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THE IMPACT OF INBOUND TOURISM BOOM AND BUST ON HONG KONG'S LABOUR MARKET

Key points

- *Hong Kong's inbound tourism has quickly turned into a bust amid the COVID-19 pandemic, and there are concerns over the scarring effect of this crisis on the subsequent labour market recovery. In view of this, we first provide empirical evidence on the labour market impacts of an inbound tourism boom in Hong Kong, and then apply these empirical estimates and other macro data to quantitatively analyse the potential impacts of the current tourism bust on medium-term unemployment.*

- *Using individual-level data from the population census in Hong Kong between 1996 and 2016, we analyse the impact of the Individual Visit Scheme (IVS) on different demographic groups. We find that relative to older cohorts, younger workers (aged 20-40), especially female and those with secondary school education, are more likely to be drawn into the tourism-related sectors during the IVS-induced tourism boom. Moreover, female and less-educated workers in these sectors also saw larger and increasing growth in labour income (3-20 percentage points) compared with their peers in other sectors. As the inbound tourism boom turns into a bust, these labour groups may become more vulnerable and therefore merit close monitoring.*

- *We next develop three illustrative scenarios on how inbound tourism would recover between 2021 and 2025 and estimate the trajectories of the unemployment rate using the micro-based empirical results and other macro-based estimates measuring how sectoral employment depends on tourism. We find that the unemployment rate would generally decline from the peak in 2020 or 2021, but it may still be 1.5-2.5 percentage points higher in 2025 compared with the pre-COVID-19 level if tourist arrivals only recover to 50-70% of their all-time high. It is important to note that, besides tourism recovery, other factors such as labour reallocation across sectors, technological advances and adoption, as well as structural transformations will also affect future*

labour market developments. Therefore, these estimates should be treated as scenario analysis, rather than as forecasts.

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I. INTRODUCTION

Tourism is an important source of income and employment in Hong Kong, accounting for 4.5% of GDP and 6.6% of total employment in 2018. As a labour-intensive sector, tourism booms and busts have major implications for the local labour market. For example, while a tourism boom helped boost the labour market after the 2003 Severe Acute Respiratory Syndrome (SARS) epidemic and the 2008 global financial crisis (GFC), the current pandemic-induced tourism bust has led to a rapid deterioration in labour market conditions. In addition, the COVID-19 pandemic is widely expected to have a deep and long-lasting impact (the so-called scarring effect) on global tourism and business travel[2], raising concerns over the subsequent labour market recovery.

Against this backdrop, this paper first provides empirical evidence on the labour market impacts of an inbound tourism boom in Hong Kong.[3] By exploiting the Individual Visit Scheme (IVS), a policy that induced a five-fold increase in annual tourist arrivals from Mainland China into Hong Kong between 2003 and 2018, we examine its impacts on employment and income using micro-level (i.e. individual-level) population censuses or by-censuses data. Based on the above estimation results as well as other macro-level estimates measuring how sectoral employment would depend on tourism, we next conduct quantitative analysis to shed light on the potential negative impacts of the current pandemic-induced tourism bust on Hong Kong's labour market in the medium term.

The main findings of the paper are as follows. Relative to older workers, younger (aged 20-40) cohorts, especially female and those with secondary school education, are more likely to enter the tourism-related sectors in years following the

[2] One glaring example is the massive restructuring by Cathy Pacific in October 2020, which resulted in 5,300 jobs lost, 2,600 unfilled posts eliminated and permanent pay cuts (reportedly over 50%) for remaining cabin and cockpit crew.

[3] Empirical work exploring the impact of tourism growth on economic development is scarce. A notable exception is Faber and Gaubert (2019), which show in the context of Mexico that tourism leads to significant local economic gains in terms of employment, population, local GDP and wages relative to less touristic regions. More recently, Nguyen (2020) find that tourist income, tourism-related relative prices and visa policies have had significant impacts on Japan's inbound tourism demand in the long run, while in the shorter run, natural disasters have had large and prolonged effects on tourism.

IVS. Moreover, female and less-educated workers (with primary or secondary school education) experience larger and rising income gain (in terms of percentage growth) over their peers in the non-tourism-related sectors. Based on these empirical results and other estimated elasticities, we conduct a scenario analysis to gauge the potential negative impacts of the current tourism bust. Our results suggest that the overall unemployment rate may remain higher than the pre-COVID-19 level in the next five years if the inbound tourism recovery is slow and partial.

The rest of the paper is organised as follows. Section II reviews key facts regarding inbound tourism in Hong Kong and discusses the IVS and related policies. Section III presents the empirical strategy and details the findings on the labour market impacts of a tourism boom. Section IV presents the scenario analysis on unemployment under the current pandemic-induced tourism bust. Section V concludes.

II. INBOUND TOURISM IN HONG KONG

Tourism covers both inbound and outbound tourism, with inbound tourism accounting for the lion's share of both the GDP and employment of the tourism sector in Hong Kong (Table 1). In 2018, inbound tourism contributes to 3.6% of GDP and 5.8% of total employment, much higher than the respective 0.8% for outbound tourism. This partly reflects that outbound tourism largely involves spending outside Hong Kong, which is a leakage to the local economy. In addition, the GDP and employment shares of inbound tourism have more or less doubled since 2000 while those of outbound tourism were stable at relatively low levels. Arguably, inbound tourism exerts a larger impact on the local labour market and we therefore focus on inbound tourism in this study.

Table 1: Hong Kong's tourism industry: value added and employment

	% of total value added (GDP)		% of total employment	
	2000	2018	2000	2018
Tourism (i) + (ii)	**2.4**	**4.5**	**3.6**	**6.6**
(i) Inbound tourism	1.7	3.6	2.7	5.8
Retail sales	0.3	1.0	0.9	2.6
Accommodation services	0.5	1.0	0.8	1.0
Food and beverage services	0.2	0.5	0.6	1.3
Cross-boundary passenger transport services	0.5	0.7	0.2	0.4
Others	0.2	0.5	0.2	0.6
(ii) Outbound tourism	0.8	0.8	0.9	0.8
Travel agency, reservation service and others	0.3	0.3	0.6	0.5
Cross-boundary passenger transport services	0.5	0.6	0.3	0.3

