CHARLES DARWIN UNIVERSITY

Domestic Tourism Demand in Fortress Australia: Insights from a Natural Experiment

Debajyoti Chakrabarty, Maneka Jayasinghe, Bhanu Bhatia & David Low

Australian Conference of Economists, Sydney 6-9 July 2025

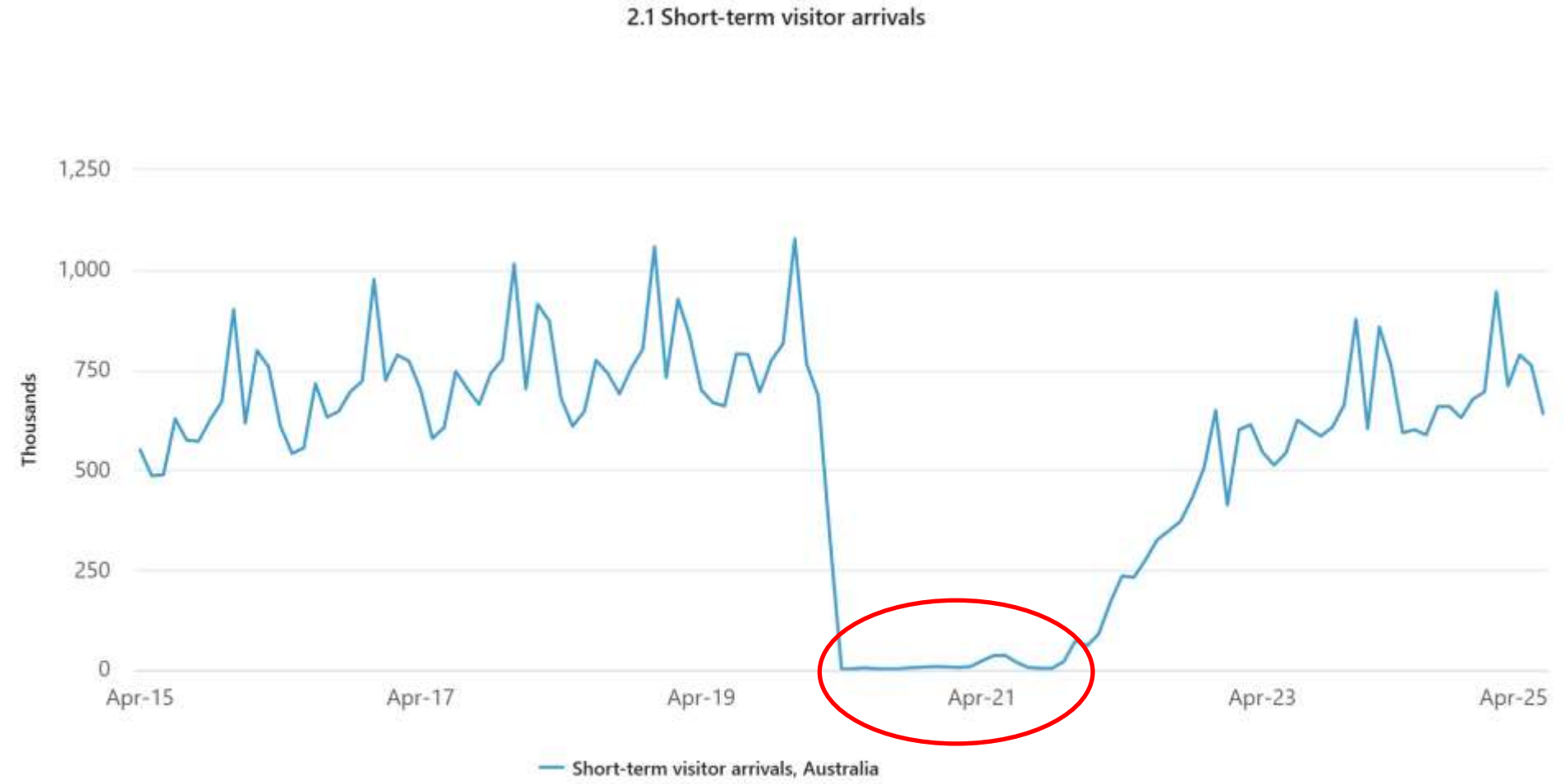
Recognition of Traditional owners and Indigenous cultures

Charles Darwin University acknowledges the traditional custodians of the land on which we're meeting and pays respect to Elders both past and present and extends that respect to all Aboriginal and Torres Strait Islander people.

