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Australia 6 months after COVID-19 restrictions- part 1: Changes to travel activity and attitude to measures

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ABSTRACT

While many countries have experienced more than one wave of the pandemic throughout 2020, Australia has been able to contain the virus in a way that makes it a stand out (with New Zealand) in the way that it has been contained, with an exception in Victoria linked to failed quarantine procedures for travellers returning from overseas. Through descriptive analysis, this paper builds on earlier papers by the authors on the Australian response, with a focus on the changing dynamics of travel activity, concern with public transport, and attitudes surrounding activity given the perception of risk of COVID-19 and the level of public support for regulatory intervention and restrictions on movement. We find that Australia continues to suppress travel, particularly that for commuting, that comfort in completing day-to-day activities continues to rise (with the exception of Victoria where confidence feel significantly), and while support for intervention measures remains high, there has been an erosion in sentiment. As with previous work, we discuss what this might mean for future transport policy, and attempt to draw lessons from the Australian experience.

1. Introduction

1.1. Literature review

The impact of COVID-19 has been profound. It has changed the dynamics of people movement not only globally via international travel, but down to the unit of a household. Many individuals have severely curtailed their activity due to personal decisions about private and/or public health, or due to government regulatory intervention to stop rising case numbers. Many countries, Australia and New Zealand in particular, have found that restricting the movement of people is perhaps the best method to restrict the spread of the disease and facilitate the tracking community transmission.

While this paper will overview the ongoing experience in Australia, exploring disaggregate changes over time via the third wave of an ongoing series of national surveys, others have been doing similar work internationally. One such study is the MOBIS: COVID-19 work in Switzerland, who have been releasing close to weekly reports on mobility behaviour as tracked by GPS, relative to a baseline period of data September to November of 2019. Recent insights from this valuable data collection effort (Molloy et al., 2021) reveal an ongoing acceptance of working from home and the modal shift in the recovery of the trip volumes and in the miles driven. They note that space-efficient large vehicles such as buses, trams and trains remain unpopular, and sustained increased in bicycle usage.

Similarly, in Sweden, who instead relied on behavioural guidelines rather than mandatory enforcement to limit human activity (Sabata et al., 2020), public transport ridership decreased in Stockholm by 60%, with travellers switching from 30-day period tickets to single tickets and travel funds and sales of short period tickets almost negligible (Jenelius and Cebecauer 2020). In explaining the propensity to stop travelling via public transport, education level, income, age, and work place were all significant (Almlof et al., 2020). In New York City it was found that subway use experienced a 90% fall, with evidence that some public transit users instead shifted to active modes such as bike sharing systems (Teixeira and Lopes 2020). The relatively larger move away from public transport can be explained by heightened concern about the risk of contagion on these modes (Scorrona and Danielis 2021; Qiu et al., 2020). Airplanes and buses are perceived to be the riskiest transport modes, while avoidance of public transport is consistently found across multiple countries, with income inequality the reported number of deaths due to COVID-19 aggravating this perception (Diego Maria Barbieri et al., 2021).

With respect to the impact on traffic, in South Korea there was a
23%–26% reduction in traffic the weeks after the first confirmed COVID-19 case, with an increasing trend in traffic being observed as the number of COVID-19 cases started decreasing (Lee et al., 2020). Others have explored the potential positive externalities of this fall in traffic, for example in the city of Santander in Spain, overall mobility fell by 76% (public transport dropped by up to 93%), and as a result NO2 emissions were reduced as were the number of traffic accidents (Aloi et al., 2020). In Somerville USA it was it was found that a state-wide stay-at-home order in Massachusetts resulted in a 71% reduction in car traffic and 46% in trucks, contributing to an almost 70% reduction in ultrafine emission particles (Hudda et al., 2020). In analysis of data across the USA, it has been found that such safer-at-home policies led to a 20% reduction in vehicular collisions entirely driven by less severe collisions, along with a 25% reduction in particular matter concentration levels (Brodeur et al., 2021). Similarly, in the state of Qatar, while mobility restrictions did not change the hourly distribution of traffic over the day, they did reduce travel by 30%, resulting in total traffic crashes by about 37%, but the easing in movement restrictions did increase violations and fatalities (Muley et al., 2021).

While there have been some positive consequences of COVID-19 like those cited above, others have noted that the low production trend of greenhouse gas emission is expected to reverse once containment measures are lifted, and that the pandemic represents an opportunity to examine the role of public transit in a new green and public paradigm of mobility (Tardivo et al., 2021). Additionally, social distancing might result in social isolation and limited physical activity and as such walking and cycling can be important ways to maintain satisfactory levels of health and well-being (De Vos 2020). However, in the context of the immediate response to COVID-19, one study found that only 30% of transport experts worldwide reported guidelines and contingency plans for responding to the pandemic (Zhang et al., 2021).