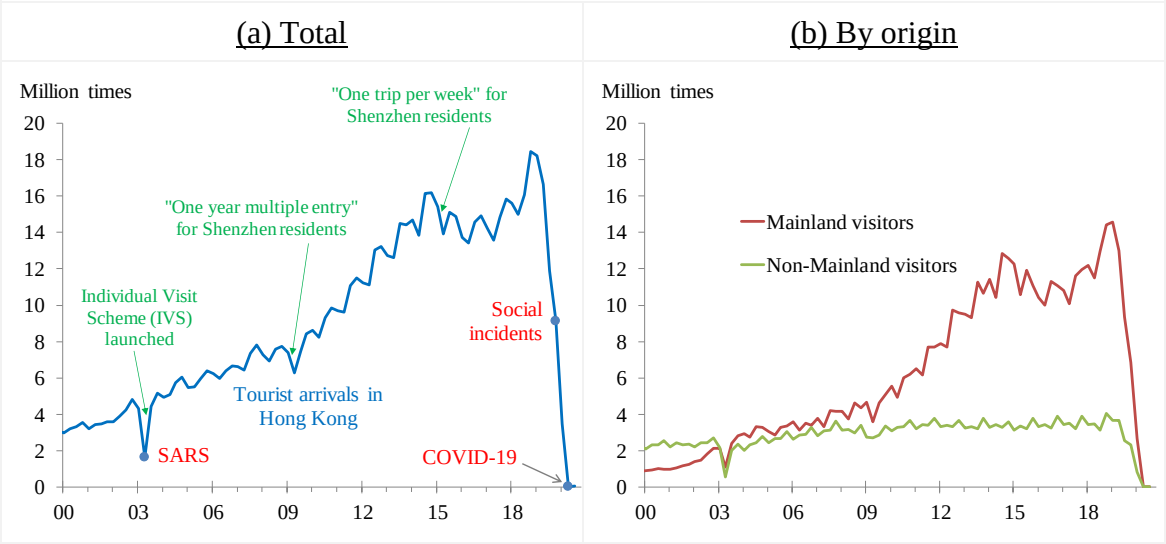
Note: Figures may not add up to total due to rounding.
Source: Census and Statistics Department (C&SD).

In Hong Kong, inbound tourism has undergone drastic boom and bust cycles since 2000 (Chart 1a). Tourist arrivals increased steadily between late 2003 and early 2008 and accelerated during 2010–2014, as the launch of the Individual Visit Scheme (IVS) and its subsequent extensions (see more discussion below) resulted in rising tourist numbers from Mainland China over the years (Chart 1b). Tourist arrivals reached an all-time high in late 2018 and early 2019 (i.e. pre-social incidents), boosted by new cross-boundary infrastructure between Hong Kong and Mainland China.[4] In contrast, inbound tourism implored briefly during the 2003 SARS epidemic, moderated slightly during the 2008 global financial crisis (GFC), and tapered off in 2015–2016 amid concerns over global economic prospects.[5] More recently, the local social incidents halved the number of visitor arrivals in the second half of 2019 and the COVID-19 pandemic has virtually brought inbound tourism to a standstill since the end of January 2020.

[4] The Guangzhou-Shenzhen-Hong Kong Express Rail Link commenced operation on 23 September 2018 and the Hong Kong-Zhuhai-Macao Bridge opened on 24 October 2018.

[5] In 2015, expectations of higher US policy rates and rising concerns over the outlook of Mainland China and depreciation of the Renminbi following changes in the mechanism for determining central parity rate, have fuelled significant depreciation of Asian currencies and sharply lower prices in commodities and many emerging market assets. The perceived dimmer prospects for global growth have triggered sharp corrections in stock markets worldwide.

Chart 1: Number of inbound tourist arrivals into Hong Kong



Note: Tourist arrivals are quarterly figures.
Sources: C&SD and Hong Kong Tourism Board.

Undoubtedly, the introduction of the IVS in July 2003 has contributed greatly to the inbound tourism boom in Hong Kong. Under the IVS, Mainland residents could apply for an exit endorsement to visit Hong Kong in their individual capacity for up to seven days each time, and for one or two visits per year.[6] The IVS was initially rolled out in four cities in Guangdong province[7], and there was no quota on the number of endorsements to be issued by the Mainland government. In fact, the IVS was extended and refined a couple of times and by 2020, it has already covered 49 cities in 18 Chinese provinces. A major extension of the IVS took effect in April 2009, allowing eligible permanent residents from Shenzhen to visit Hong Kong multiple times on a single one-year multiple-entry IVS Endorsement document known as the M-permit. In April 2015, the M-permit was replaced by the "one trip per week" Individual Visit Endorsements as Hong Kong encountered problems with receiving capacity and parallel trading activities.

[6] Previously, Mainland residents could only travel to Hong Kong through business visas or by joining organised group tours.
[7] The first four cities with IVS are Dongguan, Foshan, Zhongshan, and Jiangmen.

III. LABOUR MARKET IMPACTS OF INBOUND TOURISM

A. Empirical strategy

The goal of this part of the study is to explore the impact of inbound tourism on employment and income. The main data source is individual-level data from the Hong Kong population censuses and by-censuses. Specifically, we use the 5% samples from the 1996, 2001, 2006, 2011 and 2016 censuses or by-censuses.

In our empirical analysis, we consider the IVS launch in 2003 as an as-good-as-random economic shock since it was plausibly exogenous in its timing, and impossible to anticipate by the local population. Even though the number of inbound tourists from Mainland China further accelerated from 2009 onwards due in part to the M-permit, at that point it had already become clear that Hong Kong's tourism sector was booming.[8] Therefore, our empirical strategy relies mainly on the initial launch of the IVS in 2003 as an unanticipated event to estimate the effect of the boom in inbound tourism on labour market outcomes.

We begin the analysis with a difference-in-differences (DD) framework by comparing the employment outcomes of young workers (aged 20–40) in the treatment group with older workers (aged 41–65) in the comparison group, before and after the launch of the IVS.[9] We assign younger cohorts to be in the "treatment" group because they are still in the early part of their careers and have more flexibility to make significant changes to their jobs in response to the exogenous rise in inbound tourism. Next, we study the impact of the IVS on income

[8] As a robustness check, we have also used the introduction of the M-permit in 2009 as an intervention policy and the results are qualitatively similar and therefore not reported here.

[9] Here we restrict the sample to working-age adults in each census or by-census year. The strategy of treatment assignment based on cohort as a proxy for exposure to the policy of interest follows a large body of work in the empirical literature. Duflo (2001), for example, evaluates the impact of a school construction program in Indonesia in 1974 by comparing education and wage outcomes of those who were aged 2 to 6 in 1974 (treatment) with those aged 12 to 17 in 1974 (control). Muralidharan and Prakash (2017) use a similar approach by considering older cohorts (aged 16 and 17) who were not exposed to the "cycling to school" program in India as the control group, and younger cohorts (aged 14 and 15) who were exposed to the program, as the treatment group. Likewise, Bütikofer, Mølland and Salvanes (2018) analyse the impact of a free school breakfast program in Norway using a generalized difference-in-differences approach, comparing cohorts who were in school after the breakfast was offered (treatment) with those who finished school before the program launch (control).

by comparing the income trajectories of those employed in tourism-related sectors (treatment) with those in other sectors (comparison) before and after the IVS. The tourism-related sectors are defined to include the food, retail, hotel and transport industries.[10] Finally, we also use an event study design to estimate how labour market outcomes respond to the IVS over time.

