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Pre- and Post-COVID-19 Scenario: Impact on Migration, Occupation and Income in Maharashtra State

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Abstract

COVID-19, a virus that struck in the last quarter of 2019 in China, spread worldwide. March 2020 saw the imposition of lockdowns, disrupting not just the health condition of millions of people but also economic activities. India remained one of the most affected countries both in terms of death rates and the economy as a whole. Migrants were one of the most affected groups; many of them lost their jobs and were left stranded. This paper tries to understand the impact of the pandemic on migrants in Maharashtra. The data was sourced from the Directorate of Economics and Statistics of the Government of Maharashtra, and a comprehensive analysis was conducted. The study examined variables such as gender, sector, education, occupation, family type (nature of trade), marital status, and COVID-19 infection to determine their impact on migration during the pandemic. Microanalysis was used to gain a nuanced understanding of the situation, and the chi-square test is employed to identify associations. The study also compares pre- and post-COVID expenditure levels using a T-test analysis, and a logistic regression model was applied to determine the factors influencing migration decisions. The results contradict the beliefs and anecdotes existing during and after COVID-19, at least in Maharashtra. The results show no difference in the likelihood of migration for those not infected with COVID-19 compared with those infected. The likelihood of unmarried respondents with lower levels of education, those not in the labour force and women of working age is higher than married, secondary education, working, males and the rest category respondents respectively. Additionally, the average monthly expenditures of migrants and non-migrants have also been found to be different. The study gives a detailed understanding of the migration situation post-COVID within Maharashtra.

Keywords: Health, Education, Livelihood, Occupation, Migration, COVID-19.

I. Introduction

Migration studies have gained the attention of several policy-makers and researchers because of their increasing relevance in our globalised society. Over the decades, people have migrated for various reasons, including wars, the absence of employment, educational or professional job opportunities, and even disparities in the standard of living. Migrants bring skills that pave the way for innovation; remittances boost cultural diversity, thus driving social and economic development. However, they can strain public services offered, increase social tension, and put downward pressure on wages for domestic workers. Understanding this phenomenon and its impact, particularly in countries like India with diverse and dynamic migration patterns, becomes a critical focal point for researchers who want to address concerns related to growth and welfare. Moreover, understanding the impact becomes even more crucial in cases of extraordinary events like COVID-19.

The outbreak of the SARS-CoV-2 virus, popularly known as COVID-19, in the last quarter of 2019 marked the beginning of a global health crisis. Initially confined to Wuhan, China, the virus

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swiftly spread worldwide with the World Health Organization declaring it a global pandemic in March 2020. The impact of the pandemic has been felt across various sectors, including migration. In 2020, migration levels to OECD countries experienced a sharp decline of 30 per cent compared with the previous year, with family migration being the most affected (OECD, 2021). The consequences of COVID-19 were particularly devastating for migrants as job losses and school closures made it difficult for them to return to their home countries, leaving many stranded or forced to return earlier than planned (UNDESA, 2020). Given the global impact of the pandemic on the economy including unemployment, health and food security, migration flows have been significantly disrupted by widespread lockdowns and travel restrictions. Migrants found themselves stranded without access to even necessities, exacerbating an already challenging situation faced by migrants in India and around the world. Analysing the impact of COVID-19 on migrants at a state level, particularly within Maharashtra, becomes an essential focal point for understanding the specific challenges and dynamics of migration in the context of the pandemic.

To assess the impact of the pandemic on the state level, the Directorate of Economics and Statistics surveyed the pandemic to investigate its effects on livelihoods, education, and health on the people of Maharashtra. As far as we know, it was the only dataset collected by any government institution during COVID-19. This survey included specific questions about its impact migration and employment of the respondents, covering job losses, business shutdowns and fears related to the virus. By considering these factors, the researchers aimed to gain deeper insights into the situation and consequences of the virus on a more granular level.

II. Review of Literature

The pandemic led to border closures and restrictions on travel to curb the transmission of the virus which eventually negatively affected the migration flows, thus reducing employment opportunities and causing global economic activity to come to a standstill. According to Bateman and Ross (2021), the economic downturn severely impacted low-wage workers, and Mondragon and Tavares (2021) have found that it also adversely affected low-skilled workers. In the US, young people with lower educational levels and lower family income experienced larger employment losses than those with higher education and higher family income (Cho et al., 2021).

Migrants were more susceptible and vulnerable to COVID-19 risk factors for reasons such as legal obstacles to access healthcare services, crowded housing, or even risky occupations (Hayward et al., 2021). Immigrants faced an elevated risk of COVID-19 infection compared with native-born individuals due to various vulnerabilities, including higher poverty rates, overcrowded housing conditions and a concentration in jobs where maintaining social distancing is challenging (OECD, 2020).

Many migrant workers were stranded in destination countries without employment during the pandemic, unable to accumulate sufficient savings due to low wages. It resulted in significant remittance losses affecting family support and national development. Employed predominantly in low-wage, precarious sectors, they were often the first to lose their jobs. They faced various employment issues, including suspension, termination, reduced hours or pay, unpaid work and lack of access to social protection measures (Jones, et al., 2021).

Unemployment emerged as a major factor influencing migration, particularly during the pandemic. It dealt a severe blow to global employment, causing widespread job losses that affected thousands of individuals. Migrants, in particular, bore a significant brunt, facing either permanent job losses or temporary suspensions, leaving them without a reliable source of income (ILO, 2021). In the US, the employment rates of immigrants fell sharply compared with those of native people during the pandemic (Borjas & Cassidy, 2020). In high-income countries in the European Union, both migrant men and women had higher unemployment rates compared with the nationals, with migrant women experiencing even higher rates of unemployment compared with non-migrant women (ILO, 2020). Likewise, in the case of low- and middle-income countries in the European

Union, migrant workers had slightly higher unemployment rates compared with their national counterparts, and migrant women had higher unemployment rates compared with non-migrant women (ILO, 2020). In India, the imposition of lockdowns led to a considerable impact on the working class, especially the migrant workers with low incomes. Many workers were laid off, resulting in unemployment and unpaid wages, ultimately compelling them to return to their places of origin (Khan & Arokkiaraj, 2021).

