

Moving in the time of COVID-19: How did the pandemic situations affect the migration decisions of Hong Kong people?

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Abstract

Following mass social protests in 2019 and the enactment of a national security law in 2020 in Hong Kong, a significant proportion of Hong Kong people considered migrating to another country. At the same time, the COVID-19 pandemic had spread rapidly around the world. This background provides researchers with an excellent opportunity to study the possible impacts of a pandemic on migration decisions and planning. We investigate whether the migration intention and the planned timing of migration of Hong Kong people have changed with the COVID-19 pandemic situations both locally and abroad. We also examine if the impact of the pandemic might have varied with people's age, gender, education, and parental status. Data are from a random-sampled survey (N=2,492) conducted in 2021–2022, which collected socio-demographic information and migration intention and planning of Hong Kong people with a British National (Overseas) status. We find that a more severe COVID-19 situation in Hong Kong is positively associated with one's migration intention. The migration intention of younger and more educated people is more strongly associated with the COVID-19 situation in Hong Kong. However, the COVID-19 situation in the UK is not significantly associated with one's migration intention. Among people who intend to emigrate, a more severe local COVID-19 situation is positively associated with uncertainty about the timing of migration. We conclude by highlighting the significance of global pandemics in shaping migration decisions.

Introduction

The global COVID-19 pandemic and the related measures to contain it have disrupted public services and economic activities widely and have impacted almost all aspects

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of everyday life in the last three years. A plethora of research has been conducted to examine the impacts on social life and individuals' well-being.

A key strand of social research focuses on whether the pandemic has created and reinforced social inequalities. It has been reported that migrants, among other vulnerable groups in society, have suffered greatly during the COVID-19 pandemic. The negative consequences include economic hardship (Liao, 2020; Suhardiman et al., 2021; Zhou & Kan, 2021), homelessness (Stewart & Sanders, 2022), and heightened discrimination in host societies (Freitag & Hofstetter, 2022). However, little research attention has been given to how the pandemic might have acted as a driving force or a deterrent factor for migration intentions and mobility flows. In this study, we explore how a pandemic might affect migration flows by using Hong Kong as a case study. Specifically, we investigate how the local and global development of the COVID-19 pandemic has impacted the migration intention and planning of Hong Kong people. We chose Hong Kong as our case study because many Hong Kong people were considering emigration when COVID-19 was spreading rapidly around the world. Following mass social protests in 2019 and the enactment of a national security law in 2020 in Hong Kong, a significant proportion of Hong Kong people consider migrating to another country, and the UK is the most popular country of emigration (Kan et al., 2021). On 31 January 2021, the UK government introduced a new visa scheme which provides Hong Kong people who hold the British National (Overseas) (BN(O))¹ status a pathway for British citizenship in the UK. The new BN(O) visa scheme has since become a convenient and relatively affordable emigration route for Hong Kong people.

We employ novel data collected from a survey conducted soon after the new BN(O) visa scheme was introduced and when the COVID-pandemic was spreading worldwide to investigate how the COVID-19 pandemic situations in Hong Kong and the UK might have affected migration decisions and the estimated timing of migration of Hong Kong people. Furthermore, we assess how these impacts, if any, might vary with people's age, gender, educational attainment, and parental status.

¹ British National (Overseas) (BN(O)) is a nationality that the UK government offered to Hong Kong citizens who were born before 1 July 1997, when the sovereignty of Hong Kong was returned to China. BN(O) status holders do not have the right of abode in the UK. The BN(O) status could only be obtained before 1 July 1997 and cannot be passed to one's spouse or children.

COVID-19, migration, and the case of Hong Kong

In the subsequent discussion, we review previous studies on the relationship between migration and the COVID-19 pandemic. We then outline the development of COVID-19 in Hong Kong and the UK, and the new BN(O) visa scheme for Hong Kong people to migrate to the UK.

COVID-19 and migration intention

During a pandemic outbreak, people naturally seek places where the number of cases is lower than where they live and move to those areas, if possible, to avoid the risk of infection. Recent research on COVID-19 has demonstrated that prolonged pandemics with heightened health risks can create needs for migration from high- to low-risk areas. For example, Lei and Liu (2022) demonstrate that the individual's intention to relocate with their family members or parents surged at the beginning of COVID-19 in the United States.

The risk of being infected is just one of many grounds for migration. Other push factors include extensive lockdown measures to control the spread of the COVID-19 virus and the subsequent negative economic consequences. In countries where the economy has been severely affected, disrupted access to living necessities has also been associated with increased migration. Individuals prone to food insecurity, for instance, migrate to diversify household income and make up for reduced consumption (Smith & Wesselbaum, 2020). In addition, research on health and migration shows that individuals' perception of health policies is tied to migration decisions. In societies with restrictive access to healthcare services, individuals may consider migration for better life prospects (Dako-Gyeke, 2016). Furthermore, confidence in the competence and capacity of the healthcare system of their place of origin can influence the motivation to move (Chindarkar, 2014). As the risk of pandemic-induced mortality drops, economic concerns remain the primary driver of migration. For example, even when COVID-19 is much more severe in the host country than in the home country, many migrant workers do not return to their home country in order to maintain their financial support to their families (Giordano, 2021).

Potential migrants may also delay their plan of moving. For international migration, the cost of crossing borders has become even higher because of mandatory health

checks and quarantines (Yeoh, 2022). The risk of infection and falling sick underscores the increased need for care, and people may wait until the pandemic is over to migrate. For example, potential women migrants may delay their move to perform caretaking activities at home during an outbreak (Song et al., 2021).

These findings show that migration can be a pathway in search of social support, capital acquisition and an exit from risks and instabilities. However, the motivation to move during the pandemic may play out differently, according to potential movers' demographic characteristics such as age, gender, parenthood status, and income. Starwarz et al. (2022) found that internal migration has declined in Germany, with young people experiencing the largest drop among all age groups. Song et al. (2021) reported that women migrant workers are less likely to go back to the host country and resume paid work after their visit to their home country in order to take up a caretaker role. Having a young child, for example, is strongly associated with delayed plans to move to other cities for work, even though women might have found work opportunities with higher income in their planned migration destination. Haslag and Weagley (2022) observed that high-income households relocate away from densely populated cities faster than low-income households.

In sum, the decision of migration is a complex calculation of many factors. The development of the COVID-19 pandemic highlights the significance of health risks in shaping migration intentions and substantially increases of travelling uncertainties. Whether and how this relatively short-term health risk outweighs long-term socioeconomic concerns in different social groups is the primary focus of this research.

COVID-19 and the responses of the governments in Hong Kong and the UK

Hong Kong

The first case of COVID-19 in Hong Kong was announced by the government on 22 January 2020. The number of COVID-19 cases in Hong Kong was low until early 2022, when a sudden surge in newly-confirmed infections occurred. By then, there were already several waves of COVID-19 in the UK. Figure 1 illustrates the changes in daily new cases (7-day average) in Hong Kong and the UK. The dates on the x-axis

indicate the periods of the survey data used for this study (more details in the Data and Methods section).