Perhaps in light of this, research has also explored potential planning and operational responses, from identifying intervention measures that can support public transport service providers in planning their services in the post-shutdown phase and their respective modelling development requirement (Gkiotsalitis and Cats 2020) to the development of a new policymaking approach for battling the current COVID-19 and future pandemics (Zhang 2020). Highlighting the important role of movement and thus transport policy, it has been shown that social-based lockdown strictness will be sub-optimal and that policy makers need to intervene to impose this type of lockdown (Oum and Wang 2020). Indeed, optimisation models that can evaluate a modal-specific travel banning requirement (Gkiotsalitis and Cats 2020) to the development of a new policymaking approach for battling the current COVID-19 and future pandemics (Zhang 2020).

1.2. Scope and structure of this paper

In this paper, Part 1 of a joint overview, we will explore many of the themes addressed above, specifically reporting on the change in travel activity within Australia in the context of the majority of the country having very small to no new COVID-19 cases, while on the other hand the state of Victoria was in a very restrictive lockdown to combat a second wave of community transmission (peaking at just over 900 cases a day; a similar level to the national figures experienced in late March of 2020 after the initial outbreak). Part 1 explores not only describes changes to travel activity, but also provides an overview of the changing level of comfort in completing many day-to-day activities, support for COVID-19 policy measures and evolving perception of the risk of COVID-19. For international readers, an understanding of the overarching experience with COVID-19 in Australia might be instructive, as the country has had relatively low case numbers, but equally a relatively forceful regulatory approach to curb the spread of the pandemic.

The paper, where possible, compares the aggregate results from all three waves of the study to show the change over time, and continues to introduce new insights. In Part 2 of the paper series, we focus in detail on the rise of working from home. Note that we limit ourselves to aggregated analysis, given the desire to share timely information and the already large number of results discussed in this two-part work. We recognise that understanding the dynamics of changing behaviour at an individual level is crucial and as the panel nature of the data grows, ongoing work will seek to examine change and adaptation at an even more disaggregate level. This is part of ongoing work which complements the descriptive overview and interpretative policy analysis herein. This paper is structured as follows: section two provides an overview of the Australian experience; section three describes the sample collected for each survey wave; and provides a note on hypothesis testing; section four discusses the results of overarching analysis; section five provides a discussion of the results and the potential policy implications that arise from the result found herein; and section six discusses limitations and provides the conclusion.

2. Overview of the Australian experience

2.1. COVID-19 and the community

This paper examines data collected in a third wave of an ongoing series of surveys designed to look at the changing impact of COVID-19 on travel, activities, and attitudes in Australia. We build on the findings of the second survey wave, which was conducted during a period of time where Australia had been relatively successful in combatting the first wave of COVID-19 infections through a series of regulations which were quickly implemented to halt the rise in transmissions. In discussing Wave 2, Beck and Hensher (2020a) note that the country had experienced a relatively low number of new daily infections almost exclusively restricted to what is now the largest risk factor in Australia; residents returning from abroad. Indeed, a key pillar in the strategy to combat the transmission of COVID-19 in Australia was to require all incoming international travellers to isolate in designated quarantine hotels for a period of two weeks after arriving in Australia, and at the time of writing the Wave 2 overview, it was not known what would happen in Victoria, where a breakdown in the hotel quarantine regime led to a sustained period of lockdown and restrictions.

Despite the relatively low number of positive COVID-19 cases in the Hotel Quarantine Program, breaches of containment in the program in May and June led to the second wave of COVID-19 cases in Victoria. In Victoria, private security contractors were used to maintain quarantine, and while this was also true elsewhere, other states made far more significant use of police and defence forces. A primary part of the breach was the result of four guests in quarantine in mid-May who tested positive to COVID-19, spreading the virus to a hotel staff member and two private security guards. By June 18, a further 17 people working at the hotel had tested positive. At the same time, community transmission outside of the hotel quarantine system was starting to spread, in particular a case that arose to attention on 2 May related to an outbreak in an abattoir in Victoria that saw eight confirmed cases grow to 90 over the course of just 12 days. On 30 June, 10 Melbourne postcodes re-entered stage-three...
restrictions, and all international flights were diverted from Melbourne for the following two weeks. Four days later, lockdown expanded to include two more postcodes and nine public housing towers were placed under a controversial hard lockdown. On the 6th of July, the Victoria–NSW border was closed for the first time in a century. On 9th of July, stage-three restrictions would be extended to the whole of metropolitan Melbourne and the Mitchell Shire. On the 2nd of August, metropolitan Melbourne moved into stage-four lockdowns, being only allowed to shop for food and necessary supplies within 5 km of their home, exercise for 1 h once per day within 5 km of home, and a stay-at-home curfew from 8:00pm to 5:00am each night. At approximately the same time, regional Victoria was placed in stage-three “stay at home” restrictions.

