

What factors
determines a car's
selling price?

<George Lu>

\$\$\$ = ???

2004 Peugeot 407
\$1,600

- 152,669km
- Red 4 Door Sedan
- 1990cc Automatic
- Petrol

2004 PEUGEOT 407 2.0 PETROL ALLOYWHEELS ABS BRAKE FULL BLACK LEATHER FOLDABLE REAR SEATS GOOD LOOKING CAR REMOTE KEY FACTORY ALARM 152669 KM AUTOMATIC TIPTRONIC FRONT TYRES WORN (see photo...)

Dealer, WAIKATO
CALL NOW: 07 9818119

☐ +Watchlist

1995 Toyota Trueno
\$4,750

- 161,826km
- Blue Coupe
- 1580cc Automatic
- Petrol

At Trade In Clearance you can view a wide range of vehicles in comfort, out of the wild Wellington weather. We offer 1000 vehicles and with prices as low as \$1500, there is something to suit everyone...

Dealer, WELLINGTON
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☐ +Watchlist

1995 Toyota Townace
\$9,997

- 14,945km
- Beige Van And Minivan
- 2000cc Manual
- Petrol

1 Airbags, Alloy Wheels, Power Steering, Central Locking This is new stock and was handpicked by Heath Scott in Japan. Please enquire at the Tahuna yard. Take advantage of our pre-approved, same day, N...

Dealer, NELSON
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☐ +Watchlist

\$\$\$ = ???

\$\$\$ = ???

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Cars by Region ▼

Cars by Transmission ▼

Price

Any ▼ to Any ▼

Year

Any ▼ to Any ▼

Kilometres

Any ▼ to Any ▼

Electric/Hybrid Only



Keywords

SEARCH 🔍

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3.69%* fixed for 1 year.

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*Roll over for terms and conditions

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Used Cars for Sale

Results 1 - 20 of 29,110

List view | [Gallery view](#)

Sort by: Most Popular ▼

20 items ▼

+ Add selected cars to watchlist



1998 BMW 528i

\$9,995

- 45,101km
- 4 Door Sedan
- 2800cc Automatic
- Petrol

Comfortable drive with 2.8 Litre engine, featuring ABS, airbags, air conditioning, alloys, factory stereo with CD stacker, central locking, electric seats, power steering, windows and mirrors, tracti...

Dealer, WELLINGTON



ORAKEI
MARINE

PRESTIGE

PRESTIGE 460 S

360° views | Exceptional comfort

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15,000 x



Price

Year

Brand

Model

Mileage

Colour

Number of doors

Bodystyle

Engine size

Transmission

Fuel type

Seller type

Location

2001 Suzuki Aeno

\$4,995

- 54,250km
- Gold 5-Door Wagon
- 1500cc Automatic
- Petrol

Economic 1.5 litre engine, ABS, Airbags, Air conditioning, Alloys, Central locking, CD stereo, Tinted power windows & mirrors No deposit finance available to approved purchasers. from as low as \$32....

Dealer, WELLINGTON

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+Watchlist

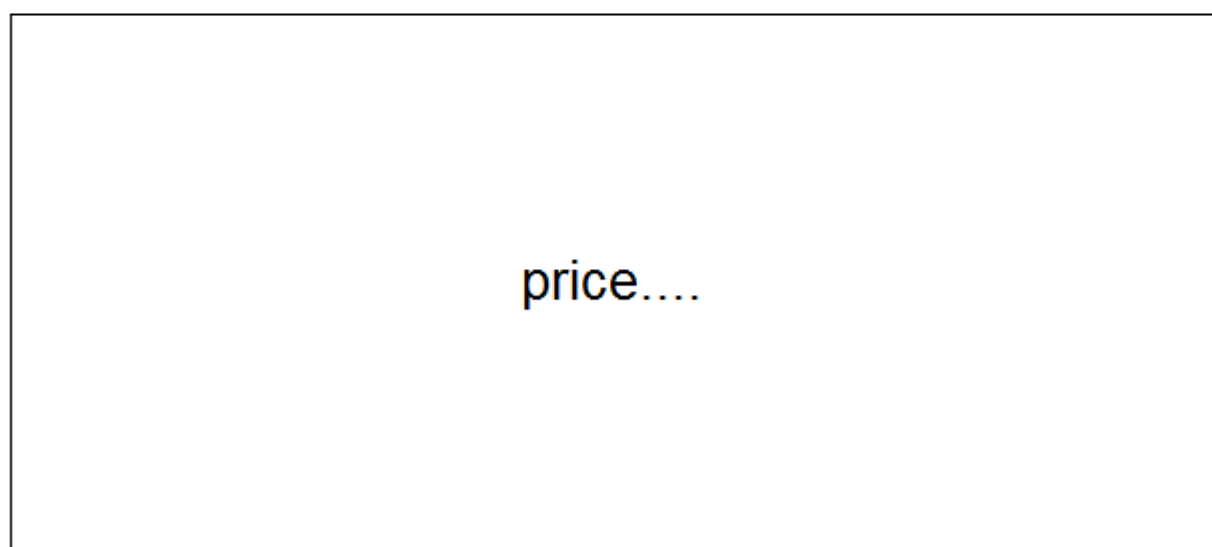
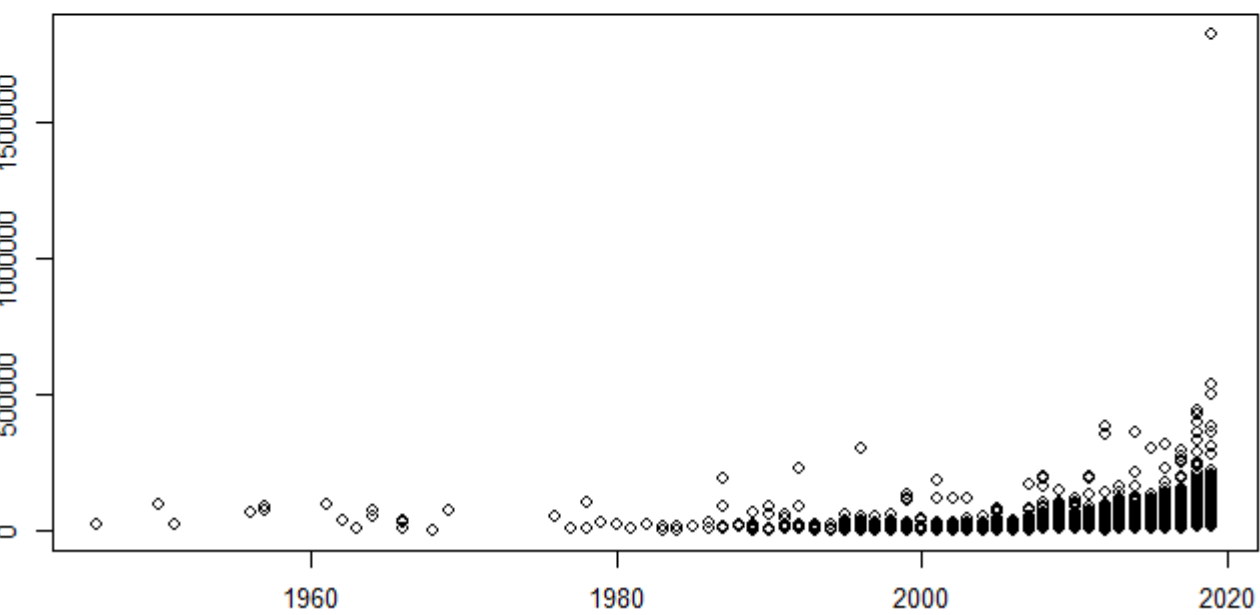
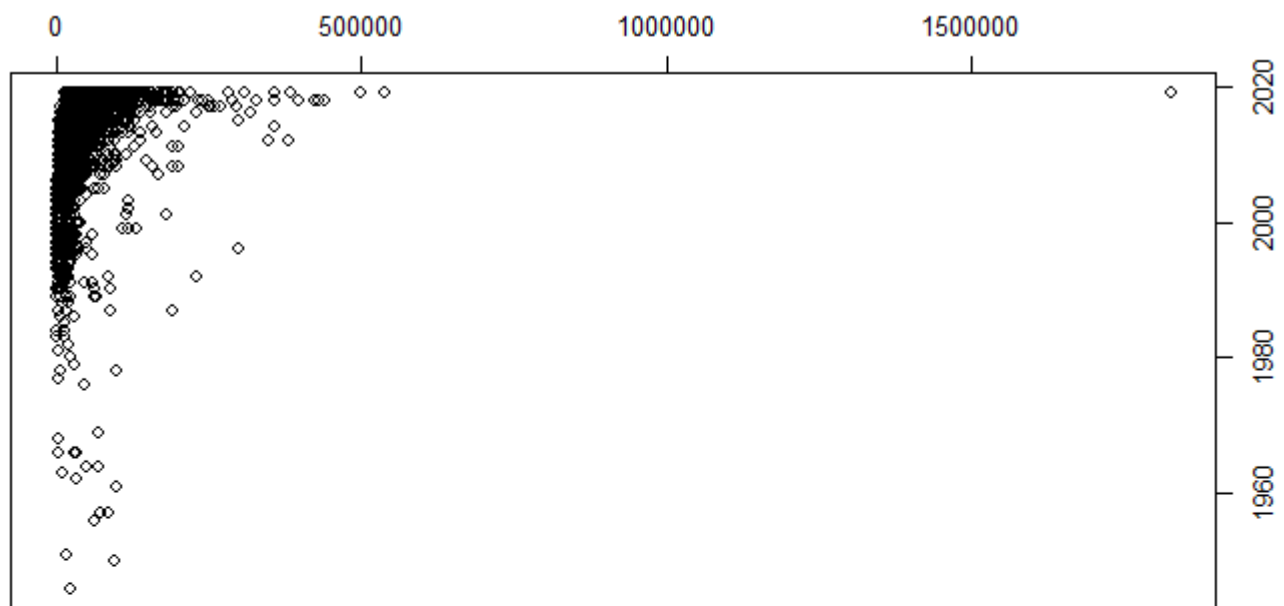
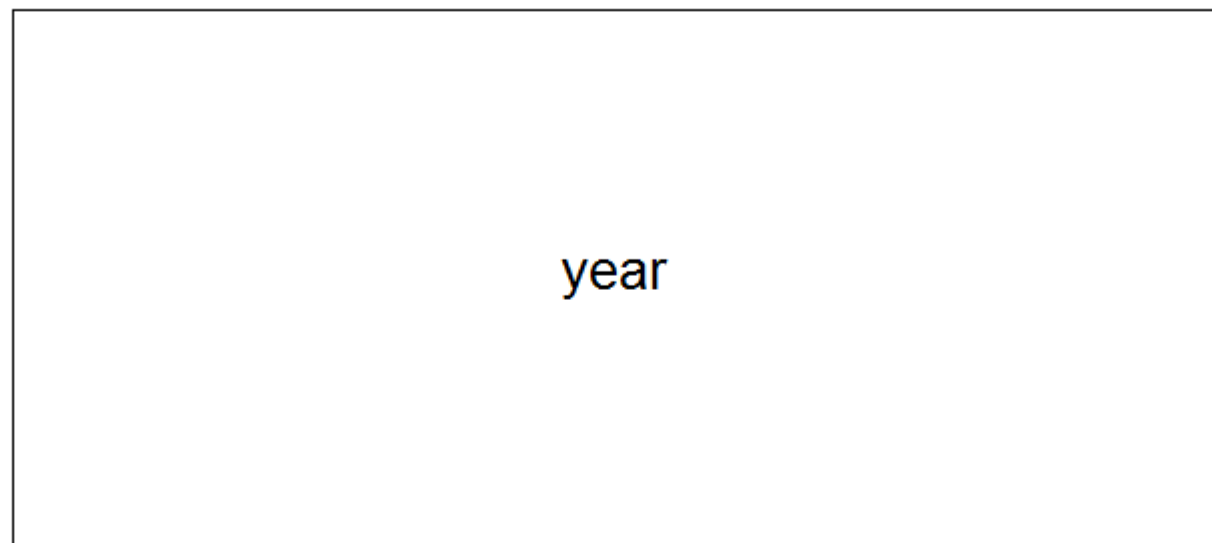
Contact