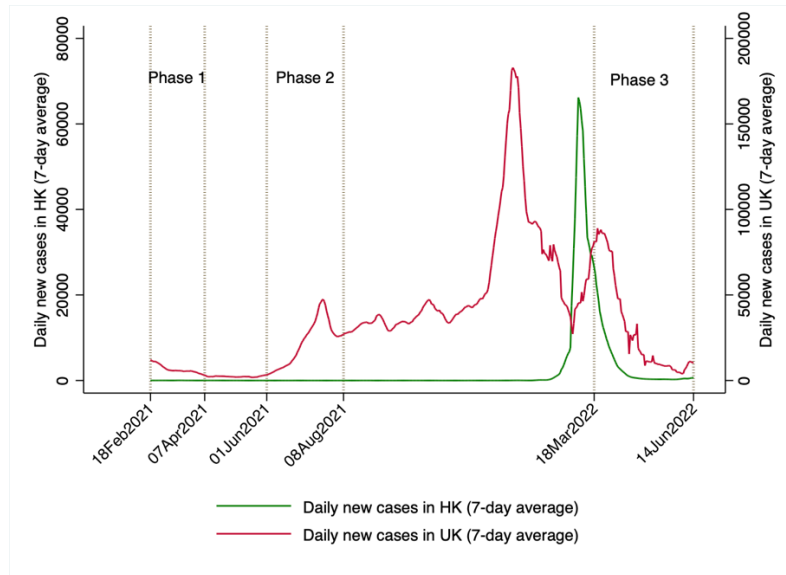


Figure 1: COVID-19 daily new cases in Hong Kong and UK (7-day average)

Source: Hannah Ritchie, Edouard Mathieu, Lucas Rod s-Guirao, Cameron Appel, Charlie Giattino, Esteban Ortiz-Ospina, Joe Hasell, Bobbie Macdonald, Diana Beltekian and Max Roser (2020) - "Coronavirus Pandemic (COVID-19)". *Published online at OurWorldInData.org*. Retrieved from: '<https://ourworldindata.org/coronavirus>' [Online Resource]

During the onset of COVID-19, the Hong Kong government was reluctant to heed the advice of medical experts to take strict elimination strategies such as setting up isolation wards in hospitals and compulsory checks at the border with mainland China. As a result, the public was filled with distrust towards the government's management of COVID-19 (Au et al., 2022). From February to July 2020, the government gradually imposed more proactive measures such as implementing a 14-day quarantine for arrivals from mainland China, forbidding gatherings of four people or more, and mandating compulsory mask-wearing in public. In January and February 2021, the government imposed short-term lockdowns and conducted compulsory testing in selected neighbourhoods. However, these lockdowns were announced without prior notice, leading to unpredicted revenue loss among business owners (Cheng, 2021). The stricter policies reduced virus transmission, but many of these arrangements have inevitably disrupted daily activities.

Border policies also vary with the development of both local and overseas COVID-19 cases. In December 2020, the Hong Kong government closed its borders to flights from the UK, and this suspension was only lifted until May 2021. This was quickly followed by another round of flight cancellation from 1 July 2021 onward, following the spread of the new Delta variant. This disrupted the plans of many Hong Kong people studying or working in the UK who had wished to return home after almost two years. Since May 2022, the borders have re-opened, and non-Hong Kong residents have been allowed to enter Hong Kong from abroad.

The UK

The UK has responded to the pandemic by adopting a flattening-the-curve approach (Zinn, 2021). COVID-19 was first recorded in the UK on 29 January 2020. To minimize the disruptive impact of COVID-19 on the economy, the government endorsed the development of herd immunity to prevent the healthcare system from being overloaded (Zinn, 2021). Nonetheless, on 23 March 2020, a nationwide lockdown was announced. People were asked to stay home except when going out to buy household necessities or for health reasons. Gatherings of more than two people in public spaces were banned (Cabinet Office, 2020). A second and third lockdown were introduced in November 2020 and January 2021 respectively when new daily cases and deaths were on the rise. These restrictions were relaxed with schools and non-essential shops re-opening through March and April 2021. In July 2021, most legal measures on COVID-19 were lifted in England. The government advocated instead for individuals to “test, trace and isolate” by themselves (Prime Minister’s Office, 2021). In 2022, the overall narrative has emphasized the need to “live safely with Coronavirus” and to maintain basic hygiene (UK Health Security Agency, 2022).

The Hong Kong British National (Overseas) migration route to the UK

It is noteworthy that in Hong Kong, the beginning of the pandemic was preceded by the Anti-Extradition Bill protest that started in June 2019. Following the legislation of the National Security Law in June 2020, political confrontations and insecurity have pushed a significant proportion of Hong Kong people to consider international migration for long-term settlement (Kan et al., 2021; Lui et al., 2022).

In Kan et al.'s (2021) study, the UK is the most popular destination among Hong Kong residents. In January 2021, the UK introduced a new visa scheme for Hong Kong residents with the BN(O) status. The BN(O) status is a British nationality offered to Hong Kong residents, as British Territories citizens, to retain their connection with the UK after the handover of sovereignty to China on 1 July 1997. The BN(O) status is lifelong and cannot be transferred to spouses or children. It is also not possible to apply for the BN(O) status after the handover of sovereignty. Under the new scheme, BN(O) holders can apply for permanent residence after spending five years in the UK along with other requirements. They can also apply for settlement together with dependents such as their partner and children who do not hold the BN(O) passport. Many see this as an opportunity for an expedited pathway to settlement in the UK. As of the end of March 2022, 123,440 applications were received for the scheme (Home Office, 2022). On 29 April 2022, the UK government revised the BN(O) visa scheme to allow Hong Kong residents born on or after 1 July 1997 to apply independently, on the condition that one or both of their parents hold the BN(O) status (Home Office, 2022).

The discussion above implies that the impact of the COVID-19 situation on migration is a combination of the associated infection and mortality risks and the disruption to the socioeconomic order due to non-medical measures to control the virus. While political unrest and the new BN(O) visa scheme are strong motivation factors for Hong Kong people to emigrate, this paper asks whether the COVID-19 situations in both Hong Kong and the UK may have further influenced people's migration intention and planning. We utilize the published daily new cases and deaths linked to COVID-19 to measure the development of COVID-19 in these two areas. Overall, the situation of COVID-19 is more severe in the UK, the major migration destination, than in Hong Kong.

Data and methods

Data measuring individuals' migration intention and other socioeconomic factors are from a random-sampled survey. This survey collected socio-demographic information, migration intention, and social and political attitudes of Hong Kong people in three periods when the pandemic situation and policies in Hong Kong

changed considerably and are contrasted with those in the UK: February to April 2021, June to August 2021, and March to June 2022. The surveys have been ethically approved by the Department of Sociology, University of Oxford (Ref: SOC_R2_001_C1A_21_01).

The survey aims to understand the migration intention of Hong Kong people with BN(O) status. Random samples were drawn from landline and mobile phone telephone numbers using the random digit dialling method. Irrelevant numbers were eliminated. The response rates of the three phases were 71.3 per cent, 70.5 per cent and 70.3 per cent respectively. In total, 1,003 BN(O) citizens born before 1 July 1997 were interviewed in Hong Kong from February to April 2021; 1,000 from June to August 2021; 1,000 from March to June 2022. 500 people, aged 18 to 23, were also interviewed in the last round of the survey because the UK government extended the BN(O) visa scheme to young adults who have at least one parent with BN(O) status. However, to make the sample age range consistent across the three rounds of the survey, we have dropped these cases in our analysis.

Due to social distancing policies and restrictions during the pandemic, the survey questionnaires were sent to respondents prior to the interview, and the interviews were conducted by phone or via a social media interface such as FaceTime, WhatsApp and WeChat. We controlled for interviewing interface in our preliminary analysis and found that it is not associated significantly with migration intention and does not affect the association between COVID-19 situation and migration intention.

COVID-19 pandemic data were retrieved from the Coronavirus Pandemic data published online at *OurWorldInData.org*. The data include detailed information about daily confirmed new cases and deaths, which is merged into the survey data according to the date of the interview in the survey.

In the analysis, the data were weighted based on the distribution of age, gender and educational levels of the Hong Kong population aged 23 or above (calculated from the 2016 Hong Kong Population by Census data). Therefore, the distribution of age, gender, and educational levels in our weighted sample is similar to that of the Hong Kong population aged 23 or above in 2016.