In other states, New South Wales continued to experience low levels of community transmissions, primarily linked to an outbreak in South-West Sydney that was the result of a function at a hotel/bar attended by a COVID-19 positive guest who had travelled up from Melbourne for the event. Elsewhere in Australia, COVID-19 had been all but eliminated save for returning travellers. The relative magnitude of the second wave of infection in Victoria, the community transmissions in New South Wales and what was occurring in other states can be seen in Fig. 1. On this figure, we also highlight the periods in time where each of the three waves of surveying were conducted.

As we have been doing throughout the series of papers related to this survey, we include a summary overview of the key events over the time period or analysis (Fig. 2 and Table 1), in this instance the period between Wave 2 and Wave 3. Unlike the timeframe between Wave 1 and Wave 2, the state borders remained mostly open; the exceptions being between New South Wales and Victoria, and Queensland for both New South Wales and Victoria. While the adoption of a tracking and tracing application (COVIDSafe) was thought to be a key prong in controlling COVID-19 at Wave 2, it has turned out that the application has been largely a white elephant. The ability of New South Wales to control and suppress COVID-19 community transmissions has instead been linked to a COVID tracking team of more than 300 people, who make over 2000 calls a day to determine an infected person’s hourly movements and who they potentially exposed, combined with testing of sewage, using photos, phone calendars, appointments and receipts to track movements (Cockburn 2020).

2.2. Aggregate changes in travel activity

For the purposes of comparison to the disaggregate results discussed in this paper, we also provide aggregate measures of travel activity changes from external sources. It should be noted that, pleasingly, the travel patterns observed in our data mirror these external aggregate trends. In Fig. 3 the aggregate data collected by the CityMapper Mobility Index (CityMapper, 2020) is presented and shows that, relative to the baseline period (4 weeks between Jan 6th and Feb 2nd, 2020) mobility was trending upward at a slightly faster rate in Sydney than Melbourne, but also highlights the impact on mobility in Melbourne as a result of the severe restrictions placed on the city in an effort to curb the second wave of the pandemic.

Data from the Google Community Mobility Report is presented in Fig. 4 (Google, 2020: aggregates data across Australia and compares to the median value for the corresponding day of the week during the 5-week period Jan 3–Feb 6, 2020 as a baseline). The data shows a slow return to the parks such that activity now reflects the baseline period; however, the time spent at retail and recreational locations and workplaces appeared to plateau over the Wave 3 timeframe, at a level around 20% below what could be considered a pre-COVID “normal”. Likewise, time spent at public transit locations has also plateaued, but at a level considerably less than the baseline.

3. Sample description

3.1. Data collection and composition

This third wave of the ongoing COVID-19 Travel Survey was in field from the 4th of August to the 10th of October, with data being collected in three segments. Firstly, respondents who completed both Wave 1 and Wave 2 were recontacted, resulting in 269 respondents who have participated in all three waves; secondly respondents who completed either Wave 1 or Wave 2 were recruited resulting in a further 254 respondents who participated in two out of the three survey waves thus far; finally another 433 respondents who completed just Wave 3 alone were recruited. The online survey company PureProfile was used to sample respondents, and the survey was available across Australia in order to examine the widespread impact of COVID-19. Table 2 provides an overview of the sample collected in each wave.

Comparing to census data (ABS), the samples are broadly representative of aggregate Australian characteristics, though the later waves oversample females. This is an artifact of the desire to try and build a valuable time-series panel data set (typically rare in transportation research), rather than achieving a specific quota. The impact of COVID-19 is, however, sufficiently widespread that no demographic can escape the disruption caused.

3.2. Analysis methods

Consistent with the previous two papers examining the impact of COVID-19 on the travel and activity patterns exhibited within Australia (Beck and Hensher 2020a, 2020b) and given the already large number of results discussed in this two-part work, we limit ourselves to understanding differences at a disaggregated level across key socio-demographic groups. Specifically, differences are explored based on gender, age (younger (18–34, n = 288); middle-age (35–54, n = 359);
older (55 or older, n = 309), and personal income (lower income ($40,000 or less, n = 328); middle income ($40,001 to $80,000, n = 307) and high income (more than $80,000, n = 235). Additionally, we further explore differences in behaviours and attitudes based on whether a respondent is in a metropolitan (n = 499) or regional (n = 423) location; and we examine every question based on whether a respondent is located in Victoria (n = 229) or another state in Australia (n = 727).

All survey questions were examined for differences across these five socio-demographic characteristics. Depending on the nature of the data and the relevant hypotheses, a mix of t-testing, ANOVA, crosstabs, and correlations were used. Only differences in behaviours that are statistically significant are presented in the figures or discussed in the text. All testing conducted at the 5% level of significance and results can be provided upon request (given the volume of statistical testing done).

4. Results

4.1. Travel activity

Fig. 5 shows that the reported number of total one-way trips undertaken in the last week indicates a similar pattern to the aggregate data from sources such as Google Mobility (reported above). There is a stabilisation in the travel activity at around 15 trips per week on average, up from the lows of Wave 1 but still well below the amount of travel that was reported prior to COVID-19. The exception is Victoria who, under restrictions on movement that matched those observed in the early stages of action against COVID-19 in March, reverted to levels of travel activity observed in those early stages of responding to the threat of COVID-19 by restricting the movement of people in order to contain the spread of the disease. Younger respondents make, on average, five more trips per week than other respondents, and those on lower incomes have significantly less weekly trips on average than respondents in the middle to high income levels.