Also scraped:

Page number

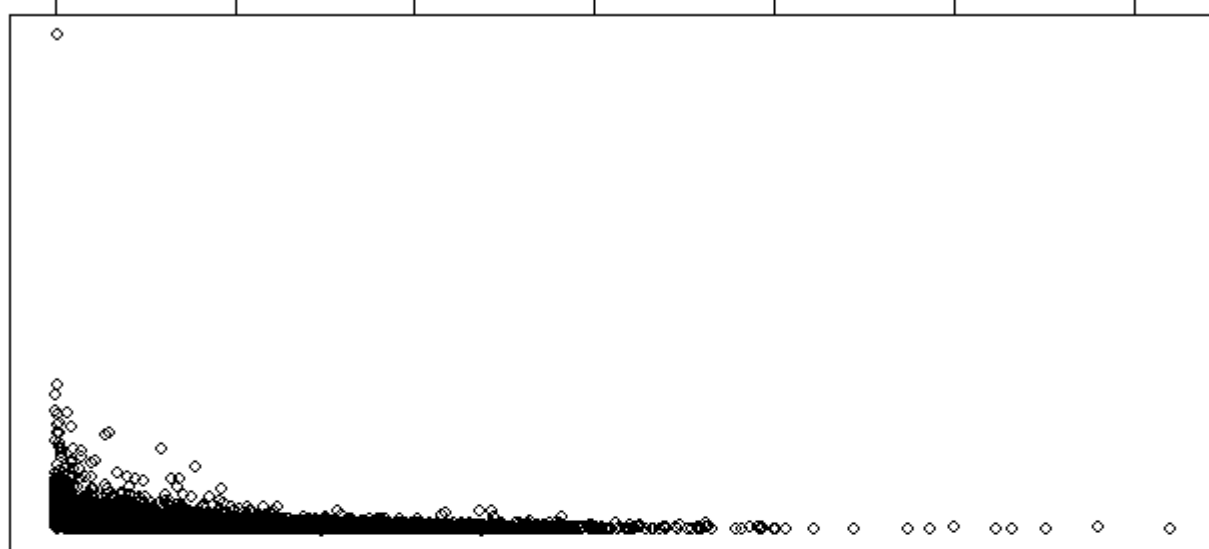
Page rank

Listing link

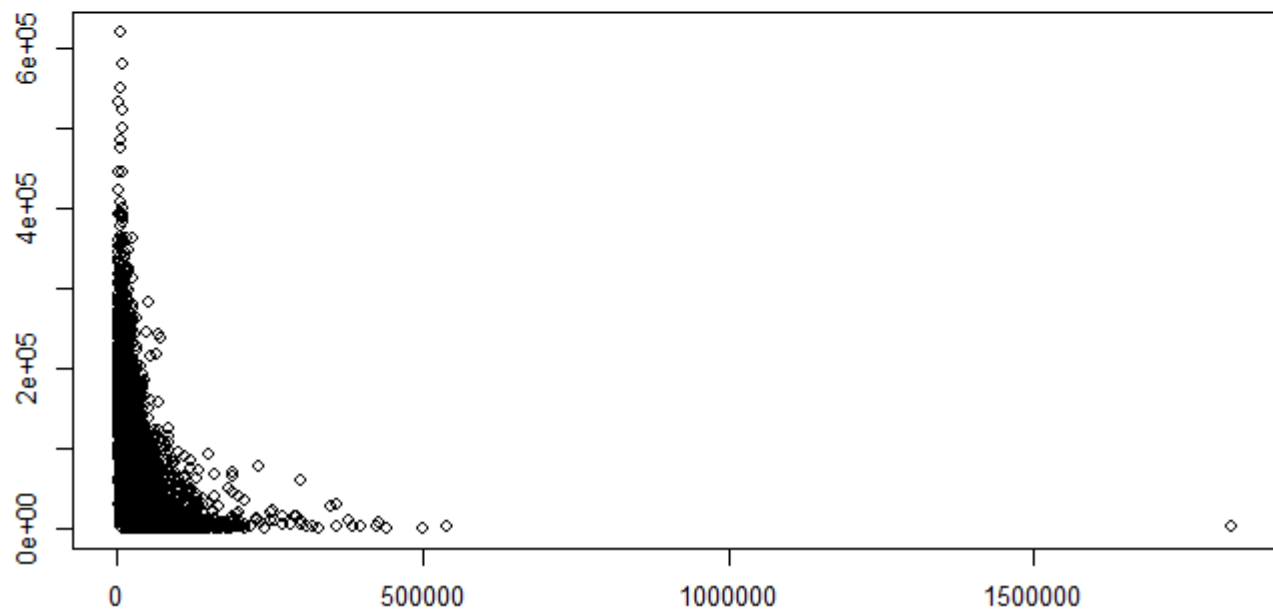


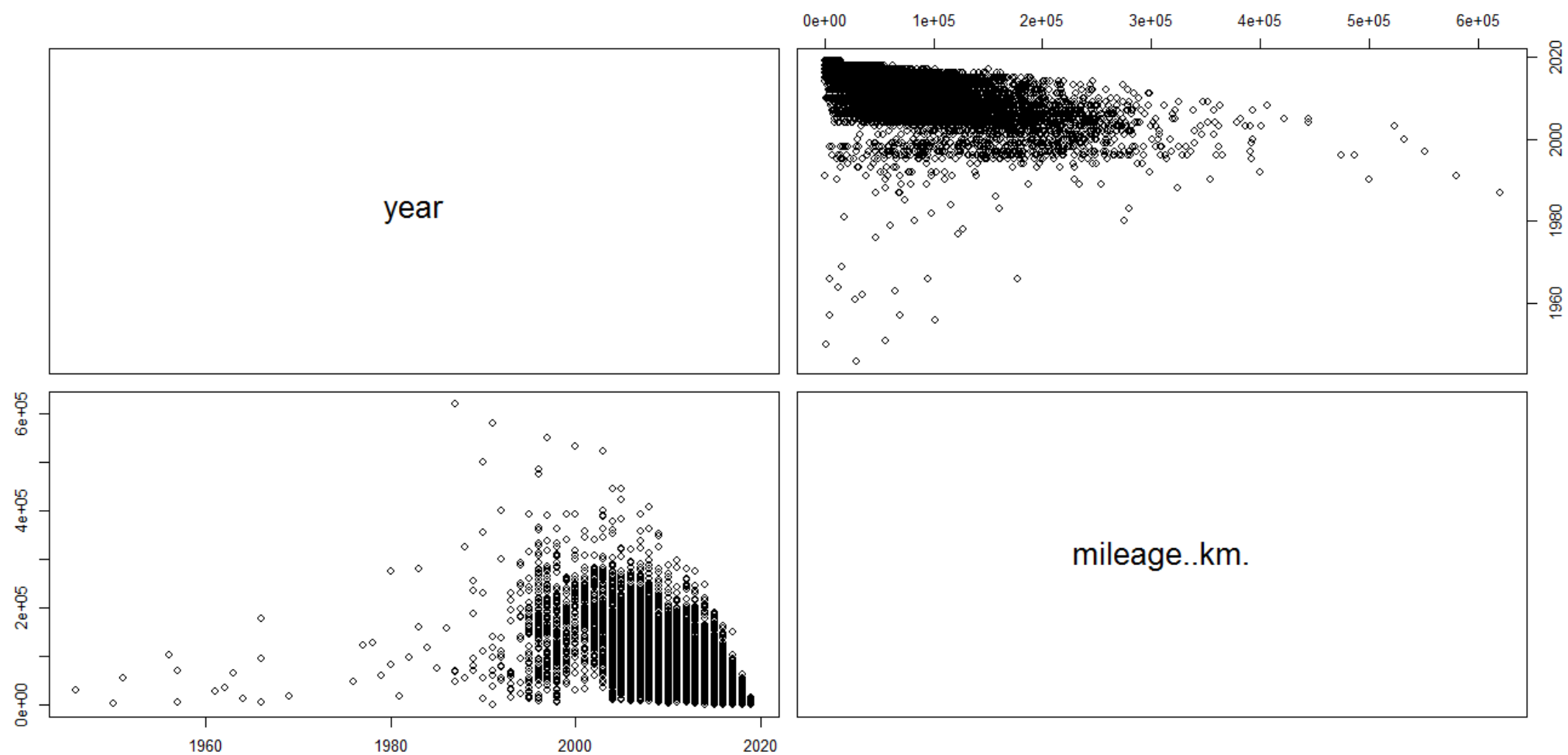
price....

0e+00 1e+05 2e+05 3e+05 4e+05 5e+05 6e+05



mileage..km.





Removed listings



2009 Nissan Tiida

POA

- 95,900km
- Grey Hatchback
- 1500cc Automatic
- Petrol

Discount City Cars. With Over 25 Years in Business and Over 25000 Happy Customers we are a Great Company to Deal with. We Accept Trade-In's and we can Offer you 12 to 36 Month Extended Mechanical War...