Measures

Migration intention and planning are the two outcomes of interest. The first dependent variable is the migration intention to another country. Respondents were asked the following question: *Do you have the intention to move to a country outside Hong Kong and China in the future?* Four answers were available: “Yes”, “No”, “I am considering”, and “Don’t know”. We create a binary variable, which is coded 1 if the respondent answered “Yes” or “I am considering”, and coded 0 if the answer is “No” or “Don’t know”.

The second dependent variable is the planned migration timing. Respondents who answered “Yes” or “I am considering” to the above question were asked the following question: *When do you think you will migrate to another country?* Respondents were given the following choices: “within 1 year”, “1 to 2 years from now”, “2 to 5 years from now”, “5 to 10 years from now”, “10 years later from now”, “not decided yet”, and “do not know”. The answers to this question were recoded into 4 categories: “within 2 years from now”,² “2 to 5 years from now”, “5 years later from now”, and “undecided” (“Not decided yet” and “Don’t know”).

The key independent variable is the COVID-19 situation. The COVID-19 situation in Hong Kong is measured by the 7-day average of the daily new cases, measures in terms of 100 cases per 1 million population, prior to the date of the interview. The same measure is taken for COVID-19 cases in the UK. We also tested alternative measures such as the previous 30-day, 14-day average of the daily cases and deaths, but the overall conclusion remained unchanged. Nonetheless, people’s responses are more responsive to the more recent measures and the impact of new cases of deaths is huge.

We considered several potential confounders that are correlated with both the COVID-19 situation in Hong Kong and migration intention. These confounders, if not included in the analysis, may bias our estimations about the impact of COVID-19 on people’s migration decisions. First, we know that the COVID-19 situation overseas was evolving concurrently with that in Hong Kong. These changes in the global COVID-19 situation may affect people’s migration intention as well as the COVID-19

² The answers from the first two options are collapsed because of the small number of observations in the first category. Only 52 people answered that they planned to migrate within a year.

situation in Hong Kong. We therefore included dummies indicating the three phases of surveys to gauge the effect. We further tested the impact of the overseas COVID-19 situation by including new COVID-19 cases in the UK, as discussed above.

In addition, as we examine the potential differences in the impact of the COVID-19 situation across different groups based on their age, gender, parenthood status, educational level, and whether the respondent already holds a BN(O) passport³, we further included these variables in the baseline model. We included four age groups: “23–34 years old (reference group)”, “35–44 years old”, “45–54 years old”, and “55 years and older”. Parenthood status indicates those who have children aged 18 and below. Education is classified into three groups: “secondary or below” (reference group), “post-secondary”, and “bachelor degree or above”. BN(O) passport status is 1 if this person holds a BN(O) passport.

Analytical Plan

Our analytical sample includes all BN(O) status holders (N=2,492). Adult children of BN(O) status holders were interviewed only in the third phase of the survey. For consistency of the samples, we exclude them from the analysis of this paper. We have dropped cases with missing values of key variables (8 cases, <0.01%). Logistic regression models are conducted to examine how the COVID-19 pandemic situation in Hong Kong and the UK affects people’s migration intention, and whether the effect differs among people with different socio-demographic characteristics such as gender, age, education, and parental status. The baseline model focuses on the association between migration intention and the COVID-19 situation while controlling for the above characteristics, and additional models were conducted to examine the interaction between the COVID-19 situation in Hong Kong and each characteristic. Moreover, a series of multinomial logistic regressions were used to investigate how the COVID-19 situations in Hong Kong and the UK are associated with migration timing, and whether the association differs by gender, age, education, parental status, and whether the respondent has a BN(O) passport.

³ All respondents in the sample hold a BN(O) status but only some hold a valid BN(O) passport. BN(O) is a nationality status. Many BN(O) status holders do not currently hold a BN(O) passport because their passports issued in or before 1997 have already expired or were lost. However, they can renew their passports anytime. BN(O) status holders can apply for the BN(O) visa scheme to emigrate to the UK by using a BN(O) passport or a passport of another nationality.

Descriptive results

Table 1 presents the descriptive results of the variables of the sample. Means are adjusted to make the sample close to the 2016 Hong Kong population census based on age, gender, and educational levels. In our weighted sample, 23 per cent of the respondents intend to migrate. Among those who intend to migrate, 28 per cent plan to move within 2 years, and 32 per cent are not sure about the migration timing. Over the past seven days, there were 229 newly confirmed COVID-19 cases per 1 million population in Hong Kong, and the number was 3,778 in the UK. Therefore, as shown in Figure 1, the situation of COVID-19 is more severe in the UK than in Hong Kong during the survey period. 46 per cent of the weighted sample belongs to the group aged above 55 (the median age of respondents is high because people born after 1997 do not qualify for BN(O) status). 53 per cent of the weighted respondents are women, and 22 per cent of them have children younger than 18 years old. Most respondents (68 per cent) have lower than secondary level of education. Approximately 21 per cent of the weighted sample have a university degree or above. 54 per cent of our weighted sample have a BN(O) passport.

[Insert Table 1 about here]

Multivariate analysis results

We focus on two outcomes related to migration. The first one is whether people intend to migrate. The second is, among those who do intend to migrate, when do they plan to migrate.

Migration intention

Table 2 shows results (reported in odds ratio) from the logistic regression of COVID-19 cases and migration intention. The baseline model shows that with the growth of every 100 more cases per million on average in the previous 7 days in Hong Kong, the odds of migrating increase by 9.1 per cent. The new cases in the UK are not associated significantly with migration intention. We also note that this model has no strong period effect on migration. Regarding the socio-demographic characteristics, younger, more educated, and those having children under 18 years old are more likely to migrate. For example, the odds of migration for people aged 45–54 and those older

than 55 are 44.3 per cent and 62.5 per cent less than that of people aged 23–34, respectively. Having children aged under 18 increases the odds of migration by 67.5 per cent. In terms of education, the odds of migration for those who have attained post-secondary school education are 2.20 times higher compared to those with secondary school education or below, and the figure is 3.92 for those who have received a bachelor’s degree education. The odds for BN(O) passport holders are 2.16 times higher than non-holders. However, there is no significant difference in the migration intention between women and men.

[Insert Table 2 about here]

We now transform the odds ratio to the predicted probability of an intention to leave Hong Kong to show the impact of COVID-19 cases on migration. We use the Average Marginal Effect (AME) to represent how one unit changes in the 7-day average of new COVID-19 cases per 100 million population in Hong Kong is associated with the change in the probability of answering “yes” or “considering” moving out of Hong Kong. This effect is calculated by averaging the marginal effect for every observation in the sample. The standard errors of this AME are calculated following the delta method, which is set by default in the *margins* command in STATA (Ai and Norton 2003; Agresti 2013). The transformation of the estimated coefficient in Table 2 into AME shows that, for every 100 new COVID-19 cases per million people over the past 7 days, the probability of intending to move increases by about 0.013 on average across the sample ($p=0.019$). The predicted margins and 95% confidence intervals across the new COVID-19 case values are plotted in **Figure 1**.

[Insert Figure 1 about here]

The effect of COVID-19 cases in Hong Kong on migration intention may differ by social group, including age, education, gender, parental status, and whether they hold a BN(O) passport. We interact these social group variables with the COVID-19 cases variable and report the results in **Appendix Table A1**. Following the previous example as in **Figure 1**, we report the AME of the COVID-19 cases for different social groups in **Figure 2**. **Figure 2** shows the predicted margins and 95% confidence intervals about migration intention across the COVID-19 cases for people in different age groups and educational groups, respectively. Compared to the younger age groups (23 to 44 years), the migration intention of older people (45 or above) changes much

less with the increase of COVID-19 cases in Hong Kong. In terms of education, **Figure 2** clearly shows that as the number of COVID-19 cases increases in Hong Kong, individuals with higher education are more likely to indicate that they intend to move, in addition to their already higher migration intention.