While 8 out of 10 Australians outside of Victoria anticipate this level of travel to remain the same in the upcoming week and 16% plan to travel less (see Fig. 6), one-third of Victorians are planning even less travel than the currently low levels of activity.

Fig. 7 shows the number of reported trips by mode, and we see that generally the private car continues its slow return to pre-COVID levels, the active modes of walking and cycling remain relatively constant but use of public transport remains relatively suppressed. Older respondents and those on lower incomes use the car significantly less than other groups, younger respondents use taxis and ridesharing options more on average as well as buses, and older people use the train less. Those in metropolitan areas, unsurprisingly, make more trips by not only private car but bus and ferry, while use of trains and buses is significantly lower among females. Except for walking and cycling, Victorian residents use all other modes less than those in other parts of Australia. Fig. 8 shows the number of reported trips by purpose. Throughout the waves, shopping for food has been relatively stable which is unsurprising given the necessary nature of the travel and that supermarkets have remained open in Australia throughout the pandemic (including Victoria). We see an increase in trips for social and recreational purposes, which again is not surprising given the rolling back of restrictions in every state or territory jurisdiction outside of Victoria. Younger respondents report more commuting trips and more trips for general shopping, and lower income respondents report less trips for commuting and work-related business.

4.2. Travel perceptions

Wave 3 explored how respondent perceived the changes in their level of use of different modes of transportation, with particular reference to active modes of transport (walking, running, cycling) given the large number of news media reports about large increases in exercise in outdoor places (ABC 2020) and significant increases in the sales of bicycles and cycling related equipment (Marks 2020), likely as substitute activity for gym closures but also because outdoor exercise was something that was also permitted throughout the pandemic. While the majority of respondents outside of Victoria reported car use to be about the same in the last week as it has been overall since the start of the pandemic, almost half of Victorians (47%) reported decreased use of their car. Generally, this trend holds true for all of the modes of transport presented in Fig. 9, though it is interesting to note that with respect to walking, more respondents reported an increased use of this activity than a decrease.

With regards to socio-demographics, respondents in metropolitan areas are more likely to have decreased their use of private car, trains, buses and taxis/ridesharing. Older respondents are more likely to have reduced car use, younger people more likely to have stated their use of the train has remained the same, lower income respondents more likely to not use taxis/ridesharing and females are more likely to state that...
they do not run or jog.

As the pandemic progressed, we were increasingly interested in how localised travel patterns may have changed; with many now working from home or limiting non-essential travel over longer distances, there was anecdotal evidence that movements in local towns/suburbs was relatively more robust than travel in wider radii from home. Fig. 10 shows that outside of Victoria, travel in the local area for many had returned to pre-COVID levels, was anticipated to remain unchanged both into the next three months and the future in general more broadly. Two-thirds of Victorians, on the other hand, reported decreased travel outside of Victoria, travel in the local area for many had returned to pre-COVID levels, was anticipated to remain unchanged both into the next three months and the future in general more broadly.

Table 1

| Date       | Event Description |
|------------|-------------------|
| 26/06/2020 | (Current position for all states) |
| WA Easing  | (3) Revision of spacing to 2sqm, non-work gatherings limited to 200 venues with appropriate space limits of 300, gyms, cinemas and galleries reopen |
| NSW Easing | (3) Pubs, clubs, cafes and restaurants limit of 50 customers |
| SA Easing  | (3) No limit on non-work gatherings other than 4sqm rule |
| NT Easing  | (3) All but 4sqm rule remains, some small venues allowed 2sqm per person |
| TAS Easing | (3) Gatherings at households remain limited to up to 20 people |
| QLD Easing | (2) Gatherings of up to 20 in homes and public spaces, gyms and non-contact sport allowed, Museums and galleries open, no limit on recreational travel |
| ACT Easing | (2) Face to face higher education resumes, cinemas and movies open, theatres and galleries open, max of 100 people for indoor and outdoor with 4sqm rule |
| VIC Easing | (2) Cafes, Restaurants, Pubs, Bars, museums, galleries have 50-person limit |