Introduction

- Australia was one of the standout performers during the COVID19 pandemic in controlling the case numbers and death rate.
- This was achieved through a slew of circumstances and policy measures at federal and state levels.
  - Border closures
  - Economic stimulus worth almost 20% of GDP (ATIC 2021)
  - Low interest rates
  - A variety of state inducements to encourage consumer spending

Introduction



Source: Australian Bureau of Statistics, Overseas Arrivals and Departures, Australia April 2025

Literature

- We study the determinants of domestic tourism in Australia during this period.
- In addition to the standard variables used in the literature, we study the impact of risk perceptions associated with outbreak of infectious diseases.
- Some papers on tourism demand related to our work:
  - Athanasopoulos and Hyndman (2008)
  - Dogru et al. (2017)
  - Garin-Munoz (2006)
  - Garin-Munoz and Montero-Martin (2007)
  - Kumar et al. (2020)
  - Kuo et al. (2008, 2009)
  - Lee et al. (2012)

Model

$$y_{it} = f(Mobility\ Restrictions_{it}, Economic\ varibales_{it}, Time\ dummies,\ Consumer\ perception_{it})$$

y_{it} tourism indicator for state i in month t

$i = 1, 2, \ldots 8$ (six Australian states and two territories)

$t = 1, 2, \ldots 22$ (February 2020 – November 2021)

Model

$$y_{it} = \beta_0 + \beta_1 Newcasespc_{it} + \beta_2 Newcasespc\_rest_{it} + \beta_3 Unemployment_{it} + \beta_4 Price\ index_{it} + \beta_5 Q_2 + \beta_6 Q_3 + \beta_7 Q_4 + \mathbf{x}'_{it}\boldsymbol{\delta} + e_{it}$$

Data & Variables

- y_{it} : Total visitor arrivals, Total visitor nights, Tourism spending (% deviations from the corresponding month in 2019)
  - Source: Tourism Research Australia, National Visitor Survey 2021

- $Newcasespc_{it}$: New COVID19 cases per thousand of population in state i in month t

- $Newcasespc\_rest_{it}$: New COVID19 cases per thousand of population in all other states in month t
  - Source: Fairfacts data website

Data & Variables

- $Unemployment_{it}$: Unemployment rate
- $Price\ index_{it} = \left(\frac{CPI_{it} - CPI_{AUS,t}}{CPI_{AUS,t}}\right) \times 100$
  - Australian Bureau of Statistics 2021

Data & Variables

- $\mathbf{x}'_{it}$ = {GMGP, GMPARKS, GMTRANSIT, AMDRIVE, AMWALK}
- Google and Apple mobility data (% change from baseline period)
  - Source: Google and Apple COVID-19 Community Mobility Reports

- GMGP and GMPARKS: A surge in grocery & pharmacy and park visits would reflect a higher risk perception.

- GMTRANSIT, AMDRIVE, AMWALK: A surge in volume of transit station visits, direction requests while driving and walking capture positive consumer perception. (Abdullah et al. 2020)

Results: Total Visitor Arrivals

Variable	Model 1.1	Model 1.2	Model 1.3
Constant	-19.453 (0.000)	12.901 (0.448)	-20.336 (0.009)
New cases (per-capita) in a given state	**-5.841 (0.025)**	**-5.725 (0.021)**	**-2.328 (0.001)**
New cases (per-capita) in rest of the states	-3.344 (0.004)	-9.005 (0.007)	-2.838 (0.171)
Quarter 2	-13.664 (0.341)	-13.003 (0.274)	-4.261 (0.478)
Quarter 3	**-21.107 (0.000)**	**-18.332 (0.025)**	**-7.263 (0.086)**
Quarter 4	-4.172 (0.351)	1.138 (0.847)	1.888 (0.645)
Unemployment		-5.107 (0.106)	0.084 (0.947)
Price index		7.997 (0.003)	-1.626 (0.425)
Grocery & pharmacy visits (GMGP)			**-0.539 (0.090)**
Parks visits (GMPARKS)			**-0.357 (0.000)**
Transit station visits (GMTRANSIT)			**0.260 (0.008)**
Direction requests (driving) (AMDRIVE)			**0.620 (0.000)**
Direction requests (walking) (AMWALK)			**0.424 (0.013)**
Number of observations	161	161	161
within R^2	0.201	0.260	0.724
Hausman test	11.13 (0.049)	33.23 (0.000)	55.36 (0.000)
Pesaran cross-sectional dependence test	9.139 (0.000)	8.924 (0.000)	2.383 (0.017)
Wooldridge serial correlation test	24.120 (0.002)	22.646 (0.002)	1.677 (0.235)

Results: Total Visitor Arrivals

- An additional COVID19 case per thousand of population results in visitor arrivals falling by 2.33 – 5.84 % compared to the same month in 2019.
- Impact of higher new per capita cases in rest of Australia ranges between 2.33 – 5.84%. (not significant in model 1.3)
- Price index is positive (7.99) and significant on one model (model 1.2). This is similar to Dogru et al. (2017).

Results: Total Visitor Arrivals

- Adding Apple and Google mobility trends substantially increases model's explanatory power (from 26% to 72.4%).
- Higher values of GMGP and GMPARKS reduce visitor arrivals (-0.54 and -0.36).
- Higher values of GMTRANSIT, AMDRIVE and AMWALK increase visitor arrivals (0.26, 0.62 and 0.42).