[Insert Figure 2 about here]

We do not report the results of the interaction terms for gender, parental status, and BN(O) passport holders in the main text, because the AME of the COVID-19 impacts on migration intention do not differ significantly between women and men, between parents and non-parents, and between BN(O) and non-BN(O) passport holders. Please see **Appendix Table A1** and **Figure A1** for more details.

Migration timing of people who intend to migrate

Among those who intend to migrate, we examine whether the COVID-19 situation could have affected their planned timing of migration. Table 3 reports the multinomial regression results (reported in odds ratio). More new cases in Hong Kong are positively associated with 28.3 per cent higher odds of being unsure about the planned migration timing compared to planning to migrate within 2 years. We also note that more new cases in the UK are associated with a reduction in the odds of being unsure about their planned migration timing, with the odds decreasing by 4.5 per cent. More educated people, parents with children aged 18, and BN(O) passport holders are less likely to have delayed planning of migration. For instance, referring to the first set of models in Table 3, for people with post-secondary education and bachelor's degree education, the odds ratios of migrating in 2 to 5 years compared to migrating within 2 years are 0.34 and 0.50 respectively. Referring to the second set of the models in Table 3, the odds for parents with children under 18 to migrate 5 years or later are 43 per cent less compared to migrating within 2 years.

[Insert Table 3 about here]

Similarly, we transform the odds ratio into the predicted probability of leaving Hong Kong at a given time to show the impact of COVID-19 cases on migration. We use the AME to represent how one unit change in the 7-day average of new COVID-19 cases per 100 million population is associated with the change in people's planned

time of migration. This effect is calculated by averaging the marginal effect for every observation in the sample. The transformation of the estimated coefficient in Table 3 into AME shows that for every 100 new COVID-19 cases per million people over the past 7 days, the probability of answering that they are unsure about the time of migration increases by about 0.042 on average across the sample ($p=0.010$). For every 100 new COVID-19 cases per million people over the past 7 days, the probability of answering that they plan to migrate within two years is reduced by about 0.025 on average across the sample ($p=0.028$). The probabilities of answering “between two and five years” and “more than five years” do not change significantly with the number of new COVID-19 cases in Hong Kong ($p=0.765$ and $p=0.110$ respectively). The predicted margins and 95% confidence intervals across the new COVID-19 cases values are plotted in **Figure 3**. **Figure 3** clearly shows that people are more uncertain about the time to leave Hong Kong when more local new COVID-19 cases were reported.

[Insert Figure 3 about here]

In the following sections, we examine how the modified migration schedule associated with local COVID-19 cases may differ for individuals in different social groups. We interact age, education, gender, the presence of a young child in the household, and whether they have a BN(O) passport with local COVID-19 cases and run the interaction models. The results are reported in **Appendix Tables A2 to A6**. Because the largest changes associated with local COVID-19 cases are found among those who are uncertain and those who plan to migrate within 2 years in the baseline model (Table 3 and Figure 3), we present predicted margins and 95% confidence intervals only for these two migration plans.

We first examine the differential effects for individuals of different ages and education and plot the results in **Figure 4**. **Figure 4** shows that when the number of daily new COVID-19 cases is not very high, people in the 55+ age group have the greatest reduction in the probability of migration for the category “within 2 years” compared to the other age groups. Among individuals from different educational groups, the response of individuals with a college degree does not change as much with new COVID-19 cases each day as it does for individuals with less education.

[Insert Figure 4 about here]

We do not report the results of the interaction terms for gender, parental status, and BN(O) passport holders here, because the AME of the impact of COVID-19 on migration timing does not differ significantly between women and men, parents and non-parents, and BN(O) and non-BN(O) passport holders. More details can be referred to **Tables A2–A6** and **Figure A2** in the Appendix.

Supplementary analysis

In further analyses, we have included employment status, marital status, and income in our models to examine whether the parameter estimate of the COVID-19 cases will change. The main results and the conclusions remain unchanged.

We have also considered some potential pathways that could explain the change in people's migration intention. For example, the spread of COVID-19 may impact people's health, thus changing their migration intention. We have included people's self-reported health condition in the analysis and have not found that this variable mediates the impact of COVID-19 cases in Hong Kong. We have also considered people's attitudes (ranked on a 1–5 Likert scale from “very satisfied” to “very dissatisfied”) towards the governments' public policies to control the spread of the COVID-19 virus. The inclusion of this variable does not change the estimate of the COVID-19 cases in Hong Kong either.

We would also like to highlight that the major impact of COVID-19 is driven by the sample from the third round of the survey, where the daily new cases have been changing dramatically. We also tested whether dropping people born after 1997 would affect our results by including them in the sample and testing models using the full sample from the third round of the survey. The results remain almost the same. Therefore, the estimate of the COVID-19 cases in Hong Kong stays stable when using different samples and models.

Discussion and conclusion

COVID-19 has transformed both internal and international migration and mobility. Although previous research has examined how COVID-19 has changed people's attitudes toward migrants and the changing situation of migrants themselves, we know

little about how the migration intention and planning of the general population have been affected. By analysing novel data collected during the time of potential mass emigration in Hong Kong and the rapid development of the COVID-19 pandemic worldwide, we have found profound evidence of the impact of a pandemic on migration decisions. Our findings show that a pandemic can be a push factor or a pull factor for migration: people tend to move away from a region where the infection is spreading fast; people are also more likely to be uncertain about the timing of migration when a pandemic is growing locally. These findings highlight people's fear of being infected, and migration is a way to lower this risk. In the meantime, increases in the uncertainty surrounding migration plans underscore the strong impact of mobility restrictions imposed by governments around the world.

But people do not experience or feel the impact of COVID-19 in the same way. The impact of the pandemic on migration intention varies with age and educational level. Our findings indicate a strong positive association between the rise in COVID-19 cases and people's migration intention. However, the association is much stronger for people with university education attainment. People with higher education are more capable of moving to high-income countries to lower the risks of being negatively affected by COVID-19 in Hong Kong. On the other hand, the migration intention of older people is less affected by the growth in the local pandemic situation. This finding is interesting because older people are among those at a higher risk of being negatively affected by COVID-19. However, compared to younger people, they are less able and much less willing to start a new life in another country. As a whole, younger and more educated people show a stronger intention to migrate because of the COVID-19 situation in Hong Kong. These people are at a relatively lower risk of being severely affected by the COVID-19 pandemic health-wise and tend to be more capable of overcoming travelling difficulties due to COVID-19 related policies.

Furthermore, we have found that among people who intend to migrate, the growth of local COVID-19 cases makes them feel uncertain about when to migrate, hence potentially delaying their migration. However, this growth in uncertainty is more substantial for older people and those less educated. These findings underscore again that even among those who are determined to migrate, people with lesser capabilities

of overcoming travelling difficulties, such as those older and less educated individuals, will be more negatively affected.

To conclude, our findings suggest that a pandemic is a risk factor for migration: people make rational decisions to avoid staying in risky areas. Increases in local risks are associated with more hesitations and delays in migration. The impacts of local risks also differ for people of different ages and education. Moreover, the closing of national borders has halted travel worldwide and has increased the uncertainties of migration plans. The United Nations has estimated that the growth of international migration is reduced by 27 per cent due to COVID-19 (United Nations, 2020). In Hong Kong, we have observed a similar impact. Our findings suggest that travelling restrictions have impacted social groups unevenly. People who are less educated and older are more likely to stay in Hong Kong or delay their migration plans. Ironically, these people are also more likely to be negatively affected by the COVID-19 pandemic economically, mentally, as well as physically. We call for more research to look into how global migration trends will be influenced by growing uncertainties brought about by pandemics and political upheavals.