| Date       | Event Description |
|------------|-------------------|
| 30-Jun-20  | VIC Tightening (1) Re-enforced local lockdowns across 10 different Melbourne postcodes |
| 1-Jul-20   | NSW Easing (4) All businesses, can reopen with exception for night clubs |
| 2-Jul-20   | WA Easing (4) All existing gathering limits and the 100/300 rule removed |
| 6-Jul-20   | VIC Tightening (2) All events permitted except for large scale, multi-stage music festivals |
| 8-Jul-20   | NSW Borders Tighten (1) NSW closes border to VIC due to Melbourne outbreak |
| 9-Jul-20   | VIC Tightening (3) Metro Melbourne and Mitchell Shire in lockdown 6 weeks |
| 10-Jul-20  | QLD Easing (3) Gatherings 100 people permitted, community sport and fitness resumes, casinos, gaming and gambling venues and nightclubs open, 4sqm rule applies |
| 16-Jul-20  | NT Border Tightening (1) NT opens borders with all states except for hotspot (Greater Sydney and VIC) |
| 17-Jul-20  | NSW Tightening (1) Per-table seating reduced from 20 to 10, max of 300 in any venue |
| 19-Jul-20  | VIC Tightening (4) Face coverings mandatory in metro Melbourne and Mitchell Shire outside of home |
| 22-Jul-20  | VIC Tightening (5) Visit in aged/health care restricted to carers only and a limit of 1 h per day |
| 2-Aug-20   | VIC Lockdown (1) State of disaster declared, curfew in Melbourne from 8pm to 5am enforced |

| Date       | Event Description |
|------------|-------------------|
| 2-Aug-20   | 200 National Deaths |
| 8-Aug-20   | QLD Borders Tightening (1) Closure of border to New South Wales and the ACT |
| 10-Aug-20  | ACT Easing (3) In and outdoor gatherings limited to 100 people, casinos and gambling venues, food courts, spas, gyms open |
| 11-Aug-20  | 300 National Deaths |
| 18-Aug-20  | 400 National Deaths |
| 24-Aug-20  | 500 National Deaths |
| 24-Aug-20  | SA Border Opening (1) Border with NSW reopens |
| 28-Aug-20  | SA Easing (4) Residential gatherings allowed to have a max of 50 people |

Table 1 (continued)

| Date       | Event Description |
|------------|-------------------|
| 30-Aug-20  | 600 National Deaths |
| 5-Sep-20   | SA Easing (5) Wedding or funeral increase to 150 people, food and alcohol service resumes for those seated at a bar |
| 700 National Deaths |
| 13-Sep-20  | ACT Easing (3.1) Small sized venues and facilities return to their pre-COVID capacity (25 max) |
| 18-Sep-20  | NSW Easing (5) Theatres, concerts and conference halls new capacity of 50%, to a max of 1000 |
| 28-Sep-20  | SA Easing (6) Private functions, weddings and funerals allowed 150 people, dancing permitted, standing consumption of food and beverages at both indoor or outdoor events |
| 3-Oct-20   | 4-Oct-20 QLD Easing (4) Standing eating and drinking permitted at indoor and outdoor venues, outdoor venues 2sqm rule, max of 1000 at outdoor events, stadium seated capacity to rise to 75% |
| 9-Oct-20   | ACT Easing (4) Gatherings max of 200 people, cinemas and theatres 50% capacity, large indoor venues 50% (up to 1000) |

Fig. 3. CityMapper mobility index weekly averages.

Fig. 4. Google mobility index.
movement), and only 17% expected that travel to increase again in the next three months.

Differences were observed between metropolitan and regional areas; metropolitan respondents were more likely to report a decrease in local travel relative to before COVID-19, and more likely to state that their travel would decrease in the next three months relative to their travel now. Those on higher incomes were more likely to state their local travel had increased relative to pre-COVID levels, and older respondents were more likely to expect the travel to be the same over the next three months.

4.3. Preliminary insights into location choices

Another spatial insight that the research explored was whether or not respondents were moving away from city locations, something that has subsequently emerged as a potential trend with some data showing certain property markets were experiencing growth on the back of COVID-19 and increased working from home (Collett 2020). Fig. 11 shows the broad results of this preliminary investigation: 4% of respondents are thinking of moving and 2% have changed where they live; and 2% respondents reporting that their workplace is considering a location shift, and 1% of workplaces having done so already, although some of this may be related to changes that were already planned irrespective of COVID-19.

4.4. Concerns about public transport

The research has been tracking community concerns with COVID-19 and public transport hygiene since the early stages of the pandemic in Marks, 2020. Wave 3 results are presented in Fig. 12. Outside of Victoria, the level of concern continues to fall; albeit while the change between Wave 2 and Wave 3 is significant, the difference is small. In Victoria, it is not surprising that concern is significantly higher than it was in Wave 2, but it is also interesting to note that concern did not increase to the

Fig. 5. Impact of COVID-19 on reported one-way weekly trips.

