Information Sharing and Oligopoly Pricing: A Natural Experiment in Retail Gasoline

Data and Code

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Below, we describe the raw data files and code files used in creating the figures and calculations in our paper, "Information Sharing and Oligopoly Pricing: A Natural Experiment in Retail Gasoline." If assistance is required in accessing proprietary data via the contacts provided below, please contact David Byrne via email at byrned@unimelb.edu.au.

1 Data Source and Access

- Price data (**proprietary**)
  - Contact for data access: Mr Nick Ferris nferris@informedsources.com
  - Files:
    - Raw datasets acquired from Informed Sources contain the complete set of daily station-level prices available on the platform in Victoria, from August 1, 2005, to August 1, 2019, stored with file names "VIC_YYYYMMDD_YYYYMMDD.csv".
    - Similarly, for New South Wales, the datasets cover the period from August 1, 2005, to August 1, 2016, with file names "NSW_YYYYMMDD_YYYYMMDD.csv".
- Wholesale terminal gate data
  - Source: the Australian Institute of Petroleum at `https://aip.com.au/historical-ulp-and-diesel-tgp-data`
  - File: "tgp_daily.dta".

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- ACAPMA Survey (**proprietary**)
  - Contact for data access: Ms. Brenda Mainlan at bmainland@surveymatters.com.au
  - Files:
    * 2015 survey, "2015 National Monitor of Fuel Consumer Attitudes - Survey Manager Raw Data.xlsx"
    * 2017 survey, "ORD-288245-B5P3 Petrol and Convenient Express Stores II Final Data_14Aug.sav"
    * 2019 survey, "ORD-417715-F6Q4 - Petrol and Convenient Express Stores 3_Final Data_25Jun.sav"
- Origin-Destination Data (**proprietary**)
  - Contact for data access: Ms Christine Westley at david.prentice@transport.vic.gov.au
  - We obtained the Victorian Integrated Transport Model (VITM) base year (2018) origin-destination car demand outputs from the Department of Transportation.
  - Files:
    * Total car demand across the VITM network "Y2018_RC22v1_06_CAR_DEMAND.csv".
    * All traffic zones in Victoria "VITM2975_Metro_Reference_v3_GDA94.shp". This is the zone system in which the origin-destination demand and demographics data is provided.
- Urban Centres and Localities (UCLs)
  - Source: The shapefile can be downloaded at `https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1270.0.55.004July%202016?OpenDocument`

2 Run the Code

2.1 Build

Open the terminal and navigate to the directory, "./Build/Code". Run the command,

```
$ ./0_rundirectory.sh
```

in the terminal will executes all scripts in the following order

1. "1_combine_vic_2005_2019_prices.ipynb"

- Description: merges raw daily station-level price datasets from Informed Sources and drops duplicates observations.
- Inputs: "/Build/Input/VIC_YYYYMMDD_YYYYMMDD.csv" from August 1, 2005 to August 1, 2019.
- Outputs: "/Build/Output/is_vic_2005_2019_raw_merged.csv"

2. "2_clean_address_obtain_geocoordinates.ipynb"

    - Description: obtains geocoordinates and site addresses in a standardized format for all stations present in the Informed Sources datasets, utilizing the Google Map Geocoding API. To execute the code successfully, an API key is required. Please refer to the documentation available at https://developers.google.com/maps/documentation/geocoding for detailed instructions on how to acquire the API key.
    - Inputs: "/Build/Output/is_vic_2005_2019_raw_merged.csv"
    - Outputs: "/Build/Output/is_vic_gmap_clean_2005_2019.csv"

3. "3_generate_melbourne_sample.ipynb"

    - Description: find the stations located in Melbourne Metropolitan Area.
    - Inputs:
        - "/Build/Input/1270055004_ucl_2016_aust_shape/UCL_2016_AUST.shp"
        - "/Build/Output/is_vic_2005_2019_raw_merged.csv"
        - "/Build/Output/is_vic_gmap_clean_2005_2019.csv"
    - Outputs: "/Build/Output/is_vic_p_2005_2019.csv"

4. "4_makedata.do"