There are limitations in this study. There might be selection biases in the data sample. First, people who have the strongest intention to emigrate might have already left Hong Kong during the survey periods. However, this bias should be small since the first phase of the survey was conducted soon after the new BN(O) policy was introduced. There are no strong differences in migration intention among people interviewed at different phases of the survey either. Second, the sample is not representative of the Hong Kong population because only those who have the BN(O) status are included. In the analysis where we include interactions between COVID-19 cases and people's BN(O) passport status in our regression models, the impact of the COVID-19 pandemic does not differ between people who have already obtained a BN(O) passport and those who have not. Therefore, we think that the selection of people who have the BN(O) status as our target population would not bias our estimation of the impact of COVID-19 situation on migration in Hong Kong.

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Tables and Figures

Table 1. Sample descriptive statistics

	Mean (weighted)	Standard deviation	Raw count
Intend to migrate	0.23		720
Planned timing of migration			
<2 years	0.28		181
2-5 years	0.22		154
>5years	0.18		157
Unsure	0.32		228
HK new daily COVID-19 cases (100 cases / million population)	2.29	(4.05)	2,500
UK new daily COVID-19 cases (100 cases / million population)	37.78	(36.72)	2,500
BN(O) holders	0.544		1,379
Age groups			
23-34	0.15		649
35-44	0.21		789
45-54	0.18		474
55+	0.46		588
Woman	0.53		1416
Parent (having children under age 18)	0.22		740
Education			
Secondary or below	0.68		1365

Post-secondary	0.11	396
Degree or above	0.21	739
<hr/>		
Interview period		
February - April 2021	0.40	990
June - August 2021	0.39	991
March - June 2022	0.21	519
<hr/>		
Number of cases		2,500
<hr/>		

Table 2. Logistic regressions predicting migration intention

	Baseline
HK 100 new cases per million	1.091*
	(0.040)
UK 100 new cases per million	1.001
	(0.005)
Interview period (ref: February to April 2021)	
June to August 2021	1.054
	(0.178)
March to June 2022	0.745
	(0.257)
Age (ref: 23-34)	
35-44	0.895
	(0.141)
45-54	0.557***
	(0.098)
55+	0.375***
	(0.074)
Women	1.092
	(0.132)
Parent (having children under 18)	1.675***
	(0.243)
Education (ref: secondary or below)	

Post-secondary	2.199***
	(0.382)
Degree or above	3.918***
	(0.573)
Has BN(O) passport	2.164***
	(0.286)
Women \times HK 100 new cases per million	
Parent \times HK 100 new cases per million	
35-44 \times HK 100 new cases per million	
45-54 \times HK 100 new cases per million	
55+ \times HK 100 new cases per million	
Post-secondary \times HK 100 new cases per million	
Degree and above \times HK 100 new cases per million	
Has BN(O) passport \times HK 100 new cases per million	
<hr/>	
Observations	2500

<i>AIC</i>	15142364.717
<i>BIC</i>	15142440.430

Table 3. Multinomial logistic regressions predicting time of migration among those who intend to migrate

	2-5 years vs <2 years	>5 years vs < 2 years	Unsure vs < 2 years
HK 100 new cases per million	1.129 (0.090)	0.992 (0.093)	1.283** (0.116)
UK 100 new cases per million	0.982 (0.011)	0.984 (0.011)	0.955*** (0.011)
Interview period (ref: February to April 2021)			
June to August 2021	0.806 (0.316)	0.519+ (0.190)	0.605 (0.224)
March to June 2022	0.953 (0.658)	0.972 (0.625)	1.378 (0.846)
Age (ref: 23-34)			
35-44	0.544+ (0.196)	0.624 (0.207)	1.005 (0.338)
45-54	0.551 (0.226)	0.766 (0.325)	0.949 (0.420)
55+	0.478	0.705	0.980

	(0.240)	(0.366)	(0.438)
Women	0.882	1.186	1.338
	(0.237)	(0.345)	(0.347)
Parent (having children under 18)	1.116	0.568 ⁺	0.563 [*]
	(0.343)	(0.167)	(0.158)
Education (ref: secondary and below)			
Post-secondary	0.337 ^{**}	0.846	0.430 [*]
	(0.136)	(0.347)	(0.159)
Degree and above	0.497 [*]	0.866	0.476 [*]
	(0.157)	(0.314)	(0.153)
Has BN(O) passport	0.407 ^{**}	0.571 ⁺	0.408 ^{**}
	(0.133)	(0.192)	(0.127)
Observations	720		
<i>AIC</i>	9948443.		
	706		
<i>BIC</i>	9948622.		
	297		
Log likelihood.	-		
	4974182.853		
Chi-squared	89.020		

Exponentiated coefficients; Standard errors in parentheses

⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$, ^{***} $p < 0.001$

Figures

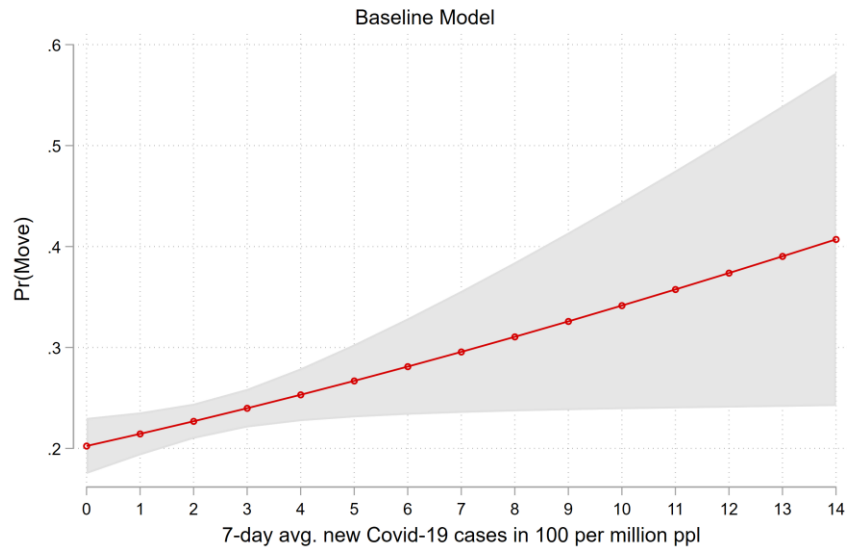


Figure 1. Predicted probability of intending to migrate across the range of new Covid-19 cases

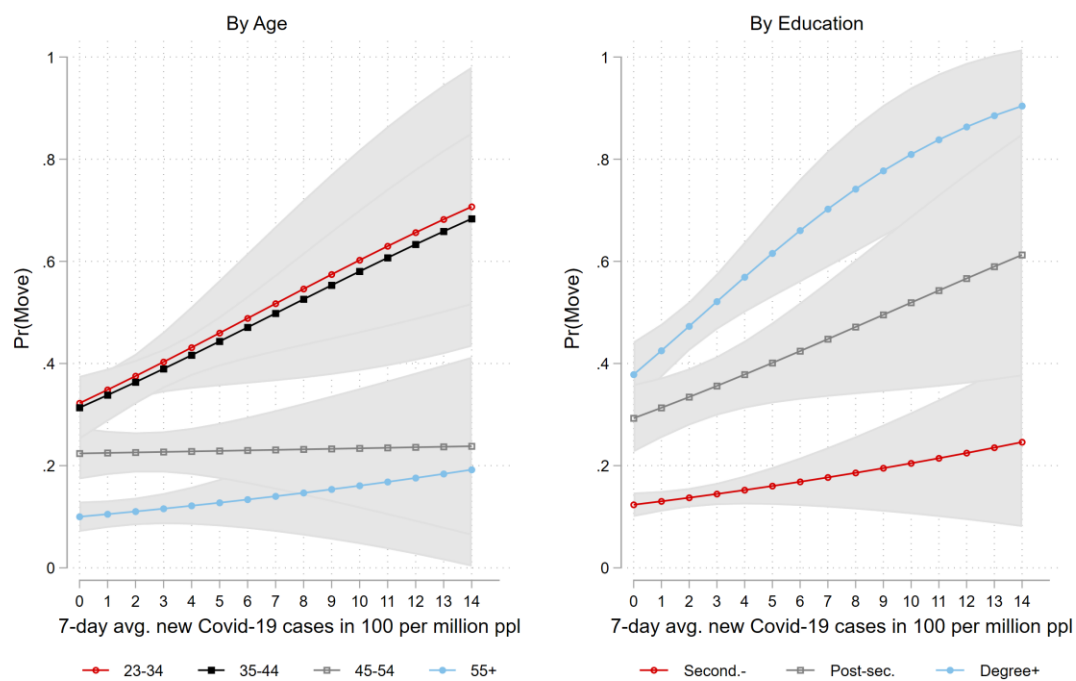


Figure 2. Predicted probability of intending to migrate across the range of new COVID-19 cases by age and by education: interaction effect between age and new COVID-19 cases and between education and new COVID-19 cases, respectively