Table 2

| Wave | Wave 2 | Wave 3 | ABS |
|------|--------|--------|-----|
| Total Sample | 1074 | 1457 | 956 | na |
| Female | 52% | 58% | 58% | 51% |
| Age | 46.3 (σ = 17.5) | 48.2 (σ = 16.2) | 48.2 (σ = 16.2) | 48.2 |
| Median Income\(^a\) | Household $1682 | Household $1202 | Personal $960 | H H $662 |
| Have children\(^b\) | 32% | 35% | 35% | 25% |
| Number of children | 1.8 (σ = 0.8) | 1.7 (σ = 0.9) | 1.8 (σ = 0.8) | 1.8 |
| Occupation for those working: |
| Manager | 1% | 2% | 14% | 13% |
| Professional | 38% | 35% | 28% | 22% |
| Technician & Trade | 5% | 6% | 6% | 13% |
| Community & Personal Services | 8% | 10% | 10% | 11% |
| Clerical and Administration | 17% | 17% | 22% | 14% |
| Sales | 23% | 22% | 11% | 9% |
| Machine | 2% | 2% | 4% | 6% |
| Operators/Drivers | 5% | 5% | 7% | 10% |
| Labourers | |

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\(^a\) ABS reported income is for all individuals 15 years or older, whereas we sample 18 years or older, this may explain some of the discrepancy in personal income.

\(^b\) Our survey reports whether a household has children or not, whereas the ABS only provides a definition of a family and includes households without children in that composition.
"peak" of concern that was observed after the initial outbreak (Wave 1). Perhaps respondents are more tempered because of the ongoing exposure, and better prepared this time around than in the early stages of the pandemic.

Given that in many places in Australia the rates of community transmission of COVID-19 were low and that people were beginning to increase travel activity, in Wave 3 we asked an additional question about the level of concern with the number of other people catching public transport, if a respondent was forced to do so themselves. Fig. 13 displays the distribution of concern about the volume of people using public transport, which was significantly higher in Victoria than the rest of Australia. Additionally, older people were, on average, more concerned about the number of people using public transport. Overall, the general lack of socio-demographic differences in concern about hygiene and the number of people using public transport shows that concern is widespread. However, it should also be noted that concern about hygiene on public transport and concern regarding the numbers of people using public transport are very strongly correlated ($r = 0.832$), as is expected.

With respect to use of public transport, we examined if people had to
wait longer for public transport services given the requirement for social distancing. The vast majority who had recently used public transport indicated that they boarded the service they had planned to use (89%), with a small number having to wait longer than normal (9%), and an even smaller number waiting too long and giving up (2%). For those that had to wait longer than normal, the average wait time was 14 min, and for those who eventually gave up, the average wait was 29 min. For the small number who gave up, most ended up driving to work (60%), or working from home (20%).

4.5. A short note on work

As with many jurisdictions globally, COVID-19 has had a large impact on the nature of work. In the most recent data, almost two thirds of respondents report that either themselves, someone in their household, or someone they know has had reduced work as a result of restrictions. We do see, however, that for states outside of Victoria, the number of days working is slowly reverting towards the pre-COVID level. Additionally, we also observe that the number of days worked from home slowly diminishes over the waves as restrictions are eased, however the number of people who work at least one day from home remains close to 20% higher than before COVID-19. People remain concerned about the threat of COVID-19 in the workplace, with an increasing number of employers instigating staggered working times to spread the number of employees in the office at any one time. While acknowledging that working from home does not suit all people, the overall experience with working from home remains, on average, a positive one for employees and there is a strong desire among employees and employers for work from home to continue into well into the future. For a detailed analysis of the work from home experience please refer to Part 2 of this paper series.

4.6. Comfort in day-to-day activities

From the analysis conducted during Wave 1 (Beck and Hensher 2020a), almost all day-to-day activities were interrupted by the initial response to COVID-19 by National Cabinet, placing restrictions on movement and how businesses could operate. In Wave 3 (excluding Victoria) we see a general uplift in the level of comfort expressed by...
respondents, above that which was stated in Wave 2. In particular, Fig. 14 highlights larger increases in general comfort visiting restaurants, going to the movies, pubs and bars, and attending gym and exercise groups. That said, respondents still only express average overall comfort for visiting restaurants, doctor’s appointments, going to the shops and meeting friends. Given the second wave of infection in Victoria, it is unsurprising to see that on average respondents express significant discomfort with all activities other than doctor’s appointments.

There are a number of sociodemographic differences. Metropolitan respondents express significantly less comfort for all activities except attending music events, watching live entertainment, and attending work functions. Females express significantly higher levels of comfort visiting restaurants, going to the movies, going to pubs or bars, and school/childcare activities. Younger respondents are more comfortable visiting restaurants, going to the movies, going to pubs and bars, attending gym and group exercise, watching professional sport, attending music events, watching live entertainment, and attending work functions. Lower income respondents also report less comfort with all activities except meeting with friends, going to the movies, doctor’s appointments, music events, and watching live entertainment.

4.7. Attitudes toward COVID-19 measures and wellbeing

Figure A1 shows the average level of agreement with attitudinal statements associated with investigating the response to COVID-19. As with Wave 1 and Wave 2, there is agreement that the response to COVID-19 has been appropriate and was needed. Respondents continue to agree that COVID-19 is a serious public health concern that will affect the way people travel and will require drastic measures to be taken. An important finding in Wave 3, however, is that there is a significant fall in sentiment for almost all attitudinal statements, but in particular agreement that the State and Federal government responses have been appropriate (although the average still indicates that the majority of respondents agree the Victorian state government response has been appropriate, the fall in this measure is particularly notable). Additionally, there is a significant fall in the level of trust expressed by respondents about how governments and business will respond in the future.