Education is an essential driver of migration. Higher levels of education and literacy increase the likelihood of migration, and the completion of secondary education has been found to have notable effects (Nayyar & Kim, 2018). Higher education and skill acquisition positively affect migration decisions, particularly in urban areas where employment opportunities are more abundant (Dustmann & Glitz, 2011). In India, as reported by Singh, et al., (2022), the 2011 Census documented 450 million internal migrants with 5.4 million (1.2%) migrating for education. Of these, 3.3 million had resided in their current location for less than five years, primarily relocating within their own state (86.5%) or to other states (13.5%). Uttar Pradesh and Bihar were the main source states, while Karnataka, Maharashtra, Tamil Nadu and Delhi were the principal destinations. The push factors for student migration in India stem from regional disparities in wages, labour markets and educational opportunities. States with high poverty rates and low literacy levels historically lack adequate educational infrastructure, leading to a shortage of higher education institutes, thus prompting students to seek education elsewhere (Chandrasekhar & Sharma, 2014). In terms of students migrating overseas, as reported by Rajan & Kumar (2023), prior to the onset of COVID-19, migration had steadily risen, reaching 5.86 lakh in 2019, but then halved in 2020 due to the pandemic, with over 2.5 lakh students still migrating abroad. Student mobility rebounded to 4.4 lakh in 2021 immediately after the pandemic.

Gender plays a crucial role in migration, especially in India. While males predominantly migrate for employment, education and business purposes, females are primarily driven by marriage (Rajan et al., 2020). Recently married people are more likely to migrate than unmarried ones (Nayyar & Kim, 2018). Marriage migration is the most common form for women, especially in rural areas in India (Fulford, 2013). This higher rate is, in fact, linked to the low autonomy of Indian women who are usually poorly educated (Fulford, 2013). According to the 2011 Census, 46 per cent of the total migrants migrated due to marriage and 97 per cent were women (Krishnan, 2019). In India, displaced migrants, including women, faced ongoing difficulties for more than a year following the initial pandemic lockdown. Women experienced greater challenges with lower rates of returning to their previous locations and re-entering the labour market locally and elsewhere (Allard et al., 2022).
Urbanisation in developing countries, particularly in South Asia and Sub-Saharan Africa, has led to large internal migration flows from rural to urban areas (Brueckner & Lall, 2015). In the urbanised regions of Latin America and East Asia, more urban-to-urban migration is prevalent (Lucas, 2016). In developed countries, urban-to-rural migration has emerged as a phenomenon, potentially driven by a desire for a rural lifestyle, which the COVID-19 pandemic may further accelerate (Selod et al., 2021). Urban-to-rural Migration can also be to a considerable extent, especially in Sub-Saharan Africa or similar countries in primary development stages. Cattaneo and Robinson (2020) used Demographic and Household Survey data from 31 developing countries. They found that a significant proportion of internal migration from rural areas to urban areas results in return migration to rural areas. This trend was the highest in Sub-Saharan African countries, where 7 to 51 per cent of males and between 3 and 32 per cent of females who were rural to urban migrants were found to have returned to a rural area at some point.

Internal migrants, as per the 2011 census, were 450 million. They form an important part of the Indian economy, mostly short-distance, intra- and inter-district migrants (Bhagat, 2011). A majority of the internal migrants travel from poor places such as Bihar and Uttar Pradesh to developed states such as Gujarat, Maharashtra and Delhi (Khanna, 2020). The most widespread form of migration in India is rural to rural, accounting for 62 per cent, followed by rural to urban, which is 20 per cent, then urban to urban at 13 per cent, and urban to rural, accounting for 5 per cent (Rajan & Bhagat, 2021).

After going through the literature, it can be understood that migration is driven by factors such as employment opportunities, gender and marriage, age, and education levels. COVID-19's impact can be observed globally and nationally. The pandemic had rather devastating effects on the world and India, especially on migrants. Due to the onset of the pandemic, there were incidences of job losses or people having to change jobs. Several studies have been conducted on the impact of the pandemic on global and national levels. However, due to its devastating nature, it becomes interesting to analyse the extent of migration and employment status of people locally. Therefore, the study aims to determine which people with what backgrounds migrated (regarding marital status, sector, gender and other such variables). The researchers have also tried to discover the occupation changes after the lockdowns and whether they led the respondents to migrate.

III. Data and Methods

Data preparation

This paper utilized data collected by the Directorate of Economics and Statistics (DES), Government of Maharashtra, for the ad hoc survey titled “Impact of Covid-19 on health, education and livelihood of people in the state”. This survey employed the survey methodology of the 78th round of the NSS, conducted using the Multiple Indicator Survey (MIS). The DES participated in the survey on a matching sample basis. Due to time constraints and COVID-19 restrictions, only 800 sample units — comprising 310 villages in rural areas and 490 UFS blocks in urban areas — were surveyed. From each unit, 20 households were randomly selected from the sample list used for the 78th round of NSS for household selection. During household selection, preference was given to households with at least one person infected with Covid-19. If fewer than 20 such households were available, the remaining households were chosen from those surveyed for the MIS of the 78th round, the reference period extended from the start of the COVID-19 pandemic in March 2020 to the day before the household visit (DES, Maharashtra 2021). The survey included 16,000 households: 9,800 were urban and 6,200 rural. The total number of respondents was 66732. However, 58 respondents aged up to fourteen years showed a working status and hence were discarded. The final count thus was 66674.