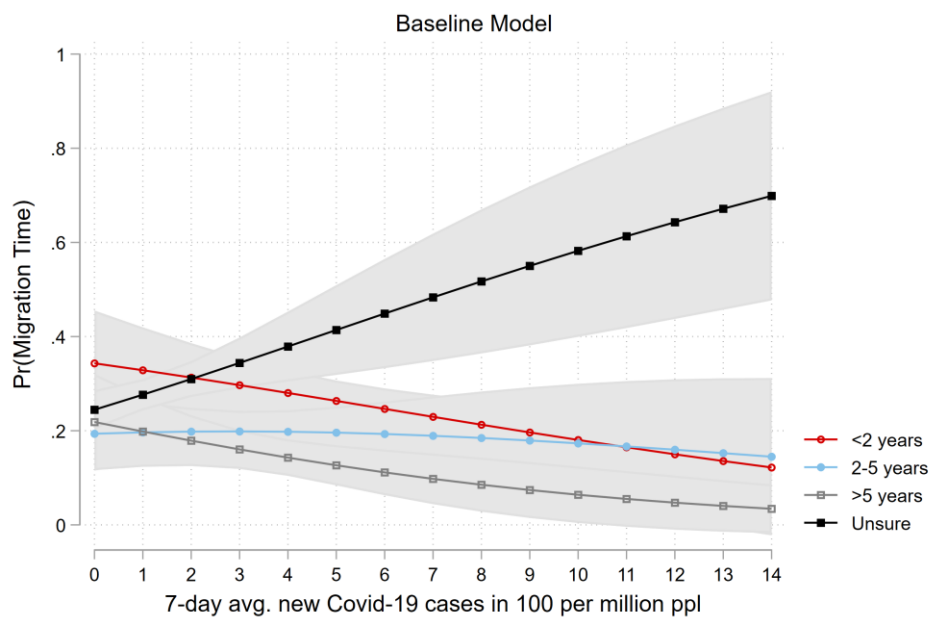


Figure 3. Predicted probability of migration time (4 categories) across the range of new COVID-19 cases

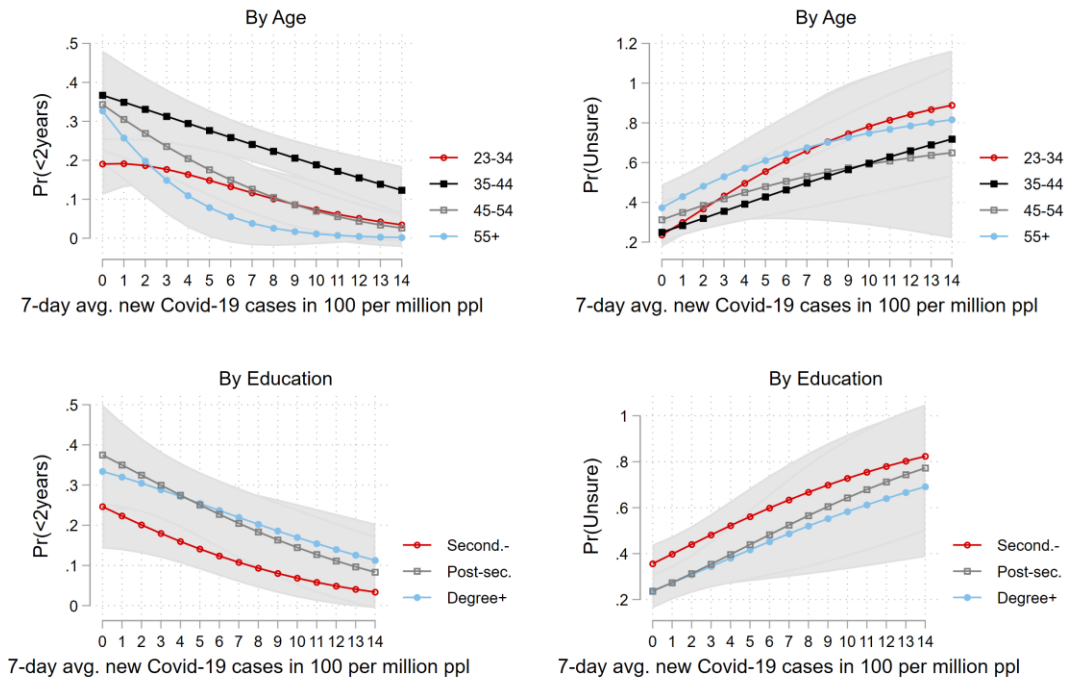


Figure 4. Predicted probability of migration within 2 years or unsure across the range of new COVID-19 cases by age and by education: interaction effect between age and new COVID-19 cases and between education and new COVID-19 cases, respectively

Appendix: Tables

Table A1. Logistic regressions predicting migration intention

	By age	By education	By gender	By parenthood status	By BN(O) passport status
HK 100 new cases per million	1.139*	1.066	1.072 ⁺	1.101*	1.096*
	(0.067)	(0.043)	(0.043)	(0.043)	(0.051)
UK 100 new cases per million	1.002	1.000	1.002	1.001	1.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Interview period (ref: February to April 2021)					
June to August 2021	1.044	1.094	1.049	1.053	1.059
	(0.174)	(0.181)	(0.177)	(0.178)	(0.180)
March to June 2022	0.716	0.712	0.739	0.743	0.743

	(0.251)	(0.247)	(0.257)	(0.258)	(0.257)
Age (ref: 23-34)					
35-44	0.802	0.849	0.898	0.882	0.897
	(0.129)	(0.136)	(0.142)	(0.140)	(0.141)
45-54	0.741 ⁺	0.553 ^{***}	0.562 ^{**}	0.553 ^{***}	0.557 ^{***}
	(0.134)	(0.097)	(0.099)	(0.098)	(0.098)
55+	0.426 ^{***}	0.359 ^{***}	0.377 ^{***}	0.374 ^{***}	0.375 ^{***}
	(0.093)	(0.072)	(0.074)	(0.074)	(0.074)
Women	1.077	1.108	0.999	1.087	1.092
	(0.132)	(0.135)	(0.136)	(0.132)	(0.132)
Parent (having children under 18)	1.733 ^{***}	1.648 ^{***}	1.688 ^{***}	1.799 ^{***}	1.674 ^{***}
	(0.251)	(0.248)	(0.245)	(0.291)	(0.243)
Education (ref: secondary or below)					
Post-secondary	2.168 ^{***}	1.948 ^{***}	2.203 ^{***}	2.206 ^{***}	2.197 ^{***}

	(0.381)	(0.377)	(0.384)	(0.384)	(0.382)
Degree or above	3.851***	2.796***	3.943***	3.939***	3.915***
	(0.569)	(0.463)	(0.576)	(0.577)	(0.573)
Has BN(O)	2.211***	2.230***	2.162***	2.165***	2.200***
	(0.295)	(0.302)	(0.286)	(0.286)	(0.327)
Women × HK 100 new cases per million			1.032		
			(0.029)		
Parent × HK 100 new cases per million				0.979	
				(0.027)	
35-44 × HK 100 new cases per million	0.996				
	(0.047)				
45-54 × HK 100 new cases per million	0.883*				