Specifically, we estimate the following model:

$$Y_{ict} = \alpha_0 + \beta[W_{ict} \times Post_t] + \alpha_1 W_{ict} + \alpha_2 Post_t + \alpha_3 X_{ict} + v_c + z_t + \varepsilon_{ict} \qquad (1)$$

where Y_{ict} equals one if individual *i* in birth cohort *c* in census year *t* (where *t=1996, 2001, 2006, 2011, or 2016*) is employed in the tourism-related sectors, or zero otherwise. Our analysis sample includes cohorts of individuals born between 1931 and 1996. The variable W_{ict} is a dummy that equals one if an individual belongs to the 20–40 age group or zero otherwise. To obtain exogenous variation in tourist arrivals, we exploit the timing of the implementation of the IVS in 2003, which significantly lowers the cost and constraint for Mainland tourists to visit Hong Kong. To this end, the variable $Post_t$ is a dummy that has a value of one if the year is *2006, 2011,* or *2016* (i.e. post-IVS), or zero otherwise. We control for a vector of individual characteristics, X_{ict}, which includes gender, occupation, years of education, and potential experience. v_c are cohort (birth year) fixed effects that control for differences in time-invariant unobservables across birth years. z_t are census year fixed effects that control for any census-year specific unobservables affecting labour market outcomes across all cohorts. Our parameter of interest is β, which measures the average impact of the IVS on labour market outcomes (i.e. the treatment effect).

In addition to employment, we also compare the income of those employed in the tourism-related sectors (treatment) with those employed in non-

[10] The definition of the tourism-related sectors we use here is broader than the definition of the tourism sector used by the Census and Statistics Department (C&SD) in its four key industries conceptual framework. The latter takes into account the contribution of tourism to the related sectors. By contrast, a separate tourism sector is not available in the census data classification, and we have to use the entire food, retail, hotel and transport industries as a proxy. That said, the use of the tourism-related sectors is reasonable as these sectors have been greatly affected by the inbound boom over the past two decades.

tourism-related sectors (comparison). The empirical model is essentially the same, but Y_{ict} is defined as (the log of) the income from main employment while W_{ict} is a dummy that equals one if an individual works in the tourism-related sectors or zero otherwise.

A potential limitation of the DD estimates is that the overall average treatment effect hides interesting dynamics in the outcome variables. Indeed, the labour market effects of the IVS-induced tourism boom can vary over time. For example, labour market frictions could prevent matching of tourism-related firms and potential workers in the short run. Workers already attached to the labour force may also be in long-term employment contracts, creating a lagged supply response to the expansion of the tourism-related sectors. As a result, we supplement our DD approach with an event study design, which allows us to identify time-varying treatment effects:

$$Y_{ict} = \alpha_0 + \sum_{t=1996}^{t=2016} \delta_t \, (W_{ict}) + \alpha_2 X_{ict} + v_c + z_t + \varepsilon_{ict} \qquad (2)$$

While the variables are similarly defined as in equation (1), the parameters δ_t measure the average, time-varying impact of the IVS on labour market outcomes (i.e. the treatment effect) across different census years. We set the reference period to be 2001, such that we omit δ_{2001} in practice and all δ estimates are relative to the census year prior to the launch of the IVS in 2003. We apply the same event study model to study the impact on income.

B. Estimation results

Employment

We first present results on employment. We begin by estimating equation (1) on the whole sample of workers aged between 20 and 65, followed by subsamples defined by gender and education. Table 2 reports the standard DD estimates of the impact of IVS on employment in tourism-related sectors.[11]

Table 2: Estimated impact of the IVS on employment probability

	Dependent variable: Probability of employment in tourism-related sectors					
	All sample	Sub-sample by gender		Sub-sample by education levels		
		Men	Women	Primary	Secondary	Post-secondary
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment effect (β)	0.00583**	-0.0182***	0.0414***	0.00115	0.00937**	0.00773
(standard error)	(0.00275)	(0.00370)	(0.00417)	(0.00998)	(0.00406)	(0.00482)
Observations	814,916	436,190	378,726	101,510	446,062	256,142
R-squared	0.26	0.27	0.28	0.26	0.26	0.16

Note: Table reports difference-in-differences estimates of the impact of IVS on the probability of employment in the tourism-related sectors. The sample covers all employed individuals aged between 20 and 65 in the 1996, 2001, 2006, 2011 and 2016 5% sample of the population censuses or by-censuses (except those in agriculture). Treatment is defined as those who are between 20-40 years old in each census year. Robust standard errors are in parenthesis. ***ρ < 0.01, **ρ < 0.05, *ρ < 0.10.

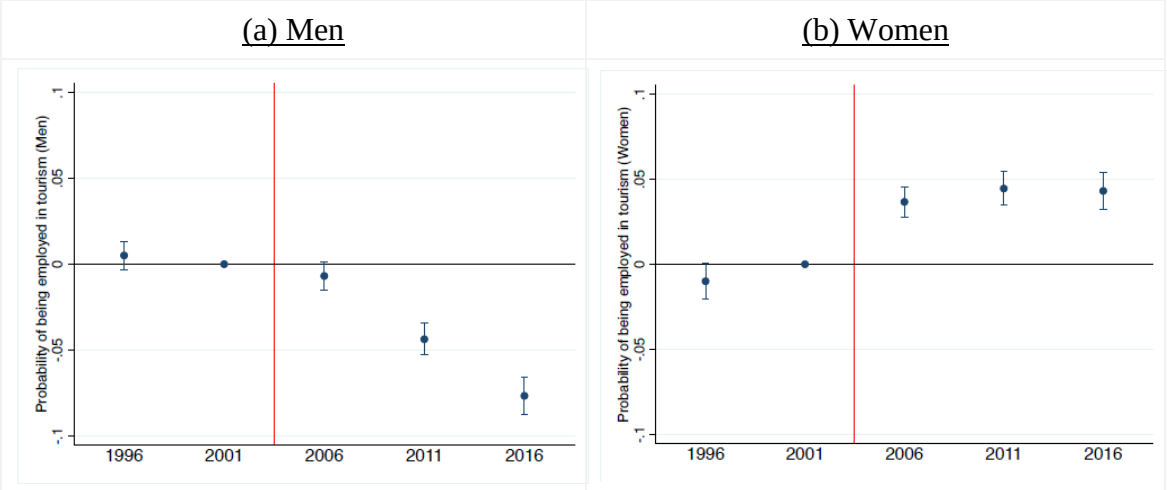
We find that relative to older cohorts, young cohorts are more likely to be employed in the tourism-related sectors after the IVS (column 1). However, this overall result masks heterogeneity by gender. Column 2 shows that relative to older cohorts, young men are 1.82 percentage points less likely than older peers to be employed in the tourism-related sectors following the IVS while young women are 4.14 percentage points more likely than their older peers (column 3). By education, we find that young workers with secondary school education are more likely to be