The questionnaire was exhaustive, and the framing and options available for respondents were different for pre- and post-scenarios for the questions related to income, working status, occupation, etc. For the variable named 'Primary Sources of Income before March 2020', after removing all the blanks, the final count of the data was 23243. The sub-question, 'Effect on Income after March 2020', applied to those whose income was derived from the first four options (agriculture, job, daily wage or business) of the 'Primary source of income before March 2020. The final count of the data for this sub-question comes out to be 21916. For the 'Main Source of Income Post March 2020', the final count after removing blanks was 23243. For sub-question 1, 'Effect on Wages' applied to respondents with 'Regular or Irregular salary' as their income source. The final count was 12782. For sub-question 2, 'Effect on Business' was applied to those with business as their main source of income. The final count was 4457. Different variables have different counts, hampering the application of advanced tools for analysis.

Methods

There are two types of information, one of which is used for advanced statistical tools like the Logit model and the rest are used for tabulation purposes only but provide very important ground-level reality, mainly regarding the change in income and occupations during the COVID period. With the help of the chi-square test, we established the associations among the variables, and then we used the logit model to identify the determinant which influences the migration decision.

For the logit model, the dependent variable is migration. The independent variables include – gender, sector, education, marital status, occupation (working status as a dummy variable), age, family type, COVID infection, primary source of income before March 2020 (includes a sub-question – effect on income post-COVID), main source of income after March 2020 (includes two sub-questions – effect on wages for respondents with regular or irregular salary and effect on business for respondents with business as their source).

Results

Background of the respondents

Due to the different counts of the respondents/households related to various variables and parameters, understanding their distribution is critical. Table 1 shows migration conditions along with the given reasons (sub-questions). The migrant families were 898: after matching them with the family members and 3390 individuals were considered migrants (Table 1). For the 'Reasons for Migration' variable, an option was provided to choose multiple answers. Therefore, the values were calculated on a household level. Exclusive reasons for migration have also been calculated. Source of income pre- and post-March 2020, with certain conditions on the sub-questions, information about 'Family Type before and after March 2020', etc., is done at the household level.

Table 1: Reasons for migration

Migrants*	3390 (5.08)	
Non-migrants	63284 (94.92)	
	More than one reason	Only one reason
Reason for migrations		
Lost job	114 (12.69)	30 (3.34)
Treatment	54 (6.01)	19 (2.11)
Fear of COVID	535 (59.58)	244 (27.17)
Business closure	242 (26.95)	77 (8.57)
Institutions' closure	143 (15.92)	55 (6.12)
To be with family	251 (27.95)	65 (7.23)
No essentials	97 (10.80)	3 (0.33)
Others	53 (5.90)	30 (3.34)

* The Migration Condition question was asked on a household level, such as, "Whether or not your entire family or one family member had to migrate due to COVID-19" The answer options were 'Yes' or 'No'. Therefore, there was no way to understand whether just one family member had migrated or an entire family. So, it is considered that respondents migrated those who answered 'Yes' to the question asked.

The number of migrants was much lower, representing only 5.08 per cent of the data. Fear of COVID-19 was the most common answer. The other two most common reasons were to remain with the family and business closure.

Before March 2020, a maximum of respondents was involved in regular salary jobs (40%), while a considerable percentage of respondents had agriculture as their main source (20%). Around 15 per cent were daily wage workers and 19 per cent reported having income from business. The post-March 2020 situation remained almost the same with a few percentage points here and there. In rural areas, most families, i.e., more than 60 per cent, were engaged in self-employment in agriculture, followed by around 11 per cent in regular salary/wage holders in non-agricultural activities. In urban areas, more than 50 per cent of the families were engaged in regular salary/wage-holding jobs, while 30 per cent were self-employed in agriculture. Post-March 2020 does not show any change (Table 2).

After March 2020, the main source of income for most respondents was from regular salary jobs, followed by agriculture, accounting for 39.56 per cent and 20.20 per cent respectively (Table 2). Not much difference was observed in the main income source pre- and post-March 2020.

The 'Effect on Wages during Lockdown' (Table 2) pertains to those with regular or irregular salary jobs after March 2020.

Table 2: Pre- and Post-March 2020- income and family type and effect on wages and business during lockdown

	Pre-March (2020)	Post-March (2020) (last 30 days)
Primary source of Income		
Agriculture	4667 (20.08)	4694 (20.20)
Job	9299 (40.01)	9195 (39.56)
Daily wage	3516 (15.13)	3587 (15.43)
Business	4434 (19.08)	4457 (19.18)
No source of income	1327 (5.71)	1310 (5.64)
Total	23243(100)	23243(100)
Family type		
Rural area		
Self-employment in agriculture	3865 (62.34)	3857 (62.21)
Self-employment in non-agricultural activities	508 (8.19)	513 (8.27)
Regular salary/wage holder in agriculture	190 (3.06)	201 (3.24)
Regular salary/wage holder in non-agricultural activities	672 (10.84)	660 (10.65)
Irregular salary in agriculture	552 (8.90)	557 (8.98)
Irregular salary in non-agricultural activities	239 (3.85)	230 (3.71)
Others	174 (2.81)	182 (2.94)
Urban area		
Self-employment in agriculture	2992 (30.53)	2985 (30.46)
Regular salary/ wage holders	5432 (55.43)	5386 (54.96)
Daily wage/irregular wage holders	730 (7.45)	745 (7.60)
Others	646 (6.59)	684 (6.98)
Effect on wages during lockdown		
Temporary shutdown, full wages received		1420 (11.11)
Temporary shutdown, less wages received		3257 (25.48)
Temporary shutdown, no wages received		3495 (27.34)
Lost previous job, accepted new one at reduced wages		249 (1.95)
Lost previous job, accepted new job at same wages		200 (1.56)
Lost previous job, accepted new job at increased wages		53 (0.41)
Lost previous job and in search of new job		12 (0.09)
Lost previous job and not in search of new job		4 (0.03)
No effect on job and wages		4092 (32.01)
Total		12782(100)
Effect on Business during lockdown		
Temporary shutdown, now operational		2776 (62.28)
Permanent shutdown		23 (0.52)
No change in the nature of business		1508 (33.83)
Started a new business		135 (3.03)
Others		15 (0.34)
Total		4457 (100)
Effect on earning post-March 2020		
No income generation		3458 (15.78)
Reduction in income		11942 (54.49)
Increase in income		284 (1.30)
No effect on income		6232 (28.44)
Total		21916(100)

A majority of them, 32.01 per cent, were found to have experienced no effect on job or wages. As many as 27.34 per cent experienced a temporary shutdown and received no wages, closely followed by those who experienced a temporary shutdown and received less wages. Approximately 11 per cent of them experienced a temporary shutdown but received full wages for their work.