	(0.046)				
55+ × HK 100 new cases per million	0.930				
	(0.055)				
Post-secondary × HK 100 new cases per million		1.040			
		(0.039)			
Degree and above × HK 100 new cases per million		1.156***			
		(0.049)			
Has BN(O) × HK 100 new cases per million					0.994
					(0.032)
Observations	2500	2500	2500	2500	2500
<i>AIC</i>	15028174.552	14996642.544	15130311.128	15137286.686	15141999.984
<i>BIC</i>	15028267.737	14996729.905	15130392.664	15137368.223	15142081.521
Exponentiated coefficients; Standard errors in parentheses					

⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$, ^{***} $p < 0.001$

Table A2. Multinomial logistic regressions predicting time of migration among those who intend to migrate (with gender interaction)

	2-5 years vs <2 years	>5 years vs <2 years	Unsure vs <2 years
HK 100 new cases per million	1.157 ⁺ (0.099)	1.055 (0.094)	1.332 ^{**} (0.120)
Women	1.122 (0.347)	1.967 [*] (0.625)	1.851 [*] (0.558)
Women × HK 100 new cases per million	0.952 (0.050)	0.836 [*] (0.059)	0.930 (0.048)
UK 100 new cases per million	0.982 (0.011)	0.985 (0.010)	0.955 ^{***} (0.012)
Interview period (ref: February to April 2021)			
June to August 2021	0.821 (0.321)	0.529 ⁺ (0.192)	0.621 (0.228)

March to June 2022	0.977 (0.687)	1.090 (0.708)	1.428 (0.891)
Age (ref: 23-34)			
35-44	0.542 ⁺ (0.195)	0.613 (0.205)	0.992 (0.333)
45-54	0.550 (0.225)	0.767 (0.323)	0.944 (0.416)
55+	0.470 (0.238)	0.656 (0.347)	0.946 (0.420)
Parent (having children under 18)	1.104 (0.341)	0.563 ⁺ (0.168)	0.558* (0.158)
Education (ref: secondary and below)			
Post-secondary	0.325** (0.132)	0.796 (0.332)	0.410* (0.154)
Degree and above	0.481* (0.153)	0.818 (0.300)	0.454* (0.142)

Has BN(O)	0.406**	0.569 ⁺	0.410**
	(0.133)	(0.191)	(0.129)
Observations	720		
<i>AIC</i>	9889668.683		
<i>BIC</i>	9889861.012		
Log lik.	-4944792.342		
Chi-squared	97.432		

Exponentiated coefficients; Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3. Multinomial logistic regressions predicting time of migration among those who intend to migrate (with parenthood status interaction)

	2-5 years vs <2 years	>5 years vs <2 years	Unsure vs <2 years
HK 100 new cases per million	1.169 ⁺ (0.096)	1.032 (0.096)	1.345 ^{**} (0.127)
Parent (having children under 18)	1.562 (0.551)	0.842 (0.272)	0.922 (0.286)
Parent × HK 100 new cases per million	0.938 (0.050)	0.911 (0.072)	0.893 [*] (0.051)
UK 100 new cases per million	0.981 ⁺ (0.011)	0.983 (0.011)	0.954 ^{***} (0.012)
Interview period (ref: February to April 2021)			
June to August 2021	0.815 (0.318)	0.526 ⁺ (0.191)	0.614 (0.225)

March to June 2022	0.980	1.002	1.460
	(0.669)	(0.639)	(0.883)
Age (ref: 23-34)			
35-44	0.523 ⁺	0.593	0.939
	(0.191)	(0.198)	(0.317)
45-54	0.506 ⁺	0.697	0.849
	(0.207)	(0.292)	(0.370)
55+	0.476	0.699	0.975
	(0.235)	(0.356)	(0.429)
Women	0.874	1.179	1.335
	(0.235)	(0.343)	(0.347)
Education (ref: secondary and below)			
Post-secondary	0.350 [*]	0.890	0.459 [*]
	(0.143)	(0.367)	(0.174)
Degree and above	0.514 [*]	0.903	0.500 [*]
	(0.162)	(0.324)	(0.162)

Has BN(O)	0.411 ^{**}	0.575 ⁺	0.411 ^{**}
	(0.132)	(0.190)	(0.126)
Observations	720		
<i>AIC</i>	9906504.		
	670		
<i>BIC</i>	9906696.		
	999		
Log lik.	-		
	4953210.335		
Chi-squared	92.602		
Exponentiated coefficients; Standard errors in parentheses			

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4. Multinomial logistic regressions predicting time of migration among those who intend to migrate (with age group interactions)

	2-5 years vs <2 years	>5 years vs <2 years	Unsure vs <2 years
HK 100 new cases per million	1.084 (0.140)	0.770 ⁺ (0.108)	1.345* (0.157)
Age (ref: 23-34)			
35-44	0.580 (0.224)	0.513 ⁺ (0.185)	1.091 (0.383)
35-44 × HK 100 new cases per million	1.036 (0.094)	1.277* (0.133)	0.976 (0.071)
45-54	0.282** (0.127)	0.436 ⁺ (0.197)	0.750 (0.325)
45-54 × HK 100 new cases per million	1.247* (0.125)	1.425** (0.177)	1.041 (0.113)
55+	0.221* (0.125)	0.292* (0.177)	0.619 (0.113)

	(0.130)	(0.156)	(0.294)
55+ × HK 100 new cases per million	1.428*	1.754**	1.247
	(0.234)	(0.304)	(0.188)
UK 100 new cases per million	0.976*	0.981 ⁺	0.950***
	(0.011)	(0.011)	(0.012)
Interview period (ref: February to April 2021)			
June to August 2021	0.934	0.574	0.680
	(0.367)	(0.210)	(0.253)
March to June 2022	0.976	1.085	1.294
	(0.659)	(0.698)	(0.785)
Women	0.920	1.278	1.391
	(0.251)	(0.371)	(0.362)
Parent (having children under 18)	1.224	0.623	0.582 ⁺
	(0.386)	(0.188)	(0.161)
Education (ref: secondary and below)			

Post-secondary	0.388*	0.954	0.468*
	(0.157)	(0.390)	(0.173)
Degree and above	0.557 ⁺	0.949	0.506*
	(0.172)	(0.334)	(0.162)
Has BN(O)	0.345**	0.468*	0.372**
	(0.117)	(0.164)	(0.121)
Observations	720		
<i>AIC</i>	9767710.		
	501		
<i>BIC</i>	9767930.		
	306		
Log lik.	-		
	4883807.251		
Chi-squared	124.295		

Exponentiated coefficients; Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5. Multinomial logistic regressions predicting time of migration among those who intend to migrate (with education group interactions)

	2-5 years vs <2 years	>5 years vs <2 years	Unsure vs <2 years
HK 100 new cases per million	1.155 (0.103)	1.019 (0.109)	1.319** (0.136)
Education (ref: secondary and below)			
Post-secondary	0.367* (0.167)	0.832 (0.358)	0.443* (0.180)
Post-secondary × HK 100 new cases per million	0.974 (0.083)	1.016 (0.094)	0.988 (0.074)
Degree and above	0.573 (0.214)	1.095 (0.434)	0.599 (0.216)
Degree and above × HK 100 new cases per million	0.969 (0.061)	0.932 (0.077)	0.945 (0.061)