Dealer, AUCKLAND



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Removed listings

McLaren Senna Coupe 2019 for sale

Victory Grey

\$1,825,000 

307 Views



 20



CALL SELLER
09 9517277



3994cc



Auto



1,000 kms



Coupe



Dealer

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Car Finance

Motor Vehicle Finance ...au

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Isuzu D-Max Ute 2301 for sale

Splash White LS Manual DC 2WD

\$46,790 

BMW 116i Hatchback 2007 for sale

White 52 Door Low KMs

\$8,999 

Categorical Variables

Market Segment

- Determined by average price of listings in last 7 years
- Luxury: > \$150,000
- Prestige > \$90,000
- Premium > \$50,000
- Mid Level > \$40,000
- Economy > \$30,000
- Entry level > \$20,000
- Budget > \$10,000



2019 BMW X5

\$144,995

- 300km
- 5 Door Suv
- 3000cc Automatic
- Diesel



2017 Nissan X-Trail

\$36,999

- 25,152km
- Black Suv
- 2488cc Continuous Variable
- Petrol



2016 Chery J3

\$14,990

- 50km
- 5 Door Hatchback
- 1600cc Automatic
- Petrol

~~IMMIS~~

Fuel type

0

0.5

1



2014 Toyota Prius

\$13,990

- 95,800km
- Silver Sedan
- 1800cc Automatic
- Hybrid



2018 Toyota Hilux

\$49,995

- 7,800km
- White Ute
- 2800cc Automatic
- Diesel



2017 Tesla Model S

\$114,995

- 8,400km
- Grey 5 Door Sedan
- 1cc
- Electric

Bodystyle

Trade



2006 Hino Dutro

\$15,650

- 200,337km
- Blue Small Truck
- 4000cc Automatic
- Diesel

Non-Trade



1998 Mazda MX-5

\$6,990

- 180,600km
- Red 2 Door Convertible
- 1839cc
- Petrol

Transmission

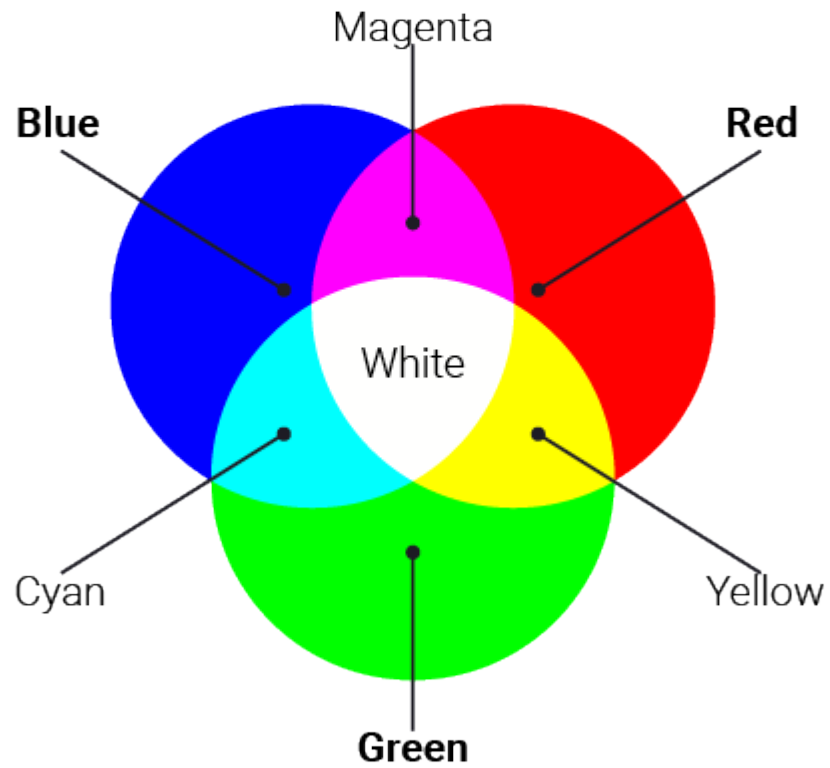
Manual

Automatic



Colour

RGB



~~cur~~

Seller type

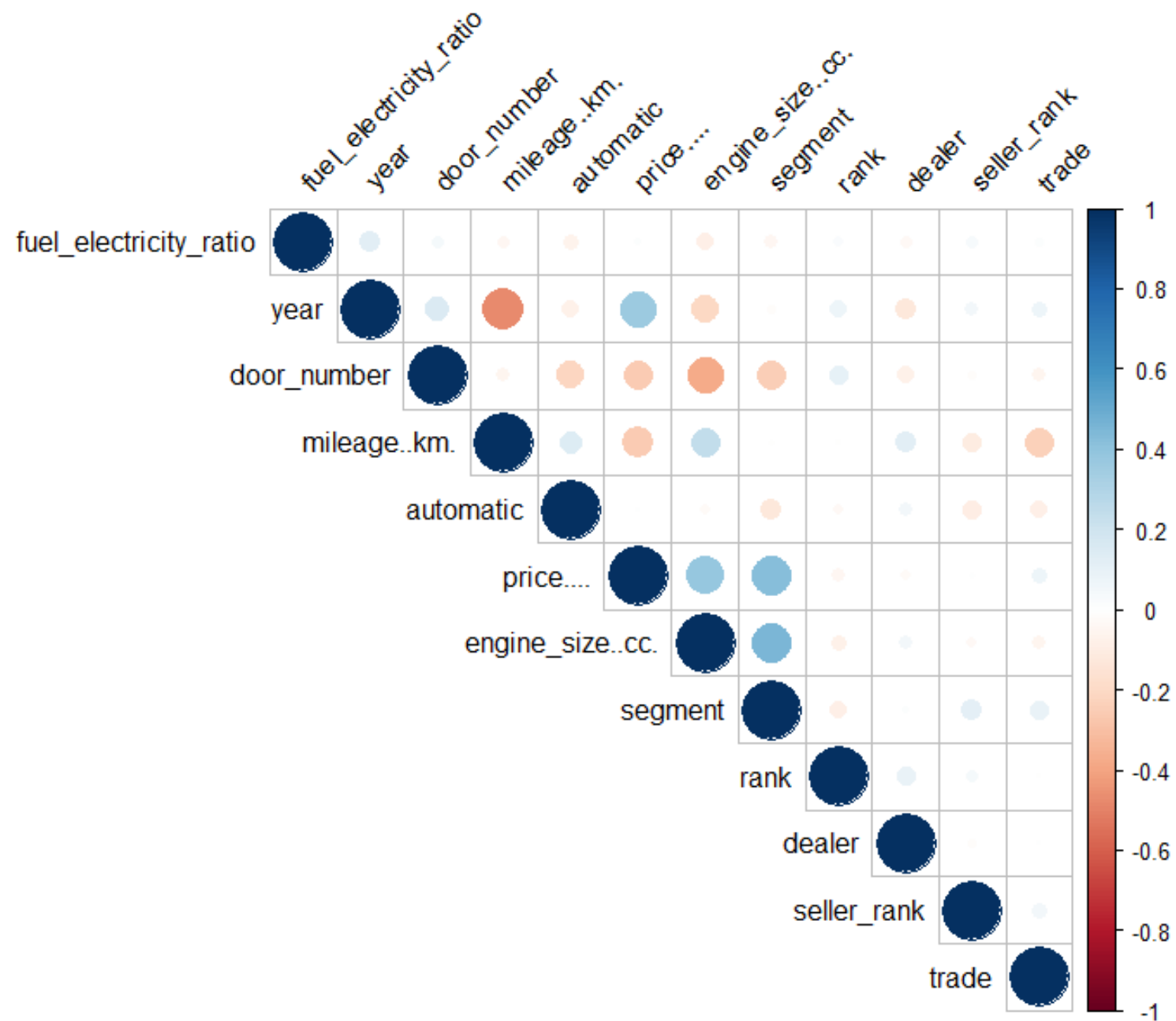


Seller location

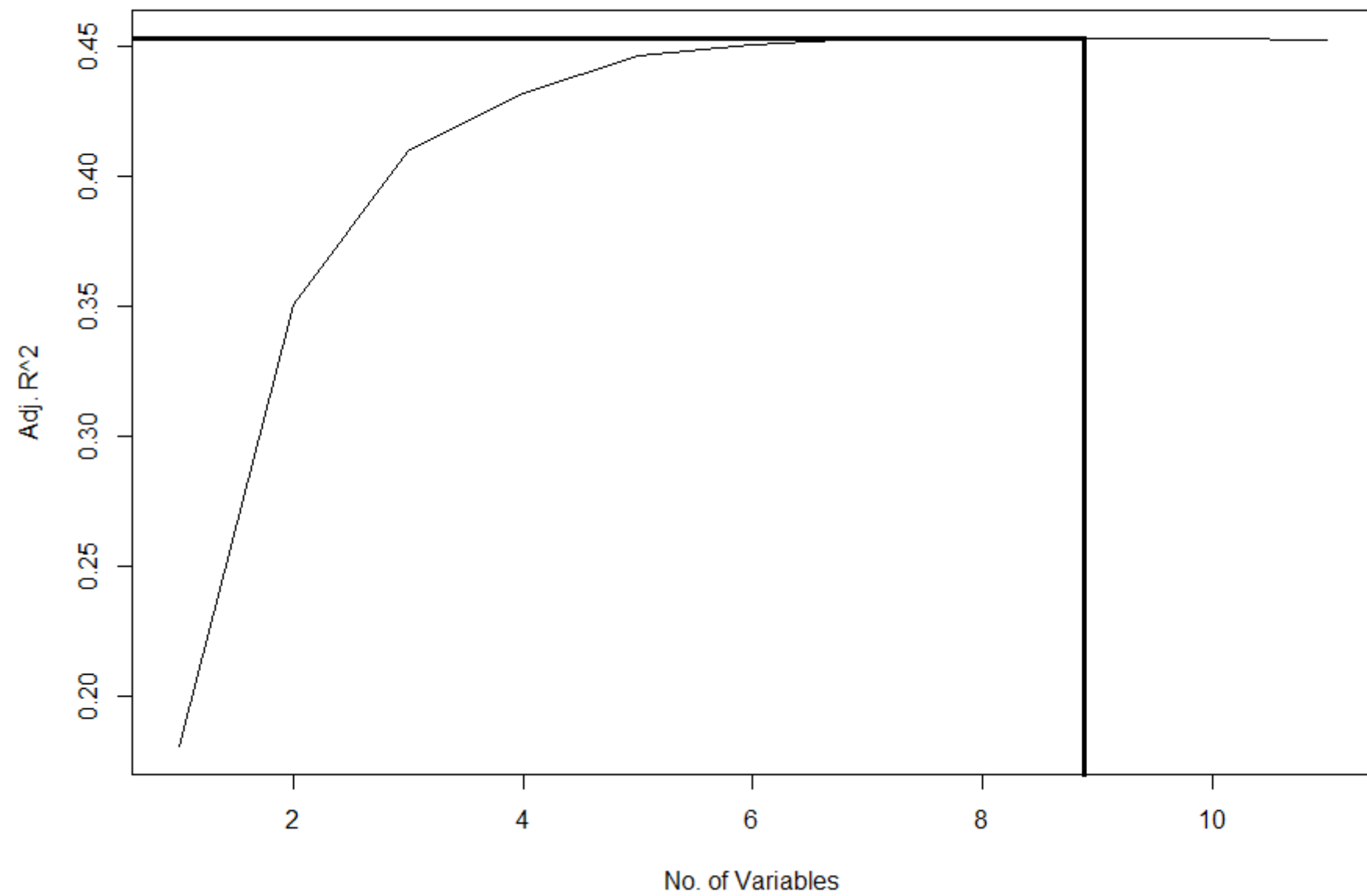
Location Size Scale:

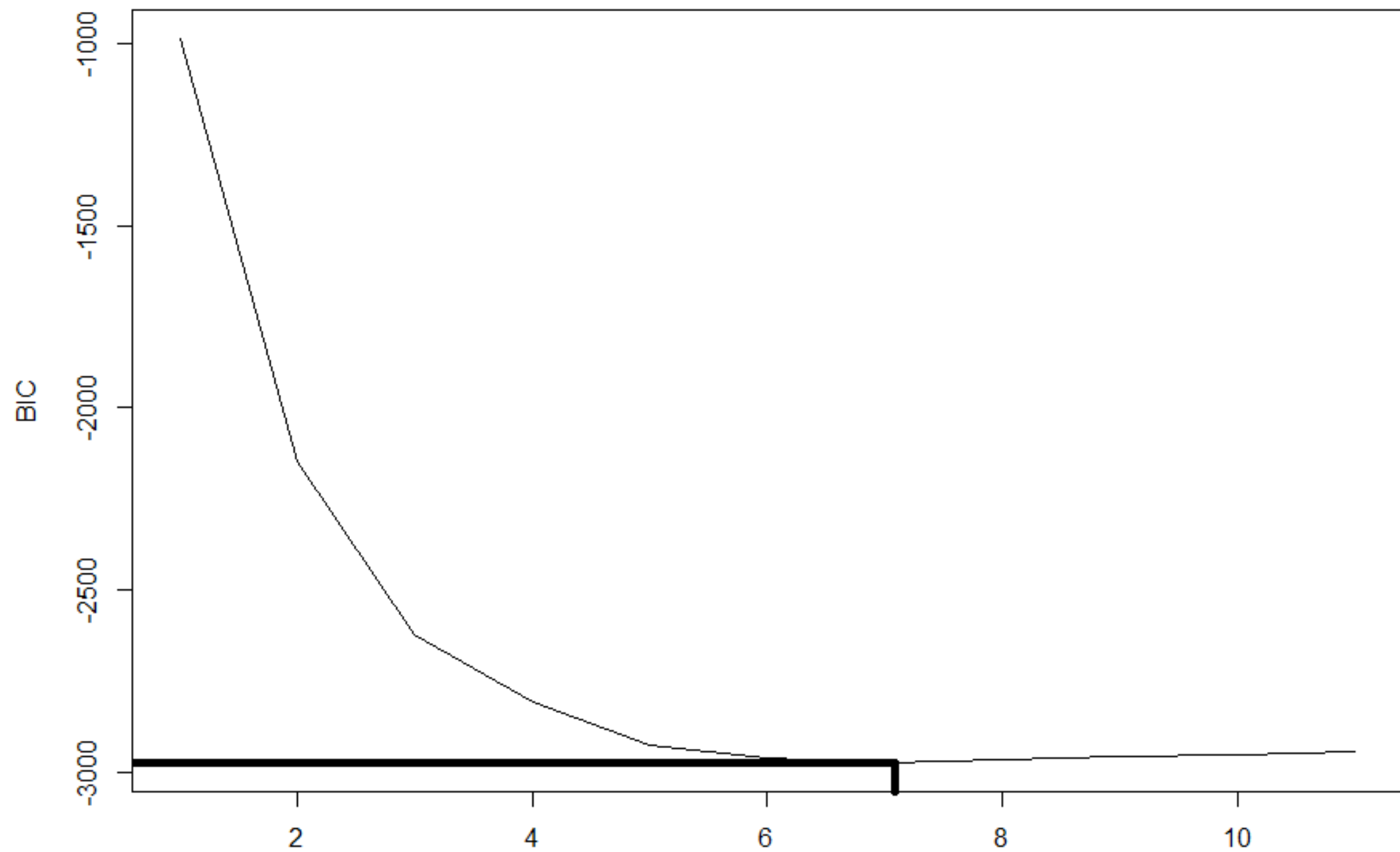
- > 1000000 : "Auckland"
- > 400000 : "Large Region/City"
- > 200000 : "Moderately Large Region/City"
- > 90000 : "Normal Region/City"
- < 90000 : "Small Region/City"