For the 'Effect on Business', which applies to those engaged in business activities post-March 2020, slightly more than 60 per cent of them experienced a temporary shutdown during the lockdown but later had operational businesses. Almost 34 per cent reported experiencing no change in their business. Around 3 per cent started a new business, and less than 1 per cent experienced a permanent shutdown (Table 2).

The 'Effect on Earning Post March 2020' applies to respondents who reported agriculture, jobs, daily wages, or business as their main source before COVID-19. Over 50 per cent of the respondents faced a reduction in their income levels. Around 28 per cent experienced no change, while approximately 16 per cent had no income generation. Surprisingly, a small percentage (1.30%) reported an increase. There was not much difference between pre-and post-March 2020, considering income and occupation (Table 2).

Table 3: Income and working status of migrants

	N(%)
Source of income	
No change in income source	21166 (96.57)
Change in income source	751 (3.43)
Working status	
Employed (11-51)	26294 (40.38)
Unemployed but looking for a job (81)	976 (1.46)
Not in the labour force (91-97)	38774 (58.15)

Source: Authors' calculations.

For the regression analysis, two variables (used as dummy variables) were constructed, the first based on the 'Source of Income Pre and Post March 2020' and the second based on the 'Working Status' (Table 3). In the case of Source of Income, we find that nearly 2 per cent recorded a change in their income source after COVID-19. In the case of Working Status, more than 50 per cent of the respondents were not in the labour force, followed by 40 per cent employed and just 1.46 per cent looking for jobs.

Relationship among variables

The decision to migrate or not depends on many parameters. As a preliminary analysis, we checked the relationship between dependent and independent variables with the help of a chi-square test, which had two purposes: to identify the relationship and distribution of information between migrants and non-migrants.

Table 4 shows that almost 60 per cent of the respondents resided in urban areas. Slightly more than 50 per cent were male, the respondents married were 54 per cent and 39 per cent were unmarried. The largest proportion of respondents was in the learning category, followed by respondents involved in household work. Approximately 14 per cent had regular salary jobs, 12 per cent were self-employed without having any paid worker and about 5 per cent were in jobs offering irregular salary/daily wage. Regarding educational status, the highest number of respondents had completed secondary school at 17.07 per cent. Respondents who were illiterate constituted 14 per cent, while 15 per cent were degree-holders. Around 80 per cent of the respondents reported not being infected with COVID-19, while 20 per cent indicated that they had contracted the virus.

Among the respondents, 94 per cent and 96 per cent were from urban and rural areas respectively who did not migrate. Looking at gender, male and female migrants are almost the same (5 per cent). For the marital status variable, out of the total unmarried respondents, close to 5 per cent of them migrated and for married respondents, 5.27 per cent migrated. Regarding occupation, out of the total respondents for regular salary/wage holders, 7.77 per cent migrated. Approximately 5 per cent of those involved in learning and 4.71 per cent of those involved in household work migrated. For the educational status variable, out of the total respondents who had completed the secondary and higher secondary levels of education were 4.87 per cent and 5.61 per cent respectively who migrated, while among the illiterate 4.85 per cent migrated. Out of the respondents infected with COVID-19, only 6 per cent migrated.

Table 4: Migration and socio-economic variables

Particulars	Number (in %)	Migration status: Migrants	Migration status: Non-migrants	Chi-square (P value)
Sector				
Urban	39847 (59.76)	2379 (5.97)	37468(94.03)	0.04
Rural	26827 (40.24)	1011 (3.77)	25816(96.23)	
Gender				
Males	34132 (51.19)	1785 (5.23)	32347(94.77)	0.07
Females	32520 (48.77)	1602 (4.93)	30918(95.07)	
Transgender	22 (0.03)	3 (13.64)	19 (86.36)	
Marital status				
Unmarried	25761 (38.64)	1281 (4.97)	24480(95.03)	
Married	36240 (54.35)	1911 (5.27)	34329(94.73)	0.06
Widowed	4473 (6.71)	193 (4.31)	4280 (95.69)	
Divorced	200 (0.30)	5 (2.50)	195 (97.50)	
Occupation				
Self-employed, no salary	8388 (12.58)	361 (4.30)	8027(95.70)	
Self-employed, salaried	798 (1.20)	40 (5.01)	758 (94.99)	
Helper in family business (unpaid)	4694 (7.04)	214 (4.56)	4480 (95.44)	
Regular salary/wage holder	9470 (14.20)	736 (7.77)	9734 (92.23)	
Social work (or program)/irregular salary in work/ daily wage	213 (0.32)	7 (3.29)	206 (96.71)	
Irregular salary in other private work/ Daily wage	3361 (5.04)	102 (3.03)	3259 (96.97)	
Unemployed but looking for job	946 (1.46)	45 (4.61)	931 (95.39)	0.02
Learning	15748 (23.62)	771 (4.90)	14977(95.10)	
Involved only in household work	15037 (22.55)	708 (4.71)	14329(95.29)	
Involved in household work and knitting, stitching for the household	280 (0.42)	1 (0.36)	279 (99.64)	
Rent collector (property owner)/ Pensioner, help receiver	1834 (2.75)	97 (5.29)	1737 (94.71)	
Disabled	253 (0.38)	10 (3.95)	243 (96.05)	
Others	5622 (8.43)	298 (5.30)	5324 (94.70)	
Education				
Illiterate	9389 (14.08)	455 (4.85)	8934 (95.15)	
Literate, without schooling	166 (0.25)	8 (4.82)	158 (95.18)	
Non-formal education (NFEC)	132 (0.20)	4 (3.03)	128 (96.97)	
Non-formal education (AEC/TFC)	170 (0.25)	10 (5.88)	160 (94.12)	
Others	121 (0.18)	6 (4.96)	115 (95.04)	
Pre-primary	6647 (9.97)	259 (3.90)	6388 (96.10)	
Primary	8030 (12.04)	380 (4.73)	7650 (95.27)	0.01
Pre-secondary	6987 (10.48)	338 (4.84)	6649 (95.16)	
Secondary	11383 (17.07)	554 (4.87)	10829(95.13)	
Higher secondary	10462 (15.69)	587 (5.61)	9875 (94.39)	
Diploma/certificate	1524 (2.29)	95 (6.23)	1429 (93.77)	
Degree	9783 (14.67)	584 (5.97)	9199 (94.03)	
Post-graduate and above	1880 (2.82)	110 (5.85)	1770 (94.15)	
COVID-infected				
Yes	13743 (20.61)	812 (5.91)	12931(94.09)	0.02
No	52931 (79.39)	2578 (4.87)	50353(95.13)	