[11] Note that the validity of the treatment effect requires one key identifying assumption, i.e. parallel time trend assumption in the outcome variable. Annex A provides more details and assesses the validity of this assumption in our setting.

employed in the tourism-related sectors (0.94 percentage points) after the IVS compared with before (column 5). Indeed, the share of workers with secondary school education, regardless of age, makes up the bulk (over 60%) of the tourism-related sectors. In other words, young women or young workers with secondary school education are more likely to be drawn into the tourism-related sectors after the tourism boom induced by the IVS. In terms of magnitude, gender appears to have played a larger role than education.

As the baseline DD results reveal that the tourism-related sectors are more likely to pull in young women after the IVS, we implement the event study estimations (i.e. equation 2) separately by gender. Indeed, we find that gender plays an important role; young men are less likely to work in the tourism-related sectors post IVS and the treatment effect, relative to 2001, becomes more negative over time (Chart 2a). Meanwhile, the effect on young women is positive and persistent, staying close to 5 percentage points from 2006 onwards (Chart 2b).

Chart 2: Estimated impact of the IVS on employment over time: by gender

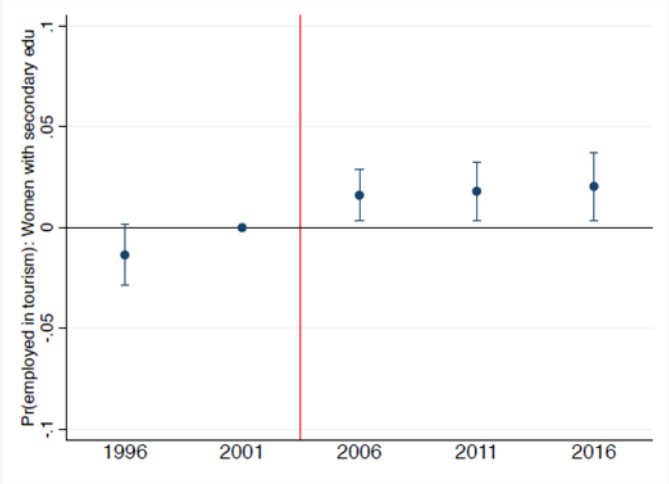


Note: Charts show the event study estimations of the impact of the IVS on the probability of employment in the tourism-related sectors, using the 5% sample of the population censuses or by-censuses. Treatment is defined as young (20-40 years old in each census year). LHS chart uses the sample of men. RHS chart uses the sample of women. 95% confidence intervals are plotted. Red vertical line indicates the IVS launch (event) in 2003. Birth year, occupation and census year fixed effects are included.

So far, the takeaway is that young women, regardless of education, are more likely to work in the tourism-related sectors after the IVS. In addition, workers with secondary education, regardless of gender, are also more likely to work in these

sectors. To explore the nuances of these findings, we focus on the subsample of workers who are female and have secondary school education. Our finding is that the younger cohorts are on average 1.9 percentage points more likely than their older peers to be employed in the tourism-related sectors after the IVS (DD estimates) and this effect is also persistent over time (event study results, see Chart 3). The effect is statistically significant at the 1% level and is larger than the overall impact (Table 2, column 1) as well as the impact of secondary school education alone (Table 2, column 5).

Chart 3: Impact of the IVS on employment: women with secondary school education



Note: Chart shows the event study estimations of the impact of the IVS on the probability of employment in the tourism-related sectors, using the sample of female workers with at most secondary school education. Treatment is defined as young (20-40 years old in each census year). 95% confidence intervals are plotted. Red vertical line indicates the IVS launch (event) in 2003. Birth year, occupation and census year fixed effects are included.

Income from main employment

We next present results on the impact of the IVS on labour income. Our DD estimation results reveal that those employed in the tourism-related sectors

experience a 2.8 percentage points higher[12] income growth compared with workers employed in the non-tourism-related sectors after the IVS (Table 3, column 1). Analysed by gender, women in the tourism-related sectors enjoy a massive 14.0 percentage points (column 3) income boost compared with their peers in the non-tourism-related sectors, while men in tourism-related sectors experience a 3.6 percentage points (column 2) shortfall in income growth relative to their peers in the non-tourism-related sectors. By education, workers with lower levels of education experience higher income gains over their peers in the non-tourism-related sectors after the IVS. Workers with primary education gain 9 percentage points (column 4) while those with secondary education gain almost 3 percentage points (column 5).

Table 3: Estimated impact of the IVS on employment income

	Dependent variable: log of income from main employment					
	All sample	Gender		Education levels		
		Men	Women	Primary	Secondary	Post-secondary
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment effect (β)	0.0284***	-0.0355***	0.140***	0.0900***	0.0291***	0.0171
(standard error)	(0.00678)	(0.00779)	(0.0123)	(0.0173)	(0.00806)	(0.0196)
Observations	814,916	436,190	378,726	101,510	446,062	256,142
R-squared	0.24	0.20	0.26	0.88	0.14	0.30

Note: Table reports difference-in-differences estimates of the impact of IVS on labour income. The sample covers all employed individuals aged between 20 and 65 in the 1996, 2001, 2006, 2011, and 2016 5% sample of population censuses or by-censuses. Treatment is defined as those who are employed in the tourism-related industries. Robust standard errors are in parenthesis. ***ρ < 0.01, **ρ < 0.05, *ρ < 0.10.

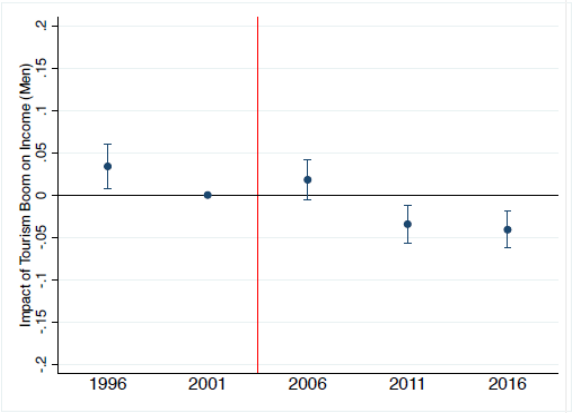
Over time, the impact of the IVS on income is persistent. In particular, gender plays an important role. Chart 4a shows that men in the tourism-related sectors gain less in income growth over their peers in the non-tourism-related sectors after the IVS (mainly in 2011 and 2016), while women in the tourism-related sectors

[12] To be more precise, the IVS and the resultant tourism boom lead to an average difference of 2.8 percentage points in labour income changes among workers in the tourism-related sectors and the other sectors. The same interpretation applies in the following paragraphs.