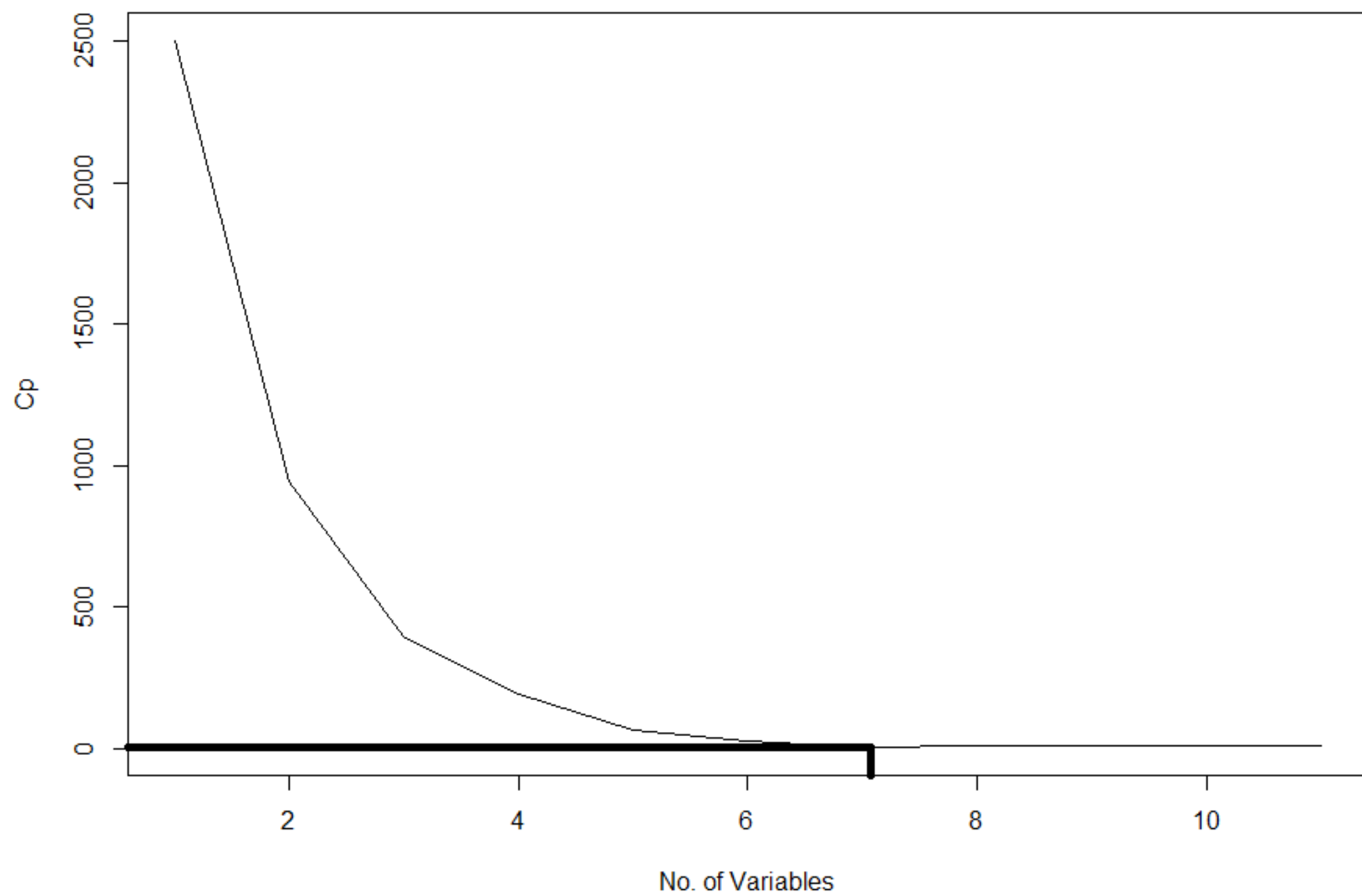


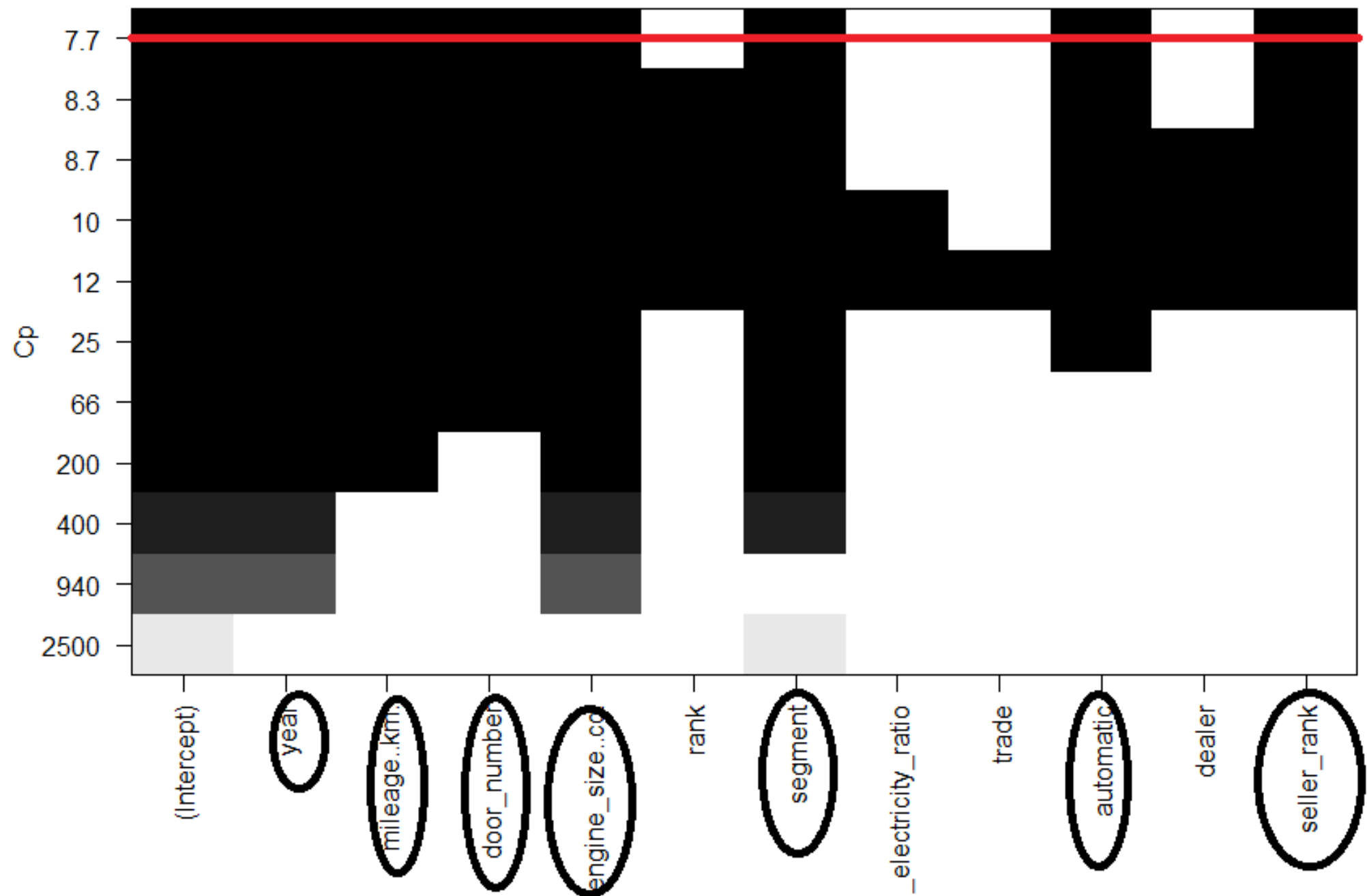


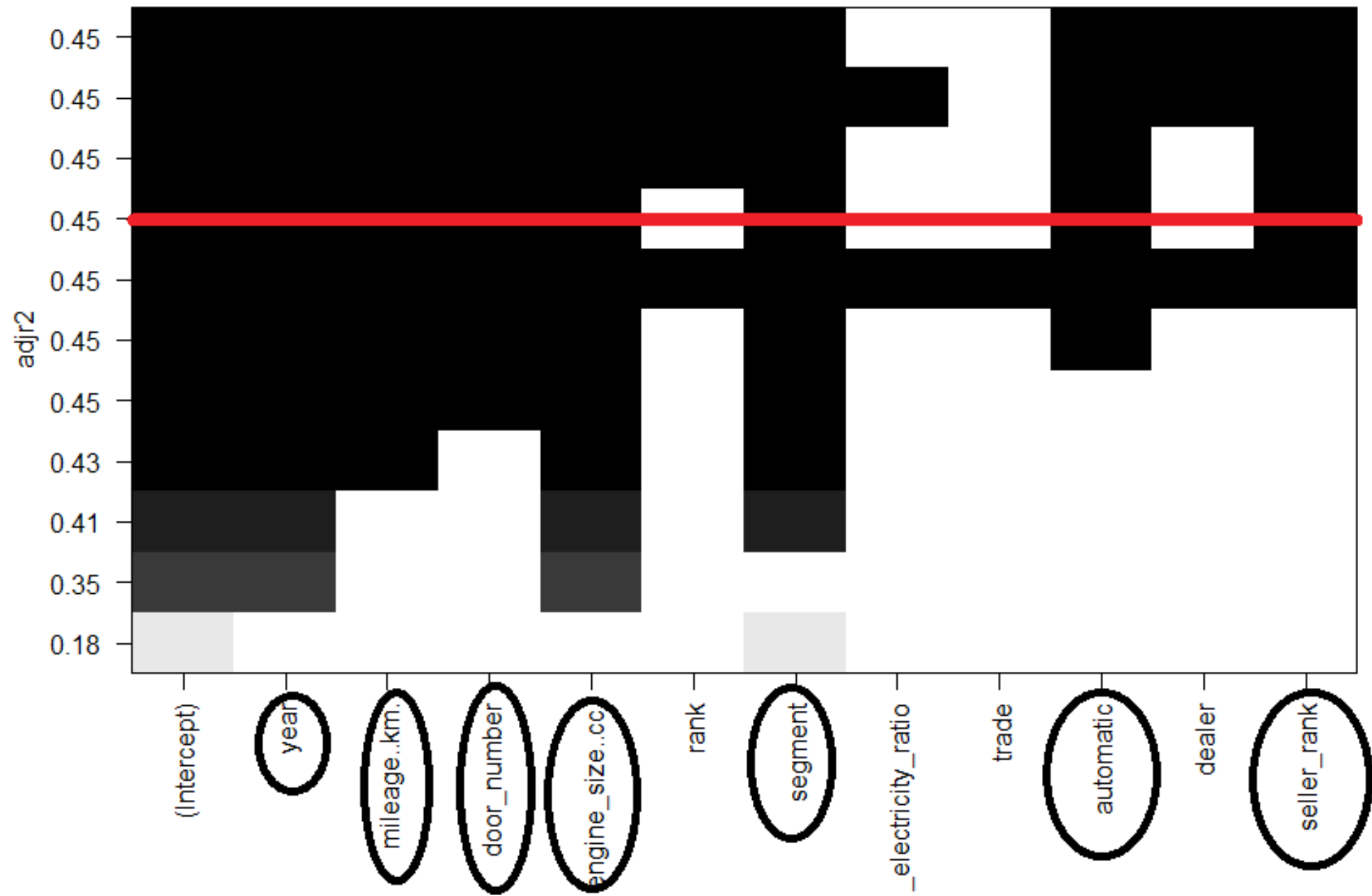
Variable subset selection

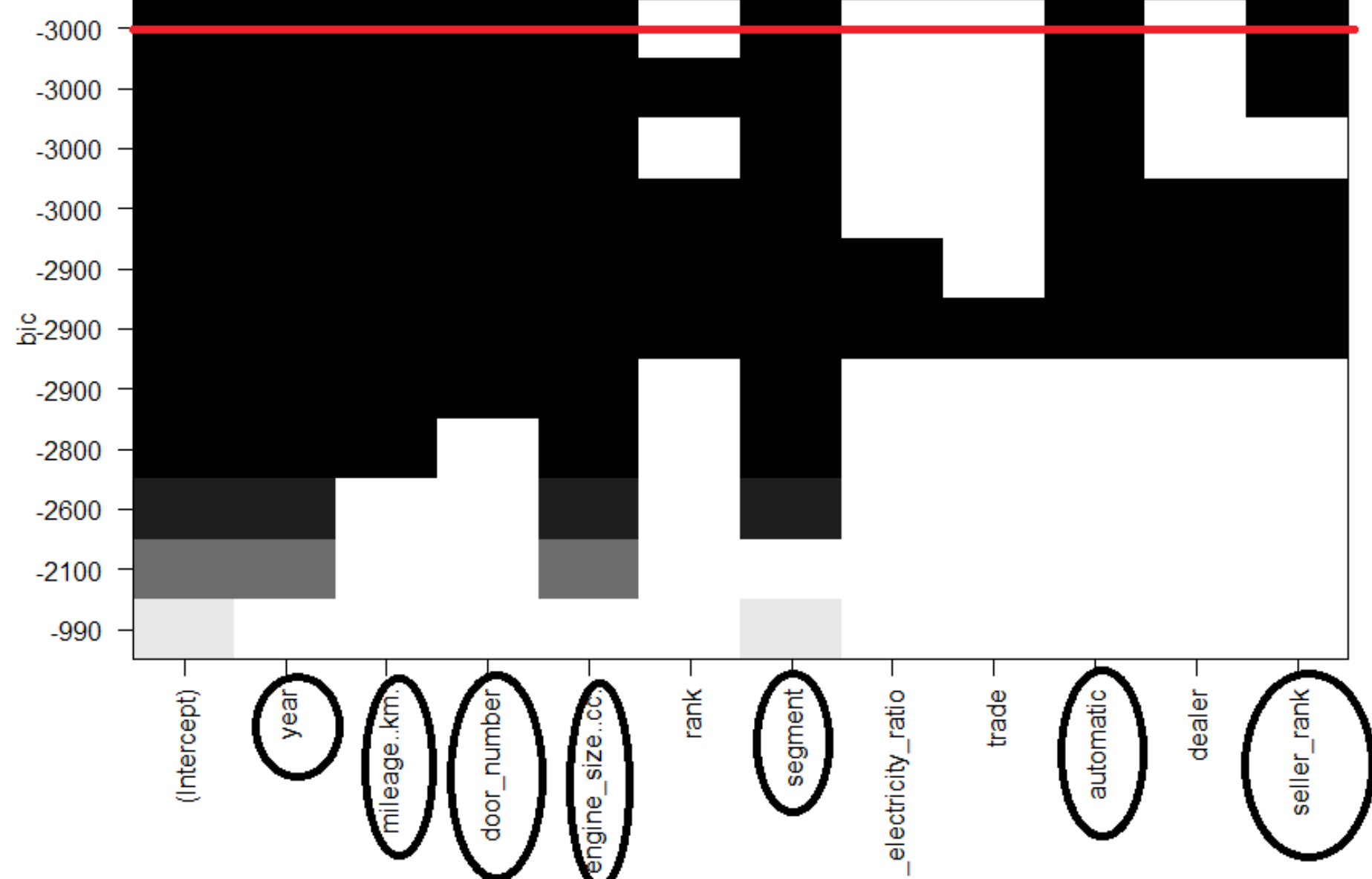












Selection Algorithm: forward

		year	mileage..km	door_number	engine_size..cc	rank	segment	fuel_electricity_ratio	trade
1	(1)	" "	" "	" "	" "	" "	"*"	" "	" "
2	(1)	"*"	" "	" "	" "	" "	"*"	" "	" "
3	(1)	"*"	" "	" "	"*"	" "	"*"	" "	" "
4	(1)	"*"	"*"	" "	"*"	" "	"*"	" "	" "
5	(1)	"*"	"*"	"*"	"*"	" "	"*"	" "	" "
6	(1)	"*"	"*"	"*"	"*"	" "	"*"	" "	" "
7	(1)	"*"	"*"	"*"	"*"	" "	"*"	" "	" "

		automatic	dealer	seller_rank
1	(1)	" "	" "	" "
2	(1)	" "	" "	" "
3	(1)	" "	" "	" "
4	(1)	" "	" "	" "
5	(1)	" "	" "	" "
6	(1)	"*"	" "	" "
7	(1)	"*"	" "	"*"

Popularity?



1998 BMW 528i

\$9,995

- 45,101km
- 4 Door Sedan
- 2800cc Automatic
- Petrol

Comfortable drive with 2.8 Litre engine, featuring ABS, airbags, air conditioning, alloys, factory stereo with CD stacker, central locking, electric seats, power steering, windows and mirrors, tracti...

Dealer, WELLINGTON



+Watchlist

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2004 BMW 525i

\$11,999

- 117,065km
- 4 Door Sedan
- 2500cc Tiptronic
- Petrol

ABS Brakes, Curtain Airbag, Factory Alloys, Leather Trim, Power Steering, Remote locking, Traction Control, Air Conditioning, Airbags, CD Player, Climate control, Electric Mirrors, Fuel Injection, Si...