Source: Authors' calculation.

Table 5: Main Sources of Income after March 2020

Particulars	Migrants	Non-migrants	Chi-square
Primary source of income pre-March 2020			
Agriculture	179 (3.84)	4488 (96.16)	
Job	712 (7.66)	8587 (92.34)	
Daily wage	105 (2.99)	3411 (97.01)	0.02
Business	214 (4.83)	4220 (95.17)	
No source of income	85 (6.41)	1242 (93.59)	
Main source of income post-March 2020			
Agriculture	177(3.77)	4517(96.23)	
Regular salary	678(7.37)	8517(92.63)	
Irregular salary	121(3.37)	3466(96.63)	0.03
Business	218(4.89)	4239(95.11)	
No source of income	101(7.71)	1209(92.29)	
Family type before March 2020			
Rural area			
Self-employment in agriculture	297(7.68)	3568(92.32)	
Self-employment in non-agricultural activities	37 (7.28)	471 (92.72)	
Regular salary/wage holder in agriculture	12 (7.89)	175 (92.11)	
Regular salary/wage holder in non-agricultural activities	43 (6.40)	629 (93.60)	0.01
Irregular salary in agriculture	43 (7.79)	509 (92.21)	
Irregular salary in non-agricultural activities	12 (5.02)	227 (94.98)	
Others	12 (6.90)	162 (93.10)	
Urban area			
Self-employment in agriculture	149(4.98)	2843(95.02)	
Regular salary/ wage holder	420(7.73)	5012(92.27)	0.02
Daily wage/irregular wage holder	53 (7.26)	677 (92.74)	
Others	31 (4.80)	(5.20)	
Family type in last 30 days			
Rural area			
Self-employment in agriculture	297(7.70)	3560(92.30)	
Self-employment in non-agricultural activities	37 (7.21)	476 (92.79)	
Regular salary/wage holder in agriculture	11 (5.47)	190 (94.53)	
Regular salary/wage holder in non-agricultural activities	43 (6.52)	617 (93.48)	0.11
Irregular salary in agriculture	44 (7.90)	513 (92.10)	
Irregular salary in non-agricultural activities	12 (5.22)	218 (94.78)	
Others	12 (6.59)	170 (93.41)	
Urban area			
Self-employment in agriculture	147(4.92)	2838(95.08)	
Regular salary/ wage holder	409(7.59)	4977(92.41)	0.01
Daily wage/Irregular wage holder	56 (7.52)	689 (92.48)	
Others	41 (5.99)	643 (94.01)	
Effect on wages during lockdown			
Temporary shutdown, full wages received	95 (6.69)	1325(93.31)	
Temporary shutdown, less wages received	190(5.83)	3067(94.17)	
Temporary shutdown, no wages received	187(5.35)	3308(94.65)	
Lost previous job, accepted new at reduced wages	43(17.27)	206 (82.73)	
Lost previous job, accepted new job at same wages	33(16.50)	167 (83.50)	0.01
Lost previous job, accepted new job at increased wages	9 (16.98)	44 (83.02)	
Lost previous job and in search of new job	1 (8.33)	11 (91.67)	
Lost previous job and not in search of a new job	0 (0.00)	4 (100.00)	

Particulars	Migrants	Non-migrants	Chi-square
No effect on job and wages	241(5.89)	3851(94.11)	
Effect on business during lockdown			
Temporary shutdown, now operational	158(5.69)	2618(94.31)	
Permanent shutdown	1 (4.35)	22 (95.65)	
No change in the nature of business	53 (3.51)	1455(96.49)	0.07
Started a new business	6 (4.44)	129 (95.56)	
Others	0 (0.00)	15 (100.00)	
Effect on earning post-March 2020			
No income generation	336 (9.72)	3122 (90.28)	
Reduction in income	482 (4.04)	11460(95.96)	0.04
Increase in income	12 (4.23)	272 (95.77)	
No effect on income	380 (6.10)	5852 (93.90)	

Source: Authors' calculation.

Out of the total respondents with jobs as their main source, the majority (92.34 %) did not migrate. In the 'Effect on Income' case, 4.04 per cent of the total respondents were migrants who experienced a reduced income after March 2020. Around 10 per cent of migrants reported no income generation after March 2020 and around 6 per cent reported no effect on income after March 2020. Out of the total respondents who had 'Regular salary/jobs' as their main source of income, 7.37 per cent of them migrated. Regarding the 'Effect on Wages during Lockdown', out of the total respondents who experienced a temporary shutdown and received less wages, 5.83 per cent migrated. Among those who experienced a temporary shutdown and received no wages, 5.35 per cent of them migrated. Turning to the 'Effect on Business during Lockdown', out of the total respondents who experienced a temporary shutdown but later resumed their business, 94.31 per cent did not migrate. Among those who reported no change in the nature of business, nearly 3.51 per cent of them migrated.