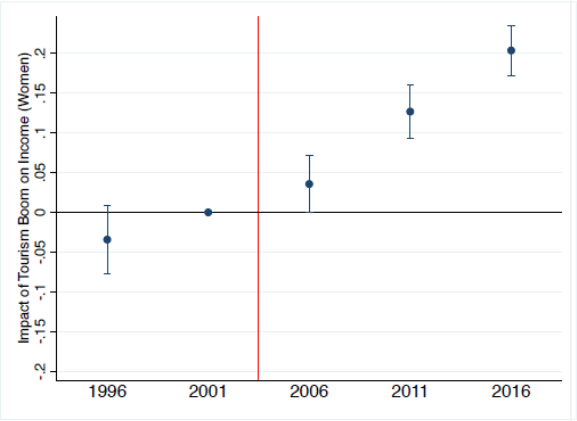
experience a large and increasing income boost over their counterparts in the non-tourism-related sectors (Chart 4b).

Chart 4: Estimated impact of the IVS on income over time: by gender

(a) Men



(b) Women

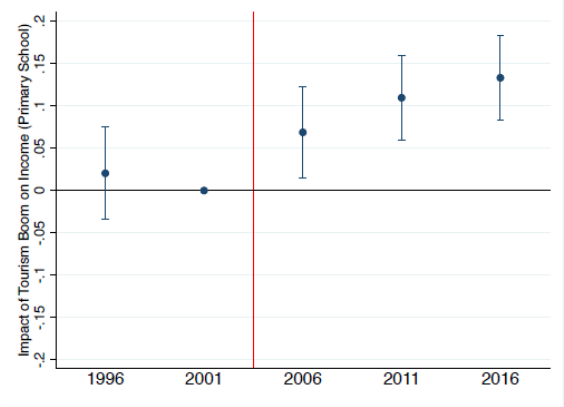


Note: Charts show the event study estimation of the impact of the IVS on labour income, using the 5% sample of the population censuses or by-censuses. Treatment is defined as being employed in the tourism-related sectors. Red vertical line indicates the IVS launch (event) in 2003. The dots represent the estimate for each of the years since the IVS. The estimate at the reference period, 2001, is set to zero. Bars extending from the dots represent the 95% confidence intervals. Birth year, occupation and census year fixed effects are included.

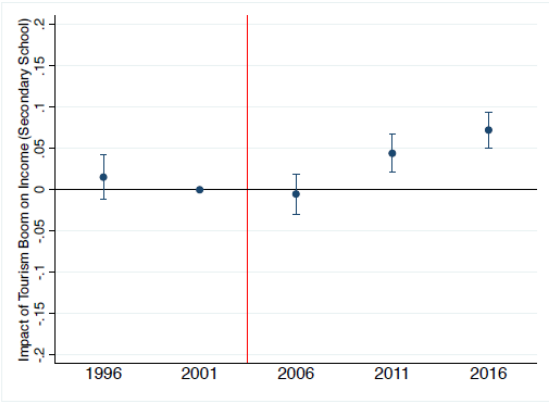
Another takeaway is that in terms of generating economic gains, the IVS benefits the less-educated workers more and the impact increases over time. Chart 5a shows that the income gain among workers with primary school education in the tourism-related sectors over their peers in the non-tourism-related sectors are generally large and persistent post IVS, almost reaching 15% by 2016. Chart 5b shows that similar effects are found among workers with secondary education albeit to a smaller extent.

Chart 5: Estimated impact of the IVS on income over time: by education

(a) Primary



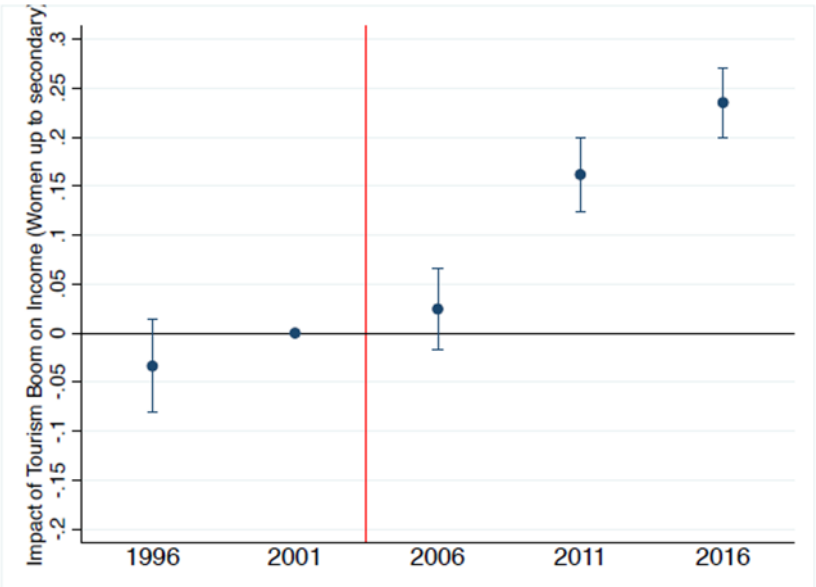
(b) Secondary



Note: Charts show the event study estimation of the impact of the IVS on labour income. 95% confidence intervals are plotted. Treatment is defined as being employed in the tourism-related sectors. LHS chart uses the sample of workers with at most primary school education. RHS chart uses the sample of workers with at most secondary school education. Red vertical line indicates the IVS launch (event) in 2003. Reference year is 2001. Male dummy is included as control. Birth year, occupation and census year fixed effects are included.

Finally, we take one further step and focus on the subsample of female workers with at most secondary school education. We find that, on average, those in the tourism-related sectors saw a 15.6 percentage points income boost relative to their counterparts in the non-tourism-related sectors (DD estimates). The effect is statistically significant at the 1% level and is the largest in magnitude from all the reported estimates in Table 3. Our event study estimates also show that the effect of the IVS on income for this group kicks in from 2011 and surpasses 20 percentage points in 2016 (Chart 6).

Chart 6: Estimated impact of the IVS on income: less-educated women



Note: Chart shows the event study estimation of the impact of the IVS on income, using the sample of female workers with at most secondary education. 95% confidence intervals are plotted. Treatment is defined as being employed in the tourism-related sectors. Red vertical line indicates the IVS launch (event) in 2003. Reference year is 2001. Birth year, occupation and census year fixed effects are included.