Dealer, HAWKES BAY



+Watchlist

Contact

CALL NOW: 06 8243601



2004 BMW 530i

\$17,999

- 161,684km
- 4 Door Sedan
- 3000cc Automatic
- Petrol

ABS Brakes, Alloy Wheels, Curtain Airbag, Leather Trim, Power Steering, Remote locking, Sunroof, Traction Control, Air Conditioning, CD Player, Climate control, Electric Mirrors, Fuel Injection, Side...

Dealer, HAWKES BAY



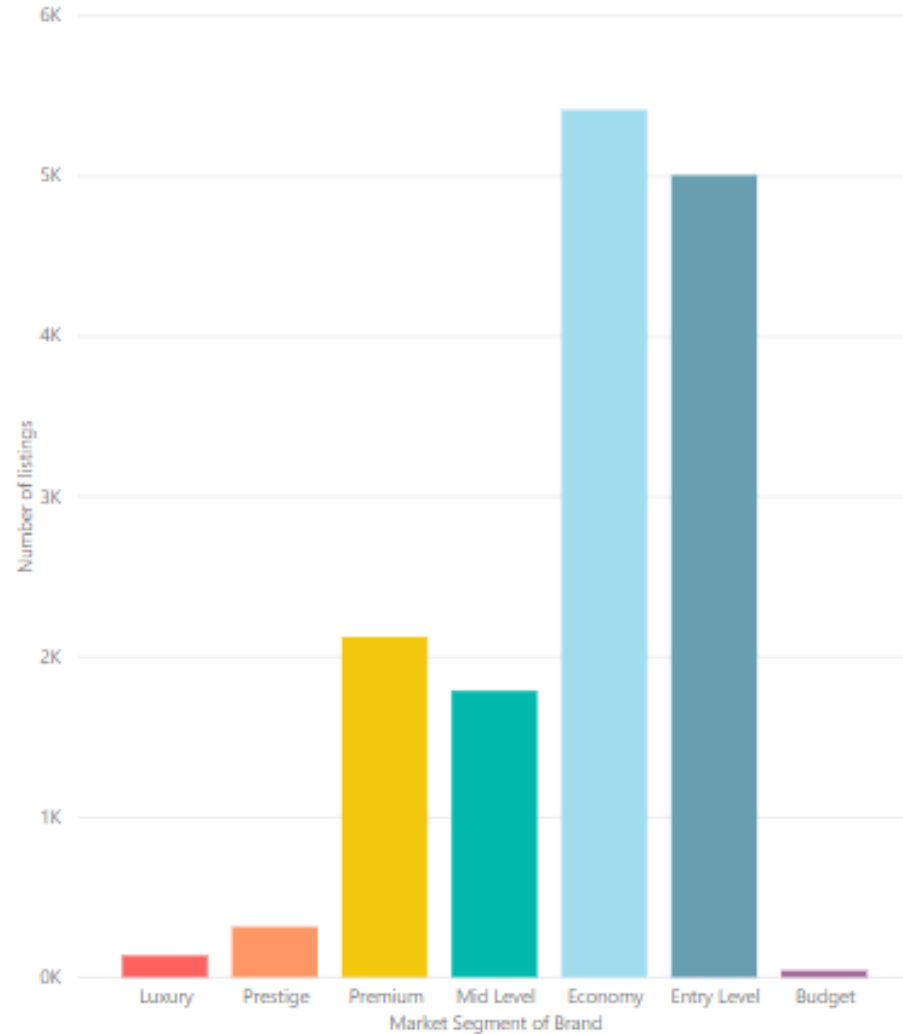
+Watchlist

Contact

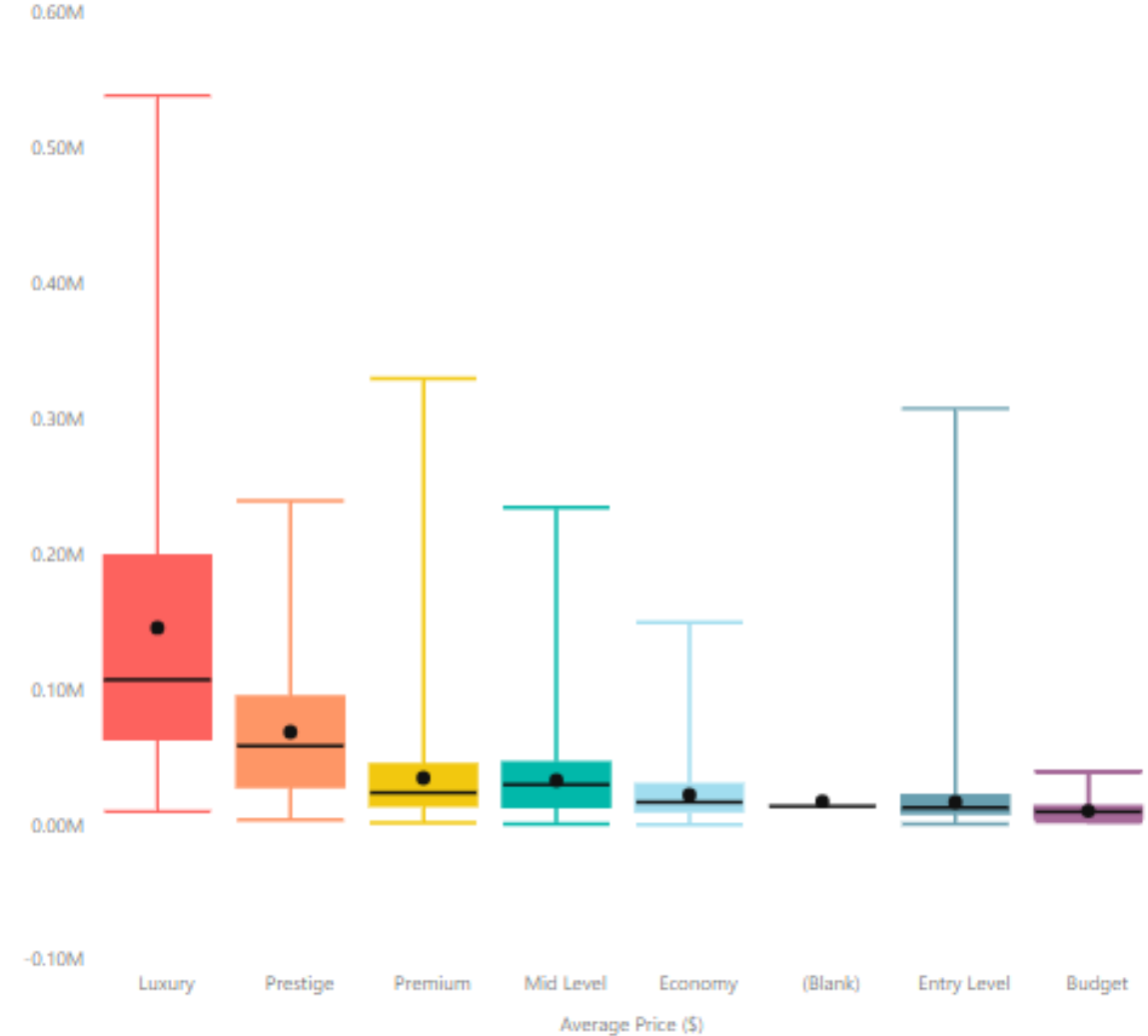
CALL NOW: 06 8243601

Power BI plots

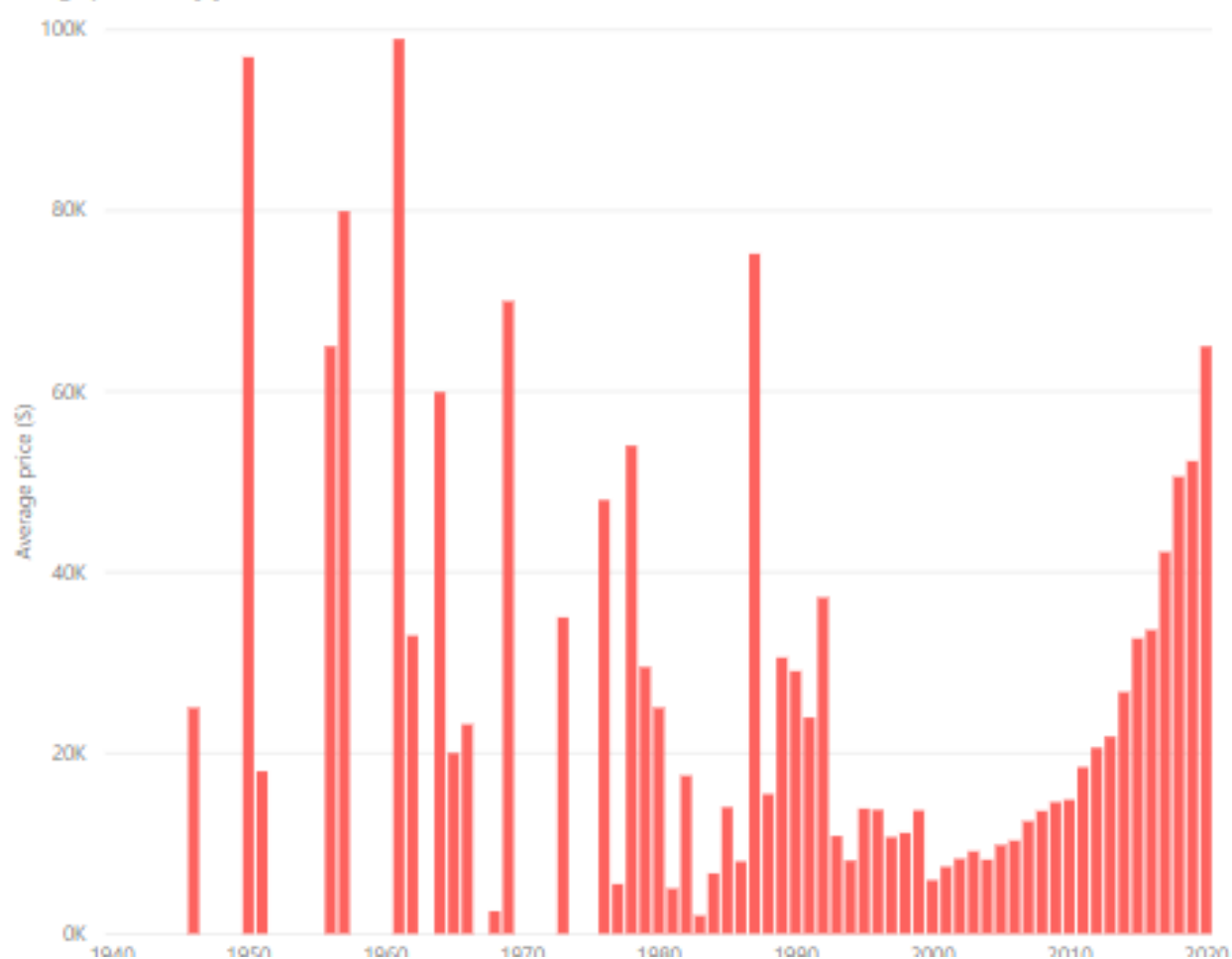
Number of listings by Market Segment of Brand