Results: Total visitor nights

Variable	Model 2.1	Model 2.2	Model 2.3
Constant	-8.267 (0.038)	38.839 (0.015)	7.653 (0.324)
New cases (per-capita) in a given state	**-5.582 (0.017)**	**-5.298 (0.016)**	**-2.738 (0.005)**
New cases (per-capita) in rest of the states	-2.353 (0.120)	-10.806 (0.000)	-6.089 (0.004)
Quarter 2	-16.054 (0.276)	-15.329 (0.166)	-8.508 (0.070)
Quarter 3	**-30.509 (0.000)**	**-26.603 (0.002)**	**-19.635 (0.000)**
Quarter 4	-16.509 (0.002)	-8.792 (0.153)	-10.173 (0.002)
Unemployment		**-7.307 (0.011)**	**-2.817 (0.049)**
Price index		**12.899 (0.000)**	**4.783 (0.011)**
Grocery & pharmacy visits (GMGP)			-0.373 (0.227)
Parks visits (GMPARKS)			**-0.332 (0.002)**
Transit station visits (GMTRANSIT)			0.113 (0.249)
Direction requests (driving) (AMDRIVE)			**0.549 (0.000)**
Direction requests (walking) (AMWALK)			**0.341 (0.016)**
Number of observations	161	161	161
within R^2	0.261	0.375	0.686
Hausman test	11.80 (0.038)	43.55 (0.000)	49.76 (0.000)
Pesaran cross-sectional dependence test	8.211 (0.000)	7.335 (0.000)	1.106 (0.2686)
Wooldridge serial correlation test	6.683 (0.036)	6.518 (0.038)	0.060 (0.814)

Results: Total visitor nights

- An additional COVID19 case per thousand of population results in visitor nights falling by 2.74 – 5.58 % compared to the same month in 2019.
- Higher new per capita cases in rest of Australia reduces Total visitor nights between 2.35 – 10.8% (not significant in model 2.1).
- Higher unemployment rate reduces Total visitor nights by 2.8 – 7.3 %.
- Higher price index leads to an increase in Total visitor nights by 4.8 – 12.9 %.

Results: Total visitor nights

- Adding Apple and Google mobility trends substantially increases model's explanatory power (from 37.5% to 68.6%).
- Higher values of GMPARKS reduce visitor nights (-0.33).
- Higher values of AMDRIVE and AMWALK increase visitor nights (0.55 and 0.34).

Results: Tourism spending

Variable	Model 3.1	Model 3.2	Model 3.3
Constant	-14.923 (0.001)	72.130 (0.001)	10.166 (0.360)
New cases (per-capita) in a given state	**-6.463 (0.016)**	**-7.065 (0.005)**	**-3.569 (0.007)**
New cases (per-capita) in rest of the states	-0.224 (0.918)	-13.804 (0.002)	-6.704 (0.013)
Quarter 2	-13.294 (0.576)	-9.658 (0.547)	0.503 (0.943)
Quarter 3	**-32.614 (0.000)**	**-24.099 (0.009)**	**-8.524 (0.112)**
Quarter 4	-14.321 (0.021)	0.084 (0.991)	1.570 (0.720)
Unemployment		**-14.748 (0.000)**	**-5.693 (0.004)**
Price index		11.639 (0.001)	-1.652 (0.532)
Grocery & pharmacy visits (GMGP)			-0.184 (0.578)
Parks visits (GMPARKS)			**-0.398 (0.004)**
Transit station visits (GMTRANSIT)			0.198 (0.087)
Direction requests (driving) (AMDRIVE)			0.238 (0.234)
Direction requests (walking)(AMWALK)			**0.937 (0.001)**
Number of observations	161	161	161
within R^2	0.171	0.350	0.706
Hausman test	13.74 (0.017)	36.19 (0.000)	51.81 (0.000)
Pesaran cross-sectional dependence test	11.151 (0.000)	7.981 (0.000)	2.338 (0.019)
Wooldridge serial correlation test	3.317 (0.111)	3.038 (0.125)	0.020 (0.892)

Results: Tourism spending

- An additional COVID19 case per thousand of population results in visitors falling by 3.57 – 5.58 % compared to the same month in 2019.
- Higher new per capita cases in rest of Australia reduces tourism spending between 6.7 – 13.8% (not significant in model 3.1).
- Higher unemployment rate reduces tourism spending by 5.7 – 14.7 %.
- Higher price index leads to an increase tourism spending by 11.64% in model 3.2 but changes sign and is insignificant in model 3.3.

Results: Tourism spending

- Adding Apple and Google mobility trends substantially increases model's explanatory power (from 35% to 70.5%).
- Higher values of GMPARKS reduce tourism spending (-0.4).
- Higher values of AMWALK increase tourism spending (0.94).

Conclusions and Policy implications

- **Mobility restrictions proxied by** new COVID19 cases per thousand of population in a state reduced tourism. This is true for all tourism indicators and model specification.
- New COVID19 cases per capita in rest of the states also reduced tourism. But the coefficient is not as robust.

Conclusions and Policy implications

- Google and Apple mobility indicators improved the fit of the model for all tourism indicators.
- Mobility indicators capturing negative and positive consumer perceptions had a significant effect on tourism in Australia during the COVID19 pandemic.
- Google trends and other social media trends can be used to measure consumer risk perceptions.
- These can be a valuable tool for policy makers to understand and manage attitudes towards tourism destinations.