C. Implications

These findings are generally in line with the international experience that tourism is an important source of employment, particularly for young people, female and less-educated workers. In the case of Hong Kong, our results also echo earlier analysis [13] that labour market resilience increased in the lower-skilled segment as vibrant growth in inbound tourism led to strengthened demand for lower-skilled labour. In addition, the take up of more jobs created by a booming tourism sector by female workers may also complement the rising female labour force participation rate, which helps neutralise the dampening impact of overall population ageing on the labour supply.

Our empirical results also help identify the vulnerable groups (i.e. young, female and lower-educated) during the current labour market downturn. In

[13] See "Box 2: The tight labour market puzzle: will it remain resilient?", HKMA Half-yearly Monetary and Financial Stability Report, September 2012.

particular, our results suggest that the pandemic-induced tourism bust could contribute to higher unemployment by hitting the youth and those who are less-educated. For example, the unemployment rate of those aged 20-24 was 17.1% in Q4 2020, those aged 25-29 was 7.8%, much higher than the overall unemployment rate at 6.3%. Moreover, the unemployment rate of workers with primary school education or below was 5.9% in Q4, and those with secondary school education was 7.0%.

IV. THE CURRENT TOURISM BUST AND UNEMPLOYMENT: SCENARIO ANALYSIS

In this section, we investigate the potential negative impacts of the current pandemic-induced tourism bust in Hong Kong on the future path of the unemployment rate. Undoubtedly, the tourism bust has had immediate adverse impact on the labour market in 2020, with the unemployment rate rising swiftly from 3.3% in January to 6.6% in December, the highest in close to 16 years. Compared with the SARS episode which was shorter and relatively less severe, the unemployment rate rose by 1.1 percentage points from the pre-SARS level of 7.4% in January 2003 to an all-time high of 8.5% in June 2003. Moreover, it took about eight months for the unemployment rate to edge back down to 7.3% in February 2004. Nonetheless, this time is different and the COVID-19's scarring effect on global tourism and travel is likely to affect the local labour market in the coming years.

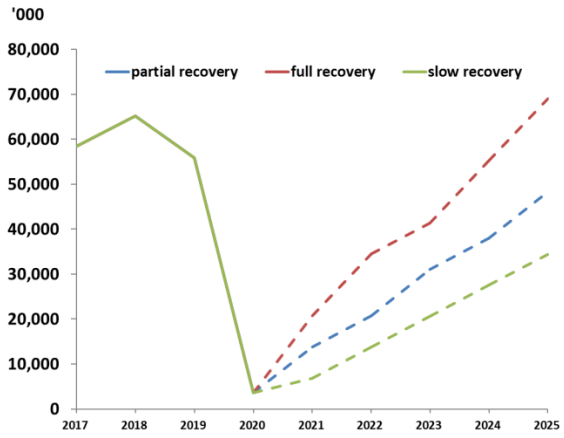
With this in mind, and given the fluid pandemic developments and the associated uncertainties surrounding the outlook for Hong Kong's inbound tourism, we create three scenarios that differ in their assumptions about the recovery trajectories of inbound tourist arrivals over a six-year window between 2020 and 2025. Table 4 and Chart 7 show the assumptions we make on the paths of inbound tourist arrivals under the (i) slow recovery, (ii) partial recovery and (iii) full recovery scenarios.

Table 4: Inbound tourism scenarios from 2020 to 2025

Scenarios based on type of recovery	Inbound tourist arrivals relative to pre-social incidents level*		
	Year 2020	Year 2021	Year 2025
Slow	5%^	10%	50%
Partial		20%	70%
Full		30%	100%

Note: * This level refers to the all-time high of 69 million during the 12 months pre-social incidents, from July 2018 to June 2019. ^ Roughly equivalent to the actual number.
Source: Authors' assumptions.

Chart 7: Assumptions on the path of inbound tourist arrivals



Note: Actual annual tourist arrivals are plotted up to 2020.
Sources: Hong Kong Tourism Board and authors' assumptions.

- For 2020 as a whole, inbound tourist arrivals stood at 3.6 million, or about 5% of the pre-social incidents level (i.e. an all-time high of 69.4 million arrivals between July 2018 and June 2019).[14]

- From 2021 onwards, we expect a vaccine will be available but tourist arrivals are assumed to increase only gradually (Table 4 and Chart 7), with different speeds under the three scenarios (e.g. achieving 10–30% of the pre-social incidents level in 2021).[15] The drawn-out recovery process reflects a number of factors. First, even with access to a COVID-19 vaccine, it will still take some time to vaccinate the whole population in an economy and much longer to have a substantial health impact around the world. Second, the opening of international borders and easing of travel restrictions are likely to be gradual and locational (e.g. travel bubbles) due to the uneven distribution process of vaccines across economies and over time. Third, some structural factors such as behavioural changes (e.g. higher risk aversion, adoption of e-commerce) and technological progress (e.g. the use of

[14] Or equivalent to about 6% of the 2019 number (55.9 million).
[15] According to the World Tourism Barometer report published by the United Nations World Tourism Organisation in October 2020, most tourism experts expect a rebound in international tourism by the third quarter of 2021 and a return to pre-pandemic 2019 levels not before 2023.

virtual business conference to facilitate business operations) may have reduced the demand for tourism and travel compared with the pre-pandemic period.

- In 2025, tourist arrivals are assumed to climb to 50% and 70% of the pre-social incidents level under the "slow" and "partial" recovery scenarios respectively, and are assumed to reach 100% under the "full" recovery scenario.

Under these illustrative scenarios on inbound tourism recovery, we conduct quantitative analysis to get a sense of the magnitude in the changes in the unemployment rate. As a first step, we estimate how tourist arrivals affect employment over time. In the second step, we make additional assumptions on the working age population and labour force participation rate for each of the relevant years to produce the estimated paths of the unemployment rate.[16] Regarding the first step, we adopt two approaches.

- Micro approach. Based on the estimated effect of the IVS on the probability of employment in different tourism-related sectors using individual-level data in the census (similar to equation 1 above), we obtain the elasticities of sectoral employment with respect to overall inbound tourist arrivals.[17] We then estimate the annual employment numbers in those tourism-related sectors under the three different scenarios discussed above. To arrive at total employment, we make additional assumptions on the annual employment growth in the non-tourism-related sectors based on relevant historical patterns (Annex C discusses the assumptions in detail).[18]

[16] Note that in step two, these assumptions are identical across the scenarios so that the differences in the estimated unemployment rates stem from the different trajectories of the recovery process of inbound tourism only. It is important to note that we do not make explicit assumptions on the reallocation process of labour across sectors. In the case of Hong Kong, it is difficult to conduct analysis of labour reallocation partly because an up-to-date, official input-output table is unavailable.