    - Description: Select and clean Informed Sources price data for gasoline stations in Melbourne metropolitan area. Create variables on cycle characteristics.
    - Inputs: "/Build/Output/is_vic_p_2005_2019.csv"
    - Outputs: "/Build/Output/is_mel_p_2005_2019.dta"

5. "5_od_table.ipynb"

    - Description: Find the centroids of all traffic zones in Melbourne. Calculate the daily number of drivers traveling from one traffic zone to another within Melbourne.
    - Inputs:

- Traffic zone spatial layer: "/Build/Input/VITM2975/VITM2975_Metro_Reference_v3_GDA94.s
- "/Build/Input/Y2018_RC22v1_06_CAR_DEMAND.csv"
- "/Build/Input/1270055004_ucl_2016_aust_shape/UCL_2016_AUST.shp"

- Outputs:
  - Centroids of traffic zones in Melbourne "/Build/Output/tzn2coor_mel.txt"
  - OD travel demand in Melbourne "/Build/Output/od_long_mel.csv"

6. "6_petrolspy.ipynb"

   - Description: Scrape all active gas stations in Melbourne from PetrolSpy (https://petrolspy.com.au/)
   - Inputs: "/Build/Input/1270055004_ucl_2016_aust_shape/UCL_2016_AUST.shp"
   - Outputs:
     - "/Build/Output/petrolspy_stations_raw.csv"
     - "/Build/Output/petrolspy_stations_mel.csv"

7. "7_prices_calibration.ipynb"

   - Description:
     - Identify the independent stations not collected by Informed Sources.
     - Interpolcate missing prices
     - Prepare price data for calibration
   - Inputs:
     - "/Build/Input/1270055004_ucl_2016_aust_shape/UCL_2016_AUST.shp"
     - "/Build/Output/petrolspy_stations_mel.csv"
     - "/Build/Input/tgp_daily.dta"
   - Outputs:
     - "/Build/Output/app_lasso_ind_p.csv"
     - "/Build/Output/petrolspy_stations_mel.csv"
     - "/Build/Output/st_mel_full.csv"
     - "/Build/Output/p_in.csv"

8. "8_tz2tz.ipynb"

   - Description: Calculate driving time and distance along the fastest route from origin traffic zone to destination traffic zone.

- Inputs:
  - "/Build/Output/od_long_mel.csv"
  - "/Build/Output/tzn2coor_mel.txt"
- Outputs: "/Build/Output/tz2tz_out.csv"

9. "9_st2tz_tz2st.ipynb"
   - Description: Calculate driving time and distance along the fastest route from a station to a traffic zone and from a traffic zone to a station.
   - Inputs:
     - "/Build/Output/st_mel_full.csv"
     - "/Build/Output/tzn2coor_mel.txt"
   - Outputs:
     - "/Build/Output/st2tz_out.csv"
     - "/Build/Output/tz2st_out.csv"
10. "10_routes.ipynb"
    - Description: Identify stations considered by consumers traveling between each origin and destination traffic zone pair.
    - Inputs:
      - "/Build/Output/tz2st_out.csv"
      - "/Build/Output/st2tz_out.csv"
      - "/Build/Output/tz2tz_out.csv"
    - Outputs: "/Build/Output/tz2st2tz_out.csv"
11. "11_daily_share_month_volume.ipynb"
    - Description: Process daily share of gasoline volume sold in Melbourne obtained from the ACCC. Process data on monthly total gasoline consumption in Victoria sources from the Australian Government Department of Environment and Energy.
    - Inputs:
      - "/Build/Input/australian_petroleum_statistics_-_issue_262_may_2018.xls"
      - "/Build/Output/tz2tz_out.csv"
      - "/Build/Output/od_long_vic.csv"

- "/Build/Output/tzn2coor_mel.txt"

- Outputs:
  - "/Build/Output/volshare_daily.dta"
  - "/Build/Output/voltot_monthly.dta"

2.2 Analysis

Open the terminal and navigate to the directory, "./Analysis/Code". Run the command,

```
$ ./0_rundirectory.sh
```

in the terminal will executes all scripts in the following order

1. "tab1_sumstats.do"