In the rural area, out of the families who had self-employment in agriculture as their main family type, 7.68 per cent of those migrated, while for families engaged in regular salary /wage holders in non-agricultural activities, 6.40 per cent of them migrated. In the urban area, of the total families involved in regular salary/wage holder activities, 92.27 per cent were non-migrants. For families engaged in self-employment in agriculture, almost 5 per cent of them migrated, while the remaining 95 per cent did not.

Table 6: Income and working status of migrants

	Migrants	Non-migrants	Chi square
Source of income dummy			
No change	1131(5.34)	20,035(94.66)	0.02
Changed	79 (10.52)	672 (89.48)	
Working status			
Employed (11-51)	1460(5.42)	25464 (94.58)	
Unemployed but looking for a job (81)	45 (4.61)	931 (95.39)	0.05
Not in the labour force (91-97)	1885(4.86)	36889 (95.14)	

Source: Authors' calculation. The values in parentheses are Coolum percentages.

Respondents reported experiencing no change in the source of income: 5.34 per cent of them migrated, while the majority did not. For those whose income source changed, 10.52 per cent of them migrated. In the case of the working status dummy, out of the total employed respondents, 5.42 per cent migrated, and for those not in the labour force, 4.86 per cent migrated. It can be concluded that the relationship between the variables is significant and these variables can be used for the logit analysis.

Impact of COVID-19 on Family Type

During the pandemic, millions lost their jobs, had to shut down their businesses, or even changed their professions. Family type before and after March 2020, calculated on the household level, to check whether due to the pandemic how many families had to shift from their original professions once the pandemic struck. Tables 7 and 8 account for the family type situation in rural and urban areas respectively. Most families in the rural and urban areas during pre- and post-COVID have been in the same family type, with very few respondent families changing it.

Table 7: Family type Pre- and- Post March 2020: Rural area

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Grand Total
Rural total	3857 (99.64)	513 (0.21)	201 (0.03)	660 (0.03)	557 (0.08)	230 (0.03)	182 (0.01)	6200
Self-employment in agriculture (1)	3851 (99.64)	8 (0.21)	1 (0.03)	1 (0.03)	3 (0.08)	1 (0.03)		3865
Self-employment in non-agricultural/related business (2)	2 (0.39)	499 (98.23)	1 (0.2)	2 (0.39)	2 (0.39)		2 (0.39)	508
Regular salary/wage holder in agriculture and related business (3)	2 (1.05)	1 (0.53)	185 (97.37)	1 (0.53)	1 (0.53)			190
Regular salary/wage holder in non-agriculture related business (4)	1 (0.15)	3 (0.45)	2 (0.3)	654 (97.32)	3 (0.45)	1 (0.15)	8 (1.19)	672
Irregular salary agriculture and related business (5)	1 (0.18)	1 (0.18)		1 (0.18)	548 (99.28)	1 (0.18)		552
Irregular salary non-agriculture related business (6)			12 (5.02)	1 (0.42)		226 (94.5)		239
Others (7)		1 (0.57)				1 (0.57)	172 (98.8)	174

Source: Authors' calculation (Frequency, row percentage, column percentage)

Table 8: Family Type Pre- and Post-March 2020 Urban Area

Particulars	Self-employment	Regular hiring, wage holder	Irregular pay holder	Others	Grand total
Self-employment	2938 (98.2)	32(1.07)	8(0.27)	14(0.47)	2992(100)
Regular hiring, wage holder	34(0.63)	5318(97.9)	25(0.46)	55(1.01)	5432(100)
Irregular pay holder –	6(0.82	10(1.37)	708(96.99)	6(0.82)	730(100)
Others	7(1.08)	26(4.02)	4(0.62)	609(94.2)	646(100)

Source: Authors' calculation.

Hypothesis Testing

The following section tries to understand whether being a migrant or non-migrant belonging to urban and rural backgrounds and having COVID-19 changes monthly expenditure. Due to space constraints, we have put the hypothesis testing process in a tabular form.

All the hypotheses have been rejected, which makes it clear that there was a difference in monthly expenditure pre- and post-COVID-19, whether the family members were migrants and had COVID-19 infection or belonged to either rural or urban areas. Everyone was affected by the prevalence of COVID-19.

As per section A, most of the respondents reside in urban areas; they are married, have a secondary level of education and have jobs/regular salaries as their income source. Most respondents were non-migrants; several experienced a reduction in their income levels, some had to change their occupational status, etc.

Table 9: Hypothesis Testing

Comparison of expenditure Pre and post-March 2020 of migrants and non-migrants by COVID infection					
Sr no	Hypothesis	Observations	Pre-March 2020	Post-March 2020 (last 30 days before data collection)	T-test
			Average expenditure		Dependent T-test
	A. Before and after March 2020 the monthly expenditure				
1.	of migrants is identical?	3393	18487	20767	Rejected
2.	of non-migrants is identical ?	63339	15783	17712	Rejected
3.	of migrants who are Covid infected is identical	812	18426	20942	Rejected
4.	of non-migrants who are Covid infected is identical	12933	16083	18221	Rejected

Comparison of monthly expenditure post-March 2020 (last 30 days before data collection) of migrant and non-migrant by COVID infection						
	Hypothesis	Observations		Average expenditure		Independent
		Rural	Urban	Rural	Urban	
	B. After March 2020, the monthly expenditure -					
5	of urban and rural migrants who are COVID infected is identical	225	587	13440	23818	Rejected
6	of urban and rural non-migrants who are COVID infected is identical	4739	8194	21790	12051	Rejected

Comparison of monthly expenditure post March 2020 of urban and rural migrants and non-migrants by COVID infection						
	Hypothesis	Observation		Average expenditure		Independent T test
		Migrant	Non-migrant	Migrant	Non- migrant	
	C. After March 2020, the monthly expenditure (last 30 days before data collection)					
7	of urban migrants and non-migrants who are Covid infected is identical	587	8194	23818	21790	Rejected
8	of rural migrants and non-migrants who are Covid infected is identical	225	4739	13440	12051	Rejected

Source: Authors' calculation.