With respect to sociodemographic differences, metropolitan areas agree more strongly that COVID-19 will affect the way people travel, that people have been appropriately self-isolating, and that they trust other people to respond in the future. Females agree more strongly that COVID-19 is a serious public health concern, will require drastic measures to be taken, that the business, State and Federal government responses have been appropriate, and that business can be trusted to respond in the future. Higher income respondents express less agreement that COVID-19 is a serious public health concern and that combatting COVID-19 requires drastic measures to be taken.

Figure A2 shows that after a significant fall from Wave 1 to Wave 2, attitudes towards the risk of COVID-19 have stabilised in Wave 3. Respondents still perceive COVID-19 to be a significantly higher risk to someone they know or the general public than themselves, and perceive the biggest risk of the virus to be to the economy. Females perceive COVID-19 to be a bigger risk to someone they know, the health of the general public and the economy. Older respondents perceive COVID-19 to be a bigger risk to themselves, the health of the general public and the economy.

Figure A3 shows how long respondents think it will take for things to return to what they used to be prior to COVID-19, with the general anticipation being that things will take another year to return to “normal”. Interestingly, metropolitan based respondents tend to think things will return to the pre-COVID situation more quickly, and older respondents believe that things will take longer to recover. Figure A4 shows how prepared respondents think Australia is to combat future pandemics. While on average respondents feel that Australia is prepared (µ = 6.2, σ = 2.0), the response indicates that this attitude is not strong. Older respondents believe Australia is more prepared than other respondents.

Figure A5 provides the results of a short series of subjective wellbeing questions that were first asked in Wave 2. These questions come from the United Kingdom’s personal well-being questions used in their annual population survey and adopted by the Department for Transport in the household travel survey (ONS 2020). From Wave 2 to Wave 3 we see a significant erosion in the measures of wellbeing, which is particularly true in Victoria. Metropolitan areas report significantly lower scores for how worthwhile the things they do are, and higher levels of anxiety. Females report a higher level of anxiousness. Interestingly, older respondents have an overall higher level of wellbeing (significantly higher worthwhile, happiness and satisfaction scores and significantly lower levels of anxiousness). Higher income respondents also report being more satisfied with their lives and higher levels of happiness.

5. Discussion and policy implications

The overall experience of Australia is unique. The country has been successful in combatting COVID-19 following the initial wave of infection in March, and Victoria has managed to overcome a second wave of infection in August thru October. At the time of writing, Victoria has recorded more than 28 consecutive days without community transmission, meeting the common definition for elimination of COVID-19. The aggressive suppression of COVID-19 has been achieved, in the main, by curtailing the movement of people and thus the virus. In turn, this has underlined the pivotal role that transport plays in both human and economic activity. Indeed, as restrictions across Australia are eased (combined with significant fiscal support from Federal and State governments), there has been a rebound in confidence and employment. According to forecasts released in early December 2020, while the Australian economy is expected to contract by 3.8 percent in 2020, it is predicted to grow by 3.2 per cent in 2021 (OECD 2020).

Over the Wave 2 to Wave 3 time period, travel activity patterns remained stable, with very little change to total travel, travel purpose or travel mode. These current travel patterns seem to have also reached a potential short-term equilibrium, with the majority of respondents anticipating no future changes to this level of travel. The ongoing lower than normal level of travel is not only in response to restrictions that were in place over that time period (though over Wave 3 those restrictions were less than during Wave 2), but also likely a function of some degree of self-moderation given the second wave observed in Victoria, the ongoing albeit low levels of community transmission in New South Wales, and that COVID-19 is still perceived as a risk, something still drastic action to combat combined with an understanding that travel will be affected in doing so. There is also a general lack of comfort with completing most day-to-day activities which is also tempering increases in activity.

If there is one change of note, it is the relatively strong rebound in car use. Through Wave 1 and Wave 2, working from home has resulted in a
dramatic change to the numbers of commuters on the transport network and in turn has resulted in significant improvements to traffic flow. It is also important to note that while diminishing, concern about public transport still exists both in terms of hygiene and the perceived number of people using the mode given the desire for social distancing is still high. Combined with the amount of working from home decreasing from the highs seen in Wave 1, this means that the aforementioned benefits associated with reduced travel demand could quickly erode should Australians en masse prefer to travel by private car as they also return to work. To that end, and as commented on in the discussion of Part 2, work from home and greater work flexibility represents potentially the largest policy level governments have ever had to reduce congestion, which has significant time and cost savings for society.