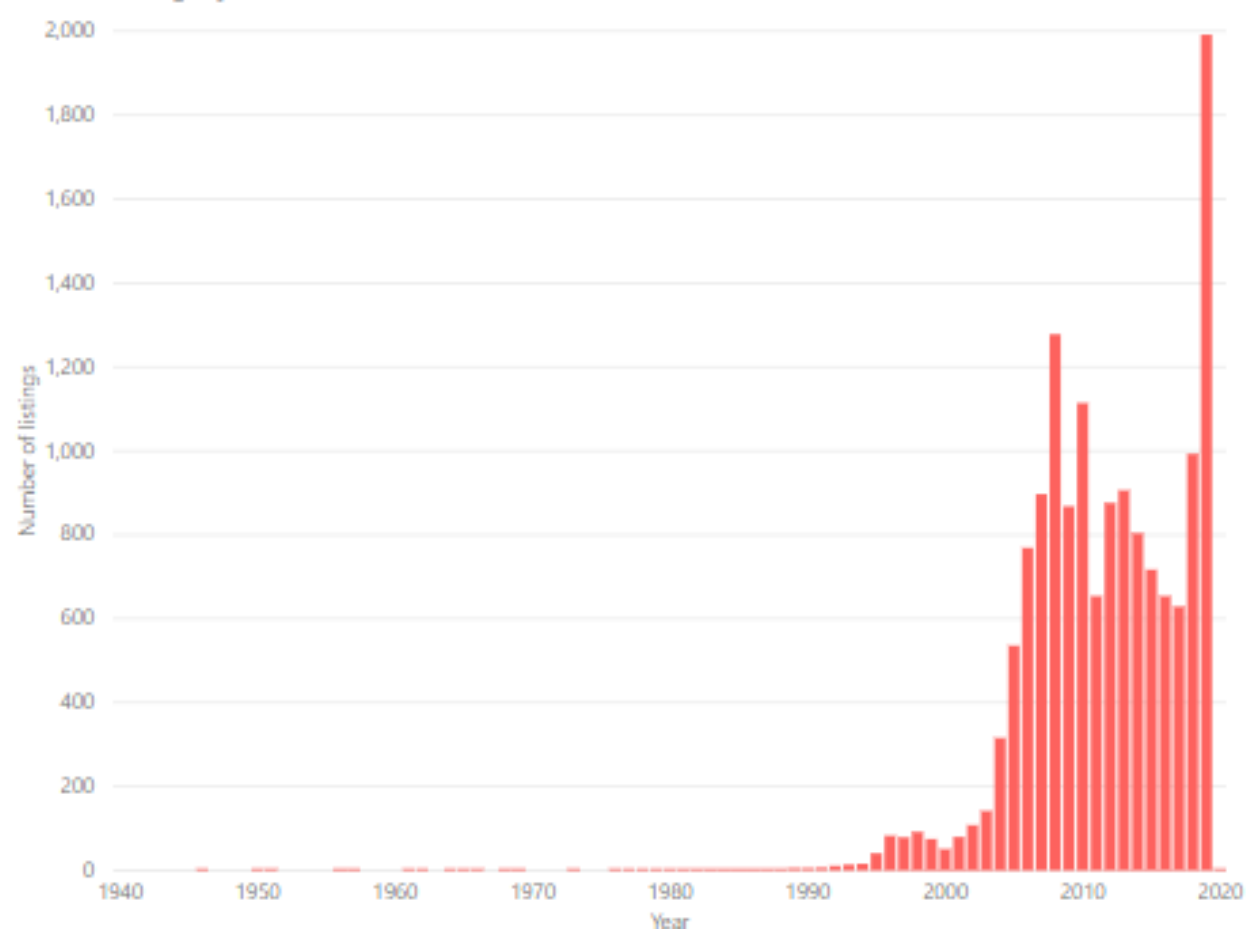
Average Price (\$) by Market Segment of Brand