With the help of chi-square tests, the significance of the relationships between the dependent variables and the independent are clear. All the independent variables were highly significant apart from family type in rural areas before March 2020 and family type in rural years after March 2020. Impact of COVID analysis- family type revealed that most families continued in the same profession before and after March 2020, which differs from the general opinion/perception that people had to change their profession.

Section B: Model

As observed previously, the variables incorporated in this study relate significantly to the dependent variable, migration. In this section, the study will use the logistic regression model. It is a prediction and classification model used when the dependent variable is categorical.

Description of the Models and Data Preparation

Four models have been used. The first model includes socio-economic variables such as age, sector, gender, marital status, COVID infection and working status. In the second model, the same variables were considered, but only in the case of age; the researchers removed the children below 15 years of age. The third model also contains the same variables; however, the respondents employed in the 'Working Class' have been removed and the impact has been analysed accordingly. In the fourth model, along with the socio-economic variables, age sector, gender, marital status, COVID-19 infection and education, the 'Source of Income' variable has also been included—model 4 covers only those respondents with working status, essentially those employed. Therefore, the study has incorporated the 'Occupation' variable to understand which profession (occupation) has more or less likelihood of migration with respect to the base category (Table 10).

Table 10: Regression Models: provide full title

Variables	Model 1 Odds ratio	Model 2 Odds ratio	Model 3 Odds ratio	Model 4 Odds ratio
Age	1.007**	1.008**	1.006**	0.984**
Sector (Reference: Urban)				
Rural	1.629**	1.637**	1.642**	0.690**
Gender (Reference: Males)				
Female	1.001	0.998	1.048	0.888
Transgender	0.353	0.354	0.196	1.271
Marital Status (Reference: Married)				
Unmarried	1.182*	1.167*	1.155	0.841
Widow	1.046	1.051	0.994	0.84
Divorced	2.276	2.3	1.195	0.277
COVID Infection (Reference: Yes)				
No	1.191**	1.185**	1.222**	0.835**
Working status (Reference: working class and not in labour force for Model 3)				
Unemployed and looking for a job	1.283	1.308	1.214	
Not in labour force	1.143	1.133**		
Education (Reference: Middle)				
Illiterate	0.906	0.838*	0.881	1.103
Literate without schooling	0.93	0.847	0.49	
Non-formal education NFEC	1.625	0.831		
Non-formal education AEC	0.736	0.596	1.666	
Pre-primary	1.183*	1.314*	1.146	0.999
Primary	0.955	0.931	0.929	1.045
Pre-secondary	0.964	0.923	1.044	1.283*
Higher secondary	0.883*	0.888	0.828*	0.978
Diploma or certificate	0.837	0.837	0.723	0.962
Degree	0.919	0.919	0.813*	0.795*
Post-graduate and above	0.975	0.972	0.997	0.814
Others	0.927	0.907	1.433	1.265
Source of income (Reference: No change in the income source).				
Change in the income source				1.755**
Occupation (Reference: Self-employed, with no paid worker)				

Variables	Model 1 Odds ratio	Model 2 Odds ratio	Model 3 Odds ratio	Model 4 Odds ratio
Self-employed with a paid worker				1.062
Helper in family business (unpaid)				0.805
Regular salary/wage holder				1.543**
Social work (or programme)/ irregular salary in work/daily wage				0.659
Irregular salary in other private work/daily wage				0.645**
Constant	9.637	0.962	11.089	0.125
Observations	66674	54096	39655	21917

Source: Authors' calculation; *p<0.05 and **p<0.01.

Statistics/ Factors	Model 1	Model 2	Model 3	Model 4
Log-Lik Intercept only	-13401.079	-11023.262	-7716.058	-4680.904
AIC:	0.399	0.405	0.387	0.422
BIC:	-713720.584	-567423.945	-404284.727	-209610.546
Log-Lik Full Model:	-13271.721	-10913.047	-7642.426	-4595.195
LR*	258.717	220.430	147.263	171.418
AIC*n:	26601.442	21884.094	15340.853	9242.39
BIC':	-14.351	19.337	64.496	8.493

Source: Authors' calculation. * Degrees of freedom is different for a different model

Model 1 includes socio-economic variables that may influence migration and the 'Covid infected' variable to examine its impact on migration decisions. Regarding 'sector', the likelihood of migration of rural respondents is higher when compared with the base category of urban respondents. The difference is significant; however, model four has the opposite outcome. Regarding gender, with males as the base category, the likelihood of migration appears to be higher for females. However, these differences are not statistically significant for all four models, indicating insufficient evidence to conclude that gender significantly impacts the likelihood of migration. Regarding marital status, with married respondents as the base category, the likelihood of migration is higher for unmarried respondents, and this difference is statistically significant except for model four. No statistically significant differences were observed for widowed and divorced respondents despite their higher likelihood of migration than married respondents. However, the sample is tiny in comparison with other groups.

Respondents not contracting the COVID virus have a significantly higher likelihood of migration than those who were infected. Again, model four has a different outcome. For the 'working status' variable, with employed respondents as the base category, the likelihood of migration appears to be higher for those 'Unemployed and looking for a job' and those 'not in the labour force'. However, these differences are not statistically significant, indicating insufficient evidence to establish an impact of 'Working Status' on the migration decision. The same is true for all the first three models.

For the 'Education' variable, the base category is respondents who completed a 'Secondary' level of education. The likelihood of migration of those with a pre-primary level of education increases, but that of those with higher secondary education decreases. The differences are statistically significant in all four models.

In Model 2, respondents below the age of 15 have been removed, considering they may not be able to decide whether to migrate or not. In the working status variable, the researchers removed those employed in Model 3. However, the odds ratio has not changed in models 2 and 3 compared with model 1. Model 4 provides a few results that are different from all the first three models. For occupation, the base category was those who were self-employed (with no paid worker); compared to them, the likelihood of those who were regular salary/wage holders was higher and significant. The likelihood of migration or those who had irregular salaries in other private work/daily wage holders was lower and significant in the base category.