To that end, resuscitating confidence in public transport remains an important, though challenging, outcome to achieve coming out of COVID-19. Policies coming out of our research in Wave 1 still apply; overt and regular deep cleaning including with something as simple as sanitiser that has a strong “antiseptic” smell; the enforcing of the wearing of masks while on board, on platforms and at public transport terminals; and COVID-19 Marshalls similar to those required in bars and hotels to patrol services to ensure distancing and cleanliness; the creation of a service created where public transport users can receive alerts about when a good time to travel is or when is a bad time, via a simple “green” or “red” indicator in a phone app; and the provision of hand sanitiser at stations and onboard services. The purpose of these demonstrable actions is to reduce the level of concern with the overall cleanliness of each public transport mode. There may be the requirement to think in a novel fashion about the role of pricing as a mechanism to attract users back to public transport. While related to the public perception of public transport, innovative operators could consider how they might use their current spare capacity to assist in the day-to-day freight task as a potential way to offset revenue losses from lower patronage.

While the concern towards the hygiene and crowds on public transport remain high, transit operators and authorities should also begin to reconsider the messaging used around public transport. Particularly in the context of Australia where case numbers continue to remain low, the “stay away” message regarding public transport that was sent earlier in the pandemic and often re-iterated in later periods, needs to be re-framed to increase public trust in the mode. Perhaps as argued by Diego Maria Barbieri et al. (2021), there is scope to use messaging about public transport as being a catalyst for change (Budd and Ison 2020) or a hallmark for recovery (Kuzemko et al., 2020), given that the perceived effectiveness of curbing COVID-19 for transport modes plays a role in determining frequency of use.

One thing governments and policy makers need to pay attention to, is the level of support expressed by the public for COVID-19 related measures. For example, in the case of Japan it was found that poor communication with the public may have been closely related to the spread of COVID-19 (Zhang 2021). In Australia, a key determinant of the early response was coherence in policy enacted by the formation of a National Cabinet, and the resulting unification of messaging and approach that brought about an “in it together” mentality. Interestingly, Australians may portray a “larrkin’ image on a world stage, but our evidence indicates that the vast majority of citizens have not only been supportive, but compliant with policy measures that might seem drastic given the relatively low case numbers compared to other countries.

While support towards the response of governments and business to COVID-19 remain high, support appears to be slowly falling. Those in positions of authority will need to continue to make sure that communication is clear, encouragement is given, and validation of behaviour reinforced in order to ensure compliance, particularly as changes to behaviour continue and pandemic fatigue becomes a significant concern, mixed with a tentative but nonetheless growing desire and level of comfort with day-to-day activities, particular the more high risk COVID transmission risk activities of visiting restaurants, meeting friends, going to bars and gyms where restraint is often hard to maintain.

As highlighted in Beck and Hensher (2020a) however, the bigger challenge for policy makers is the way in which restrictions are removed rather than enforced. In Wave 3 we have seen a slight but significant erosion in the level of support for the COVID-19 response, in particular a slip in the trust respondents have for government to respond in the future. Maintaining policy consistency may be important in maintaining trust, as there have been numerous ongoing public disagreements between state (and Federal) governments about the response to COVID-19, and varying state border closures and travel restrictions that have made it harder for individuals to plan travel into the future.

6. Conclusion

The impact of COVID-19 has been profound, and admittedly while benefiting from being an island nation with a much better capability to control international borders, the Australian experience of swift and decisive action to restrict the travel and movement of people has shown to be relatively successful in controlling the spread of the disease. The biggest risk to community transmission in Australia remains breaches to hotel quarantine for inbound Australian citizens, but the severe lockdown in Victoria bought the uncontained spread under control with 112 days and a more recent cluster totalling 150 cases in the Northern Beaches of Sydney was contained and brought under control in 22 days by locking down just that area of the metropolitan area. Our results show general support for the actions of policy makers at both state and Federal levels, as well as support for the way in which business has responded. The reader is encouraged to move to Part 2 of this paper, where impact of and experience with working from home is discussed in greater detail.

Despite the relative global success Australia has had in combating COVID-19, there is a general expectation from our surveys that it will take a year to 1.5 years to return to ‘normal’ or at least a well-defined future, and while respondents agree that Australia is much better prepared for a future pandemic, the attitude is not particularly strong. This is an interesting juxtaposition for governments and regulators given the success of Australia on a global scale in combating COVID-19. We acknowledge that the analysis completed in this paper is descriptive in nature, but nonetheless it provides a substantial number of insights as to the changing impact of COVID-19 and how policy might be formed accordingly. Future work will seek to quantify many of the results herein. In future work we will seek to examine in more detail the direct link between attitudes, experience, policy intervention and travel behaviour changes, using more complex methodologies.

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Fig. A1. Attitudes toward COVID-19 Response

Fig. A2. Perceived Risk of COVID-19
Fig. A3. How Long till Thing Return to pre-COVID “Normal”?

Fig. A4. How Prepared is Australia to Combat a Future Pandemic?

Fig. A5. Overview of Subjective Wellbeing
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