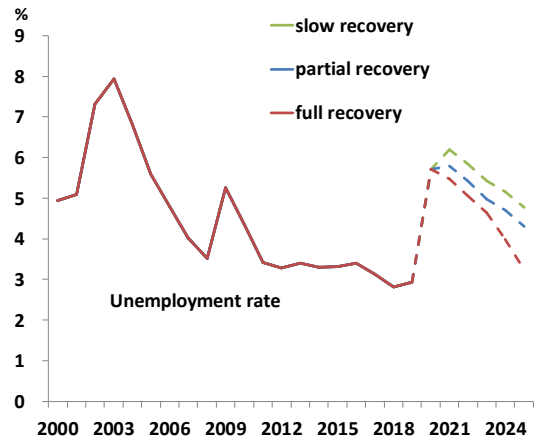
[17] Annex B provides more details on this approach.

[18] Meanwhile, economic theory suggests that a booming services sector should generate a sizable and positive multiplier effect on other sectors. However, the general equilibrium effects of the sectoral boom on the labour market at large are beyond the scope of the current study. That said, our assumptions on the employment in the non-tourism-related sectors has partially taken this effect into account by considering what has already happened during the pandemic (see Annex C).

- Macro approach. We also use macro-level data to obtain the elasticities of sectoral employment with respect to inbound tourist arrivals based on an industry's reliance on direct tourism consumption, i.e. the industry tourism ratio (ITR), which is the proportion of the total value-added of an industry that is related to tourism. [19] Conceptually, the higher the tourist arrivals, the larger the employment in the sector with a high ITR.

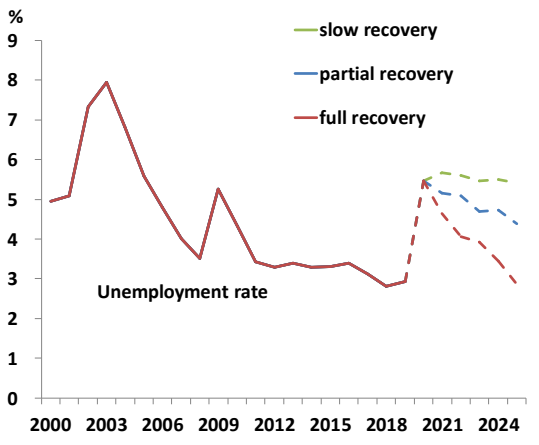
Chart 8: Unemployment rate estimates

(a) Micro approach



Note: Actual annual data are plotted before 2020.
Sources: C&SD and authors' calculation.

(b) Macro approach



Note: Actual annual data are plotted before 2020.
Sources: C&SD and authors' calculation.

In general, the two approaches give broadly consistent estimates of the unemployment rate under the different scenarios (Chart 8). As expected, the unemployment rate trajectory will hinge critically on the speed and path of recovery in inbound tourism. We would like to highlight three major observations here:

- First, all three scenarios suggest that, following the large and immediate adverse impact in 2020, the unemployment rate would generally moderate alongside the

[19] Specifically, we leverage data published under the Tourism Satellite Account framework by the Census and Statistics Department to measure the importance of inbound tourism for each sub-sector. For tourism-related industries, including retail, food and beverage, air and water passenger transport services, and accommodation services, ITRs are generally available from 2000 to 2018. We assume that the non-tourism-related industries have an ITR of zero (or a negligible proportion of the total value-added being related to tourism). We find that, other things being equal, for a one-percentage-point increase in ITR, employment goes up by 1.6% on average in all sectors, while for a 1000 increase in tourist arrivals, ITR rises by about 0.2 percentage points on average.

gradual tourism recovery in the coming years. In the optimistic scenario where inbound tourism to reach 100% of the pre-social incidents level by 2025 (i.e. full recovery scenario), the unemployment rate could return to the pre-pandemic level of about 3%.

- Second, in our worst–case scenario where the tourism recovery was very sluggish (i.e. slow recovery scenario), the unemployment rate would increase slightly further in 2021 (Charts 8a and 8b) such that the peak impact of the COVID-19 pandemic on unemployment would be delayed.

- Third, despite general improvement over time, the unemployment rate may settle at a higher level by 2025 relative to the pre-pandemic level (2.9% in 2019) if the tourism downturn becomes prolonged (i.e. slow and partial recovery scenarios).[20] Compared with the pre-pandemic level, the estimated unemployment rate under the slow and partial recovery scenarios could be about 1.5–2.5 percentage points higher in 2025.

V. CONCLUDING REMARKS

The IVS generated an unprecedented boom in inbound tourism in Hong Kong. As a result, younger workers, especially female and those with secondary school education, were drawn into the tourism-related sectors after the tourism boom. Moreover, female and less-educated workers in these sectors saw larger and rising growth (3-20 percentage points) in labour income compared with their peers in other sectors. As the inbound tourism boom turns into a bust, these labour groups may become more vulnerable and therefore merits close monitoring. Meanwhile, the pandemic's scarring effect on global tourism and business travel is likely to affect unemployment for some years to come, and our scenario analysis suggests that the unemployment rate will hinge on the pace and extent of tourism

[20] According to the micro-based estimates, there are even chances that the unemployment rate could stay at the current high level for a protracted period (Chart 8a, green line).

recovery, potentially settling at a higher level by 2025 compared with the pre-pandemic period if the tourism recovery is slow and partial.

Finally, we would like to highlight some caveats of the study. First, the scenarios we have posited may veer significantly from actual developments as the analysis is subject to further uncertainties and risks, including those stemming from the pandemic developments, geopolitical factors such as US-China tensions, as well as Hong Kong Government's policy response. Therefore, these estimated impacts should be treated as scenario analysis, rather than as forecasts. Second, besides the recovery in tourism, other factors also affect future labour market developments. For example, the impact of the tourism bust on the overall unemployment rate will also depend on how quickly other sectors can absorb workers from the tourism-related sectors. On the flip side, some jobs in the tourism-related sectors may no longer be "viable" as the pandemic is proving to be an unexpected catalyst to innovation and the integration of new technologies. Given these fluid developments and the complexity of the analysis, a separate study is needed in the future to give more attention to these structural changes in the labour market.[21]

[21] For example, in terms of policy implications, the authorities may need to focus on the ongoing structural changes in the economies, and the resource allocation necessary to channel labour towards more productive sectors in a post-pandemic world.