As discussed earlier, these four models have different variables and counts and so each model's outcome cannot be compared. Model 1 is better according to the BIC criteria, while model 3 is better according to the AIC criteria. Theory suggests that BIC has a higher penalty than AIC for a large sample. So we recommend that model 1 be used for further discussion. The mandatory econometric test was performed and necessary modifications were made to the model.

Model 1 includes socio-economic variables that may influence migration and the ‘Covid infected’ variable to examine its impact on migration decisions. Starting with the ‘Sector’ variable (urban vs rural) – the rural respondents are more likely to migrate than the urban ones and this difference is statistically significant in Model 1. However, this result reverses in Model 4, where urban respondents appear more likely to migrate – highlighting that this relationship is not consistent across all models.

Decisions related to migration are taken mainly by the male counterpart in a family. With males as the base category, the likelihood of migration appears to be higher for females. However, the differences are not statistically significant in any of the models. This means we don’t have sufficient evidence to suggest that gender has a meaningful impact on migration decisions.

When it comes to marital status, unmarried individuals are more likely to migrate than married ones, and this difference is statistically significant in all the models except Model 4. Widowed and divorced respondents also appear more likely to migrate than married ones, but the differences are not statistically significant because there are few respondents in these categories.
For the COVID-19 infection variable, people who were not infected by the virus are significantly more likely to migrate than those who were infected. Again, Model 4 gives a different result which weakens the consistency of this finding.

Looking at working status, with employed respondents as the base category, those who were unemployed, looking for work, or not in the labour force show a higher likelihood of migration. However, none of these differences are statistically significant in the first three models. So, we cannot confidently say that employment status impacts migration decisions.

For the ‘Education’ variable, the base category is respondents who have completed a ’Secondary’ level of education. Interestingly, respondents with only pre-primary education are more likely to migrate, while those with higher secondary education are less likely to do so. These differences are statistically significant across all the four models, indicating that education level does play a role in migration decisions.

In Model 2, respondents below age 15 were removed from the sample since they aren’t in a position to make independent migration decisions. In Model 3, employed individuals were excluded to isolate other working categories. Despite these changes, the odds ratios in Models 2 and 3 remain similar to Model 1. Model 4 provides a few results that are different from all the first three models.

For the occupation variable, the base group is the self-employed without any paid workers. Compared with them, people with a regular salary or wage holders are significantly more likely to migrate. In contrast, those with irregular or daily wage work are significantly less likely to migrate. These results are statistically strong.

As discussed earlier, these four models have different variables and counts and so each model’s outcome cannot be compared. Model 1 is better according to the BIC criteria and model 3 is better according to the AIC criteria. Theory suggests that BIC has a higher penalty than AIC for a large sample, and so we recommend that model 1 be used for further discussion. The mandatory econometric test was performed and necessary modifications were made to the model.

Conclusion

The data suggests that most respondents did not migrate. This is likely due to the travel closures and lockdowns brought on by the pandemic. However, 5 per cent of the respondents did migrate due to the pandemic (asked explicitly in the questionnaire). The possible reasons, as mentioned previously, were fear of COVID-19, treatment, etc.

Although the question gives a count of the number of people/families who migrated, data regarding the type of migration, whether rural-rural, rural-urban, urban-rural or urban-urban, is unavailable which could have given better insights. The model analysis only provides the information that the respondents living in the rural area had a higher likelihood of migration than the urban. Regarding gender, umpteen research papers suggest that females are more likely to migrate than males. However, the results for gender were not statistically significant when compared with the base category, which provides insufficient evidence to conclude that gender significantly affects the likelihood of migration. The researchers could not find studies analysing the impact of gender on migration after the advent of the pandemic at this granular level. Therefore, this result remains a contribution and paves the way for further detailed research. In the context of India, migration is, in fact, heavily driven by marriage, especially in the case of women, as discussed previously, who have, according to the 2011 Census, elicited to be their dominant reason for migration, followed by employment. As researched by Kyoung & Kim in 2018, married people are more likely to migrate than their unmarried counterparts. Here, this is not the case. Unmarried respondents have shown a statistically higher likelihood of migration than married respondents. Some possible reasons could include migrating to be the family or elderly people, fear of COVID-19, treatment, or other factors, which gives a good reference point to explore further why this was observed.

Respondents who did not come into contact with the virus had a higher likelihood of migration than those with the virus. This is especially true as those who contracted the virus had to isolate themselves for about 14 days (depending on the severity or as advised by the doctors) to prevent it from spreading. Researchers could not find any literature on the relationship between people who contracted the virus and their migration. Therefore, this is one of the contributions of this study.

For education, as per the literature, as the level of education increases, the likelihood of migration increases (Kyoung & Kim, 2018). In this analysis, in the first model, the pre-primary education provided a higher likelihood of migration. In contrast, the higher secondary had a lower likelihood than the base category and a similar case was observed only for the pre-primary level in the second model. In the subsequent model, the pre-secondary respondents had a greater likelihood of migration than the base category, which consisted of respondents with a secondary education level. This is inconsistent with the literature before the pandemic. Moreover, no such study was found wherein justification was provided for whether those who migrated during COVID-19 had which level of education. Therefore, it also remains one of the contributions of this paper.

Besides, respondents whose income sources changed during the pandemic were more likely to migrate than those whose sources did not change. The researchers found no literature supporting or disagreeing with this notion.

There are a few outcomes which do not follow the standard outcome in case of normal circumstances which itself suggests that the COVID period was a circumstance when every household or member of the household, be it from a rural or urban area, be businessmen or a job seeker, be they were migrant or non-migrant, got impacted. There were many reports, but this research is based on the data collected during the pandemic and the sense of what would have happened during the difficult time.

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