UK 100 new cases per million	0.982 ⁺	0.984	0.955 ^{***}
	(0.011)	(0.011)	(0.012)
Interview period (ref: February to April 2021)			
June to August 2021	0.802	0.505 ⁺	0.596
	(0.314)	(0.187)	(0.220)
March to June 2022	0.960	0.977	1.391
	(0.661)	(0.630)	(0.858)
Age (ref: 23-34)			
35-44	0.551 ⁺	0.632	1.029
	(0.199)	(0.212)	(0.348)
45-54	0.549	0.770	0.952
	(0.223)	(0.328)	(0.421)
55+	0.484	0.720	1.004
	(0.243)	(0.374)	(0.445)
Women	0.869	1.169	1.308

	(0.232)	(0.341)	(0.336)
Parent (having children under 18)	1.134	0.581 ⁺	0.576 ⁺
	(0.352)	(0.169)	(0.164)
Has BN(O)	0.405 ^{**}	0.563 ⁺	0.406 ^{**}
	(0.132)	(0.188)	(0.126)
Observations	720		
<i>AIC</i>	9932003.845		
<i>BIC</i>	9932209.911		
Log lik.	-		
	4965956.922		
Chi-squared	91.727		

Exponentiated coefficients; Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A6. Multinomial logistic regressions predicting time of migration among those who intend to migrate (with BN(O) status interaction)

	2-5 years vs <2 years	>5 years vs <2 years	Unsure vs <2 years
HK 100 new cases per million	1.133 (0.112)	0.966 (0.118)	1.203 ⁺ (0.133)
Has BN(O)	0.417* (0.164)	0.515 ⁺ (0.196)	0.334** (0.127)
Has BN(O) × HK 100 new cases per million	0.992 (0.065)	1.030 (0.093)	1.072 (0.072)
UK 100 new cases per million	0.982 (0.011)	0.984 (0.011)	0.956*** (0.012)
Interview period (ref: February to April 2021)			
June to August 2021	0.809 (0.323)	0.506 ⁺ (0.190)	0.574 (0.220)

March to June 2022	0.953	0.968	1.376
	(0.660)	(0.626)	(0.846)
Age (ref: 23-34)			
35-44	0.552 ⁺	0.610	0.962
	(0.199)	(0.214)	(0.325)
45-54	0.558	0.747	0.901
	(0.229)	(0.323)	(0.399)
55+	0.478	0.696	0.958
	(0.240)	(0.360)	(0.429)
Women	0.887	1.180	1.316
	(0.238)	(0.343)	(0.342)
Parent (having children under 18)	1.112	0.572 ⁺	0.572 [*]
	(0.344)	(0.173)	(0.160)
Education (ref: secondary and below)			
Post-secondary	0.340 ^{**}	0.835	0.416 [*]
	(0.138)	(0.346)	(0.155)

Degree and above	0.503*	0.862	0.467*
	(0.159)	(0.311)	(0.150)
Observations	720		
<i>AIC</i>	9932486.		
	901		
<i>BIC</i>	9932679.		
	230		
Log lik.	-		
	4966201.451		
Chi-squared	88.580		
Exponentiated coefficients; Standard errors in parentheses			

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix: Figures

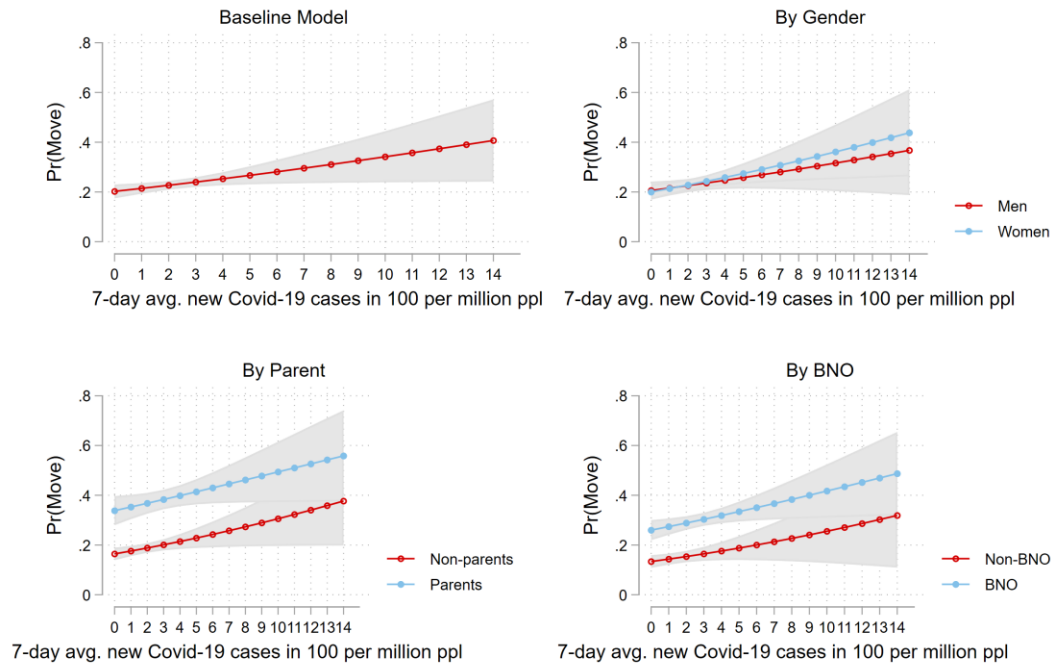


Figure A1. Predicted probability of intending to migrate across the range of new COVID-19 cases: baseline model and interaction models by gender, by parenthood status, and by BN(O)-passport holder status

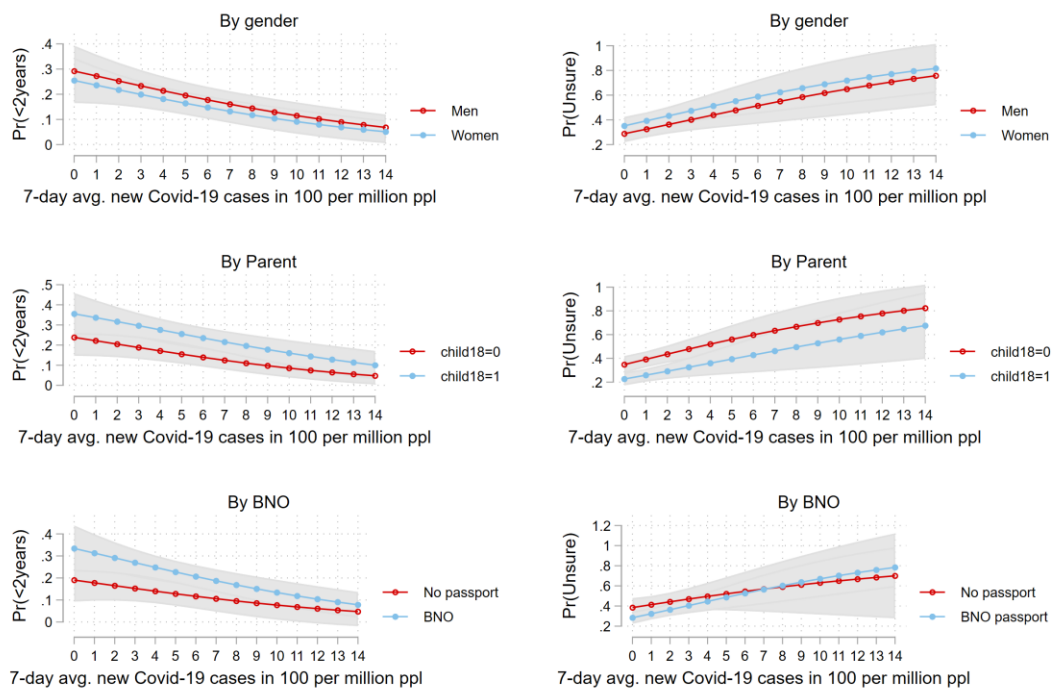


Figure A2. Predicted probability of migration within 2 years or unsure across the range of new COVID-19 cases by gender, parenthood status, and whether has BN(O) passports: interaction effect