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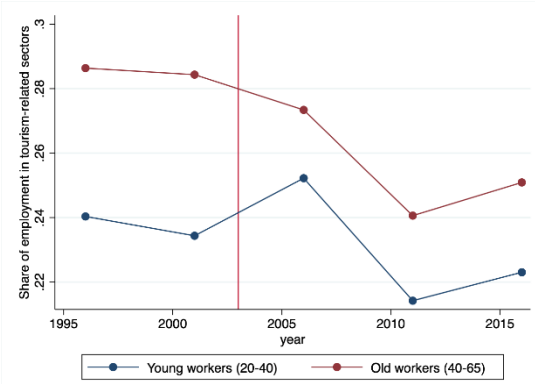
Annex A: The validity of the "parallel time trend" assumption in the Difference-in-Differences estimation

The validity of the difference-in-differences (DD) results rely on, first, the assumption that the introduction of IVS in 2003 is not correlated with prior trends in outcomes (employment or income) over time between the treatment and comparison groups. An additional assumption is that there are no young/old (tourism/non-tourism) worker-specific shocks that are concurrent with the IVS and that differentially affect young (tourism) workers compared with old (non-tourism) workers. Otherwise, we could be erroneously attributing the treatment effect to the IVS-induced rise in tourism. In layman's terms, the key identifying assumption is that in the absence of the surge in the number of inbound tourists and the subsequent boom in the tourism-related sectors, the labour outcomes of the treatment group and the comparison group would follow a parallel time trend.

Chart A1 plots the two main outcomes of the study — the probability of employment in the tourism-related sectors (left) and log of income from main employment (right) — before and after the IVS by the treatment and comparison groups. On the left-hand-side chart, the trends in the probability of employment in the tourism-related industries are almost in parallel between the young (treated) and old (comparison) workers until after the IVS in 2003 when the probability among the young turns upwards. On the right-hand-side chart, we see that the income trajectories of those employed in tourism (treatment) and non-tourism related sectors (comparison) are similar prior to 2003, until a slight fall in income among the comparison group between 2001 and 2006. These results suggest that the parallel time trend assumption seems to be valid in our study.

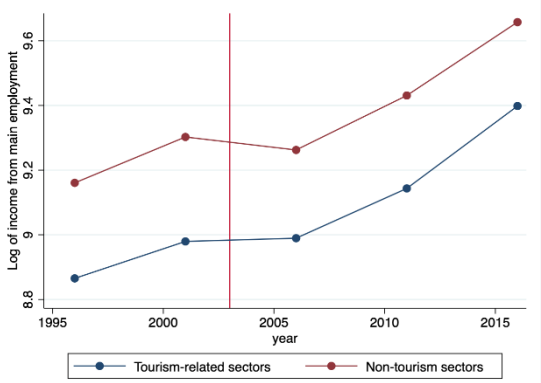
Chart A1: Trends in income and tourism employment by treatment status

(a) Share of employment in tourism-related sectors



Sources: C&SD and authors' calculation.

(b) Income from main employment



Sources: C&SD and authors' calculation.

Annex B: Micro approach in scenario analysis: details on obtaining the elasticities of sectoral employment with respect to overall inbound tourist arrivals

We take the following steps to utilise the census estimates in the scenario analysis:

1. Using a difference-in-differences framework, we first estimate the impact of the IVS on employment in each of the tourism-related sectors: food, retail, hotel, and transportation. The estimated coefficients represent the average change in the probability of employment in each of these sub-sectors after the IVS compared with pre-IVS (for example, about 0.2 percentage points higher in the hotel sector).

2. As a second step, we calculate the actual increase in the number of tourist arrivals from the pre-IVS census years (1996, 2001) and post-IVS census years (2006, 2011, 2016). We then transform each of the above estimated coefficients for the food, retail, hotel and transportation sectors into a percentage point change in employment probability for every one percent increase in the number of tourist arrivals (for example, approximately 200% increase in tourist arrivals translates into a 0.2 percentage points increase in the employment probability in the hotel sector, which implies that a 1% increase in tourist arrivals leads to 0.001 percentage point increase in employment probability).

3. We then derive the total employment in each of the tourism-related sectors for each year from 2020 to 2025 based on (i) the assumed number of tourist arrivals under the three scenarios, (ii) the estimated coefficients in Step 2, and (iii) the 2019 employment number in that sector and share in total employment (using the General Household Survey data from the C&SD). For example, in 2019, 43,300 people were employed in the hotel sector, comprising 1.13% of total employment. In 2020, the assumed total tourist arrivals are at 5% of the pre-social incidents level, or a 94% drop from 2019. We derive the total number of workers employed in the hotel sector in 2020 by multiplying the 2019 employment number with the estimated elasticity in employment probability with respect to tourist arrivals, weighted by the share of the sector in total employment (43,000*(1+(0.001*-94)/1.13) = about 39,300).

4. Total employment in the tourism-related sectors is then the sum of estimated employment in each of the sub-sectors. We make additional assumptions on non-tourism employment to arrive at total employment (see Annex C).

Annex C: More details on the assumptions in the scenario analysis

Table C1: Assumptions used in the scenario analysis

	Labour force participation rate	Working age population		Non tourism employment		
				Slow	Partial	Full
	%	000	%		000	
2015	61.1	6388.2	0.8		2960.9	
2016	61.1	6415.9	0.4		2972.3	
2017	61.1	6459.2	0.7		2995.5	
2018	61.2	6501.6	0.7		3031.1	
2019	60.6	6544.9	0.7		3033.1	
2020	59.4	6564.5	0.3	2906.8	2906.8	2906.8
2021	59.4	6597.3	0.5	2904.8	2919.1	2929.7
2022	59.5	6617.1	0.3	2934.2	2948.6	2959.3
2023	59.5	6643.6	0.4	2963.8	2978.4	2989.2
2024	59.6	6670.2	0.4	2993.8	3008.5	3032.4
2025	59.6	6700.2	0.5	3024.0	3038.9	3076.2

Note: Table summarises the assumptions made on the labour force participation rate (LFPR), growth of the working age population and employment in the non-tourism-related sectors for the scenario analysis. Figures in red are assumed or derived from assumptions. Under the micro approach, we use census estimates to gauge employment in the tourism-related sectors and make additional assumptions on the growth of non-tourism employment to arrive at overall employment. We assume non-tourism employment to grow at average rates over historical periods. For 2020, we use the actual monthly employment in the non-tourism-related sectors from January to July 2020, and assume that for the rest of 2020, it grows at the average rate during the first six months of 2020. For 2021 to 2025, we assume non-tourism employment to first grow at the average rate over the pre-COVID, post-social incidents period of July 2019 to December 2019, before picking up and growing at the pre-COVID and pre-social incidents average (over the period from June 2018 to May 2019).