We calculated the poverty gap under the three scenarios in Figure 13, which also includes information for the base pre-shock. The poverty gap is the ratio by which the mean income of the poor falls below the poverty line. As shown in Figure 13, the national poverty gap index was 5.6 percent pre-shock and rose to 7.0 percent (including the poor pre-shock and the newly poor after the shocks) during the lockdown. The rise in the poverty gap among the rural poor was more than among the urban poor. In the base, the poverty gap for rural remittance-receiving households was 8.6 percent, while it rose to 10.4 percent during the lockdown. A rising poverty gap indicates that more poor households fall further below the poverty line. With economic recovery, income for some of the households that fell into poverty during the lockdown bounced back when remittance incomes started to recover as their migrant family members returned to their previous jobs. The poverty gap indexes thus started to converge to their pre-shock level, but were still modestly below their values in the base situation. Considering that many of these households were already in poverty prior to the pandemic, any declines in their

2Available from: https://data.oecd.org/inequality/poverty-gap.htm (online; cited 6 October 2021).
income can make them more impoverished. Hence, social protection programs designed for the poor prior to the pandemic are an important mechanism to provide relief for impoverished households, and such programs should be scaled up to cover those newly poor households caused by the pandemic.

Figure 13. Poverty gap index in the base and under the three scenarios (percentage)

Source: China microsimulation model results.

V. Conclusions and policy implications

China was the first country to be hit by COVID-19 and one of only a few countries that have largely recovered economically, although the annual growth rate in 2020 was lower than the pre-pandemic level. Moreover, recovery was uneven among different economic sectors and different types of enterprises. Many service sectors, such as hotel and catering, business services, and household services, are recovering much more slowly, which implies a longer-lasting impact of the pandemic on employment and on the income of employees in these sectors. Working mainly in micro-, small, and medium-sized private enterprises in these sectors, migrant workers in China are very exposed to the negative income shocks associated with the pandemic. Migrants typically send a large portion of their income back home, and remittances are an important factor keeping a significant number of rural households out of poverty. This paper applies a microsimulation method to assess the impacts of COVID-19 on migrants and remittance-receiving household income and poverty using the latest nationally representative household survey data from the CFPS. The results need to be verified by ex post analyses when actual data become available, but the analysis presented here is useful and timely when ex post analysis is infeasible.
We find that the COVID-19 pandemic generated adverse effects on migrants and their families in hometowns through falling remittances. Declines in remittances have significant poverty effects because remittances enable many low-income rural households to stay out of poverty. About 70 percent of migrants were affected by the COVID-19 pandemic, and those working in sectors such as construction, manufacturing, and hotel and catering were most impacted. Nearly 50 percent of remittance-receiving households were affected, with remittances falling more than 45 percent on average during the lockdown. About 13 percent of remittance-receiving households that were low-income but not poor prior to the pandemic fell into poverty during the lockdown. The poverty rate rose by 4 percentage points among remittance-receiving households as a whole. The poverty gap index also increased by 2 percentage points, indicating that many previously poor households became more impoverished from the shock. As many migrants worked in micro- and small private enterprises without formal employment contracts, they were more vulnerable to the shock. As expected, rural migrants were more affected than their urban counterparts during the lockdown. Migrants with low education levels were also hit harder. While economic recovery helps many migrants return to work, 20 percent of remittance-receiving households still have their total income lower than the pre-COVID-19 level, even with fast economic recovery. There were almost 3 million additional rural households and 9 million people falling into poverty during the lockdown, and 1.3 million of them were likely to stay in poverty in 2020 even after the national economy recovers almost back to normal.

The above findings have two important policy implications. First, because micro- and small-scale private enterprises are the most important employers of migrant workers, it is important to have policy measures keeping these enterprises in operation to stabilize migrants’ employment opportunities and mitigate the negative impacts of COVID-19 on their incomes. Second, targeted social protection programs are necessary for the most affected migrants and their families. Financial support and some skill-training programs for unemployed migrants should be considered as targeted policies to help some migrants transition to other available jobs. Migrants’ employment and incomes are closely linked with their families’ wellbeing in rural areas. Policies that help migrants should be considered as an integrated component of national rural poverty-reduction initiatives. In the medium to long run, an integrated rural and urban social security system, including unemployment insurance for migrant workers, needs to be established as a sustainable solution to build resilience among migrants to cope with unexpected shocks like COVID-19 in the future (Zhan and Chen, 2021). This paper focused on migrants and their rural families at the national level, but further research focusing on regional differences in the impact of COVID-19 on migrants and remittance-receiving households is necessary.
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