   - Inputs:
     - "/Build/Output/is_mel_p_2005_2019.dta"
   - Outputs:
     - "/Analysis/Output/tab1b_sumstats.tex"
     - "/Analysis/Output/tab1c_sumstats.tex"
     - "/Analysis/Output/tab1d_sumstats.tex"

2. "fig1_uploads.do"

   - Inputs:
     - "/Build/Output/is_mel_p_2005_2019.dta"
   - Outputs:
     - "/Analysis/Output/fig1a_elec.pdf"
     - "/Analysis/Output/fig1b_manual.pdf"

3. "fig2_example.do"

   - Inputs:
     - "/Build/Output/is_mel_p_2005_2019.dta"
   - Outputs:
     - "/Analysis/Output/fig2_example.pdf"

4. "fig3_prices.do"

- Inputs:
  - “/Build/Output/is_mel_p_2005_2019.dta”
- Outputs:
  - “/Analysis/Output/fig3_prices.pdf”

5. “fig4_zoom.do”
   - Inputs:
     - “/Build/Output/is_mel_p_2005_2019.dta”
   - Outputs:
     - “/Analysis/Output/fig4a_zoom_before.pdf”
     - “/Analysis/Output/fig4b_zoom_after.pdf”
6. “fig5_margin.do”
   - Inputs:
     - “/Build/Output/is_mel_p_2005_2019.dta”
   - Outputs:
     - “/Analysis/Output/fig5a_margin_coles.pdf”
     - “/Analysis/Output/fig5b_margin_rival.pdf”
     - “/Analysis/Output/tabC8_baseline_estimates.tex.pdf”
7. “fig6_margindiff.do”
   - Inputs:
     - “/Build/Output/is_mel_p_2005_2019.dta”
   - Outputs:
     - “/Analysis/Output/fig6_margdiff.pdf”
8. “fig7_freq.do”
   - Inputs:
     - “/Build/Output/is_mel_p_2005_2019.dta”
   - Outputs:
     - “/Analysis/Output/fig7a_freq_coles.pdf”

- "/Analysis/Output/fig7b_freq_rival.pdf"

9. "fig8_commit.do"

   - Inputs:
     - "/Build/Output/is_mel_p_2005_2019.dta"
   - Outputs:
     - "/Analysis/Output/fig8_commit.pdf"
     - "/Analysis/Output/fig8_commit.tex"

10. "fig9_demand.do"

    - Inputs:
      - "/Build/Output/is_mel_p_2005_2019.dta"
      - "/Build/Output/volshare_daily.dta"
      - "/Build/Output/voltot_monthly.dta"
    - Outputs:
      - "/Analysis/Output/fig9a_volshare.pdf"
      - "/Analysis/Output/fig9b_voltot.pdf"

11. "tab2_choiceprob.ipynb"

    - Inputs:
      - "/Build/Input/ACAPMA/2015 National Monitor of Fuel Consumer Attitudes - Survey Manager Raw Data.xlsx"
      - "/Build/Input/ACAPMA/ORD-288245-B5P3 Petrol and Convenient Express Stores II Final Data_14Aug.sav"
      - "/Build/Input/ACAPMA/ORD-417715-F6Q4 - Petrol and Convenient Express Stores 3_Final Data_25Jun.sav"
    - Outputs:
      - "/Analysis/Output/tab2_choiceprob.tex"

12. "calibration.ipynb"

    - Inputs:
      - "/Build/Output/p_in.csv"

    - "/Build/Output/od_long_mel.csv"
    - "/Build/Output/tz2tz_out.csv"
    - "/Build/Output/tz2st2tz_out.csv"
  - Outputs:
    - "/Analysis/Output/calibration_mks_pre_post.csv"

13. "tab3_calibration.ipynb"
  - Inputs:
    - "/Build/Output/p_in.csv"
    - "/Analysis/Output/calibration_mks_pre_post.csv"
    - "/Build/Output/voltot_monthly.dta"
    - "/Build/Output/volshare_daily.dta"
  - Outputs:
    - "/Analysis/Output/tab3_calibration.tex"