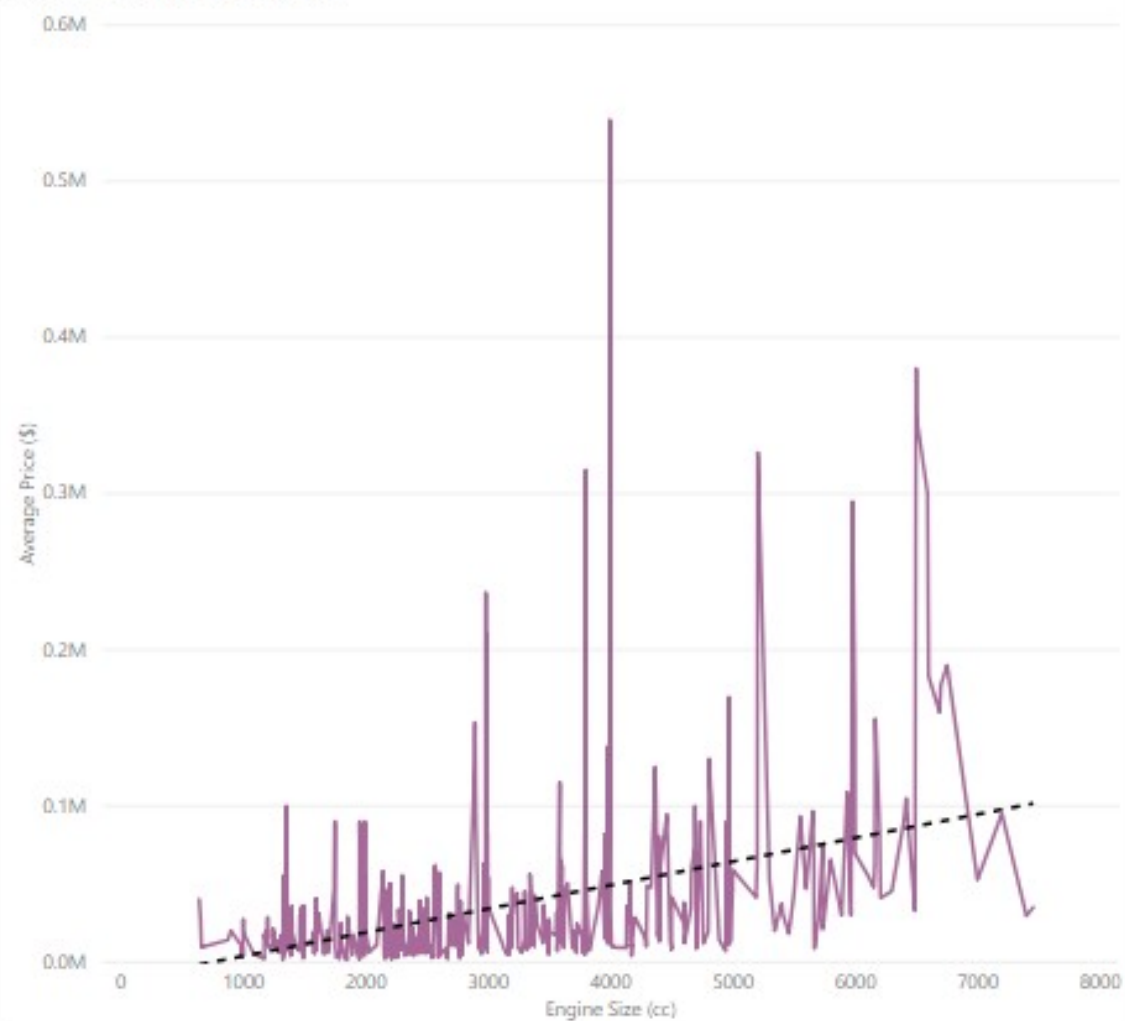
Average price (\$) by year



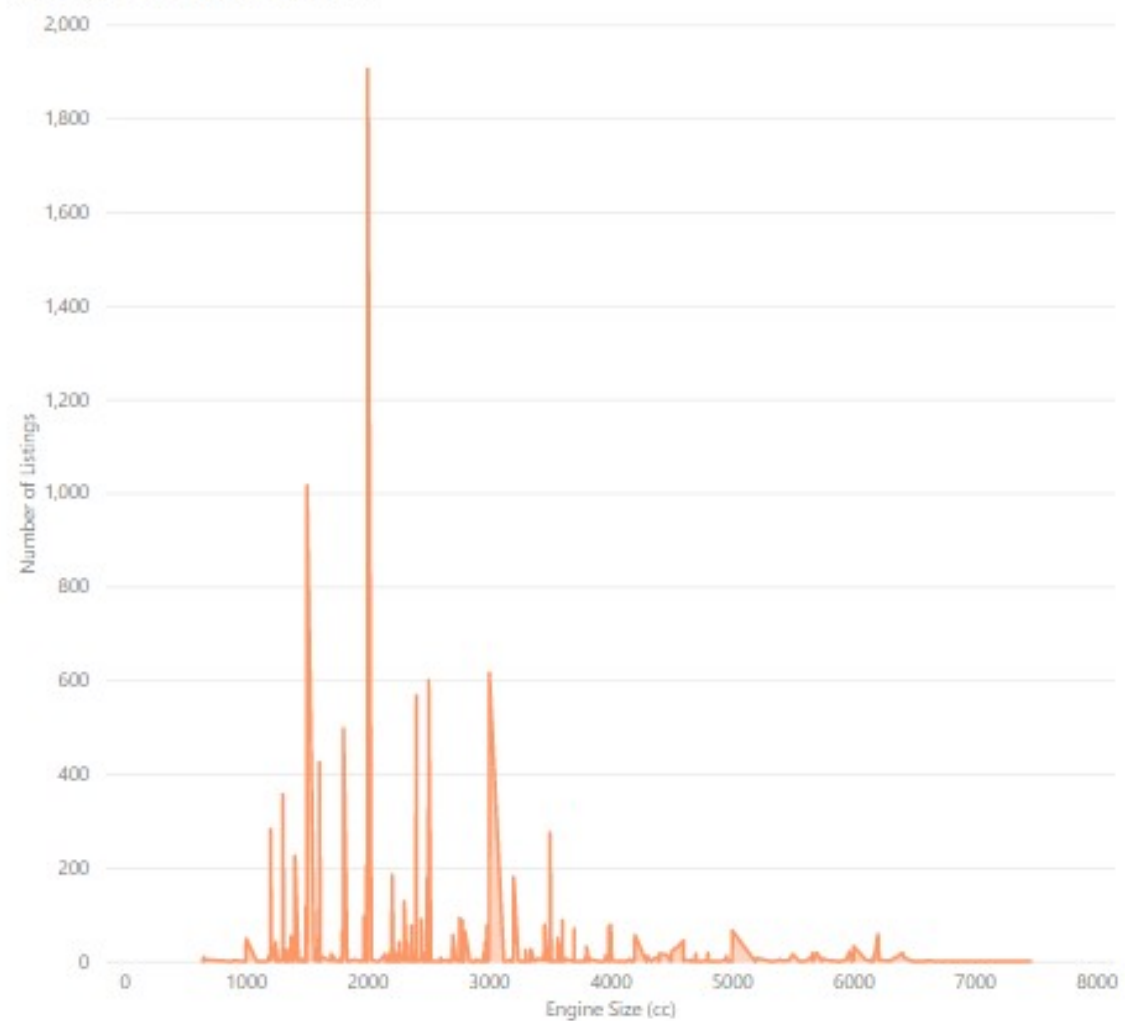
Number of listings by Year

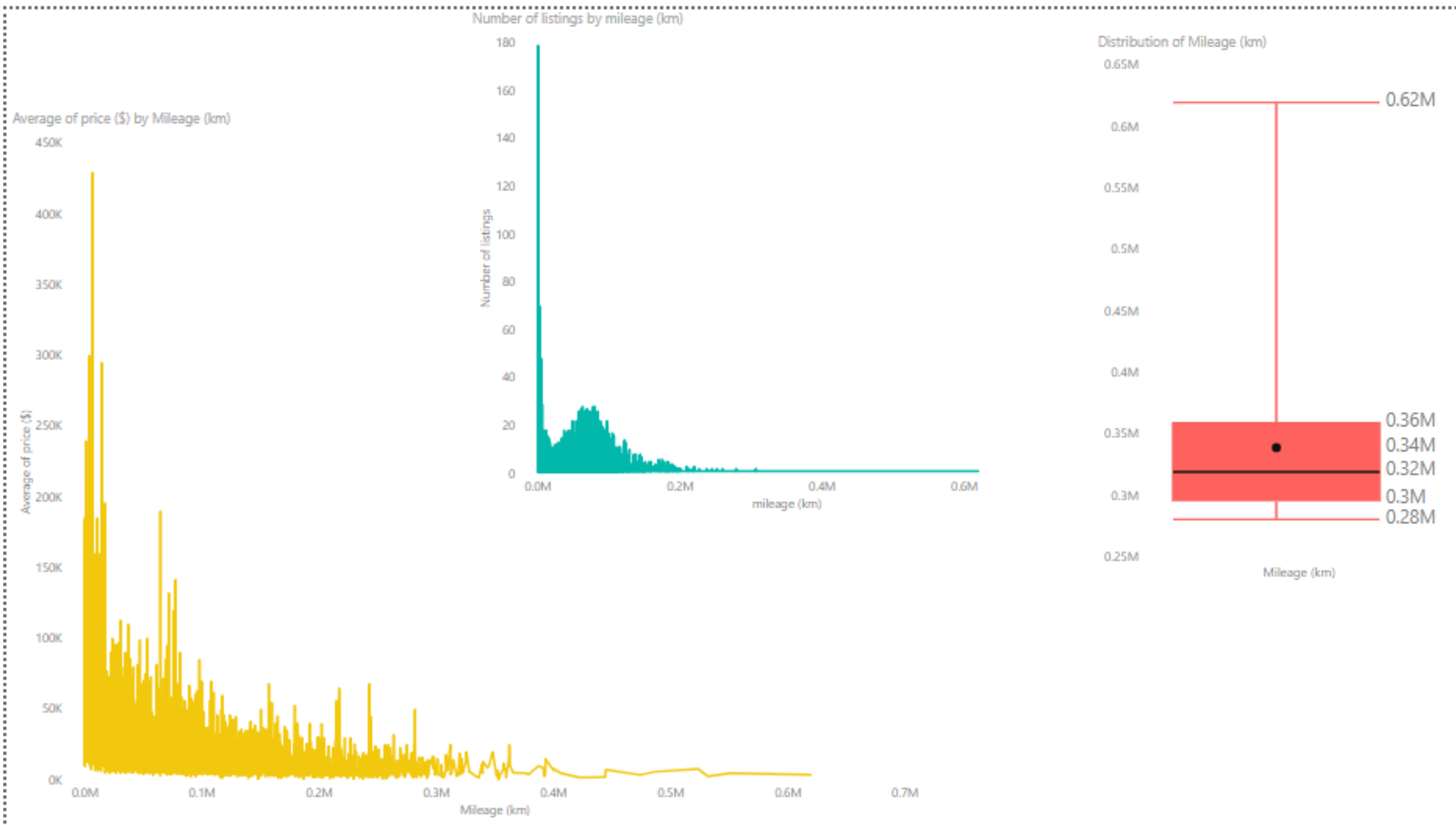


Average Price (\$) by Engine Size (cc)

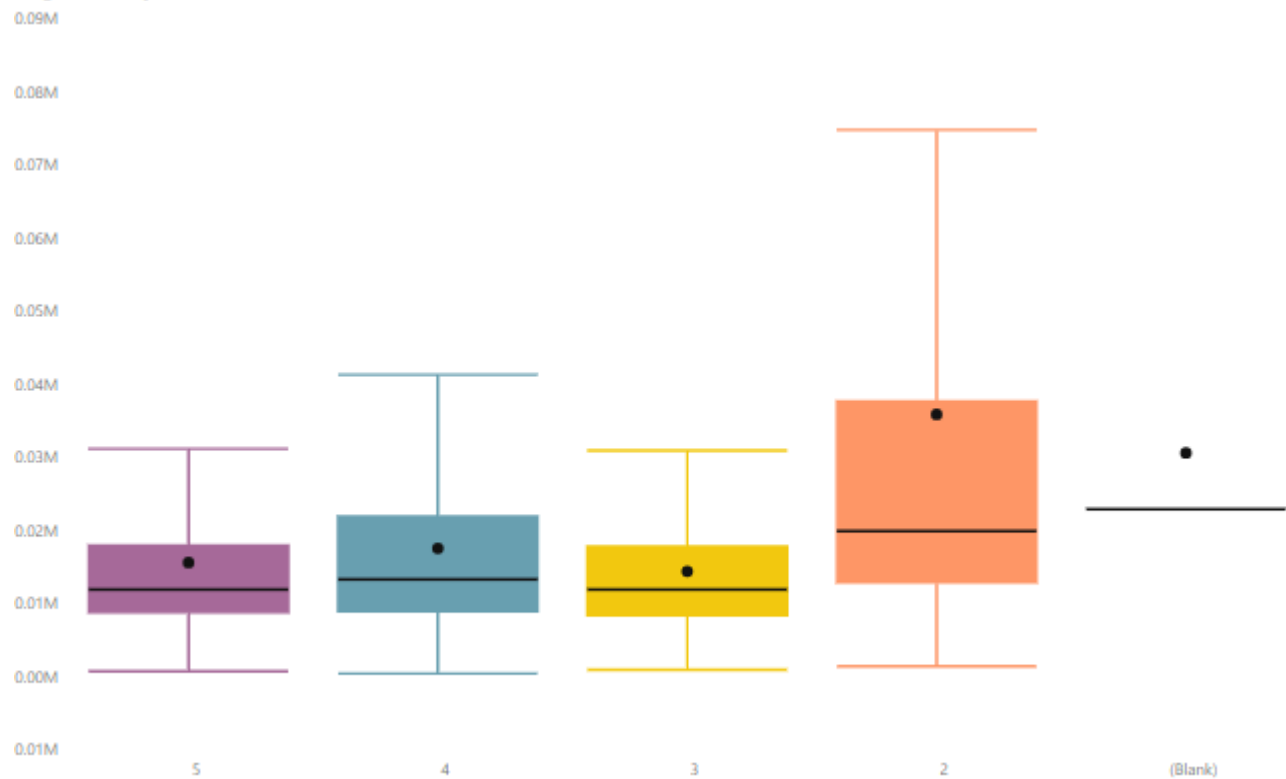


Number of Listings by Engine Size (cc)

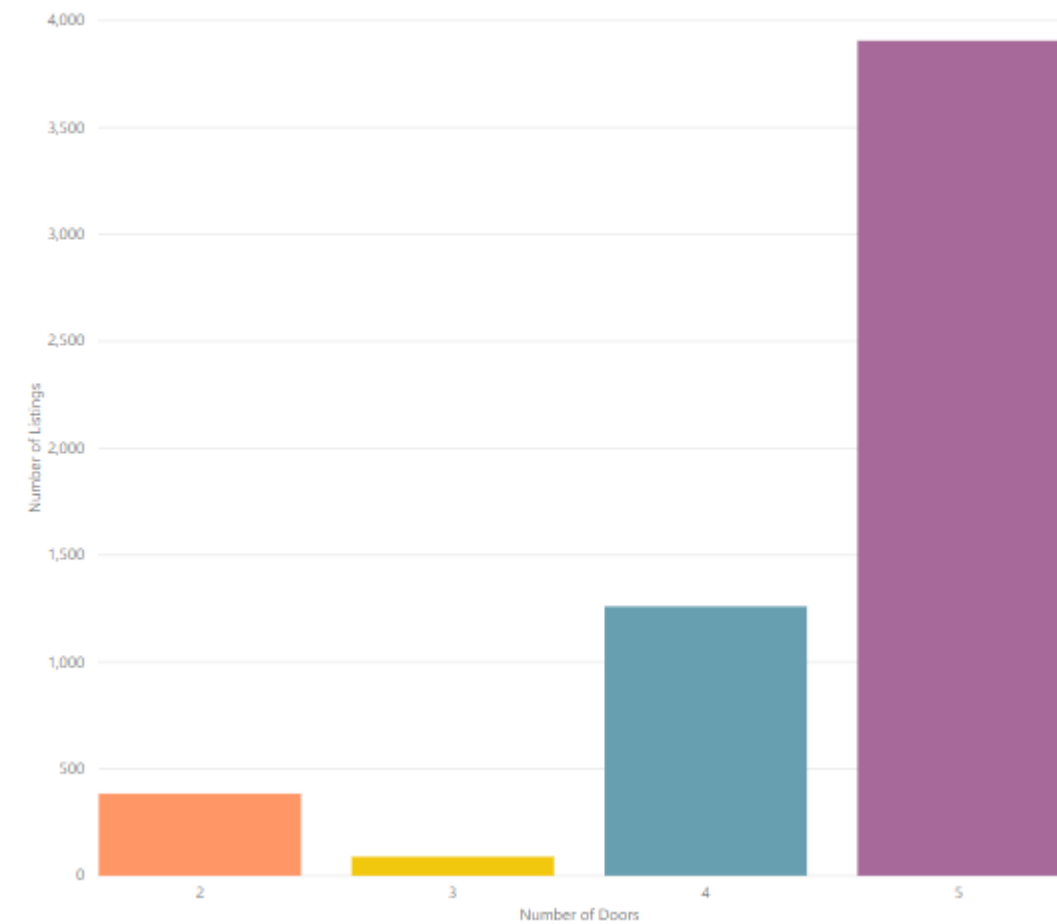




Median Price (M) by Number of Doors

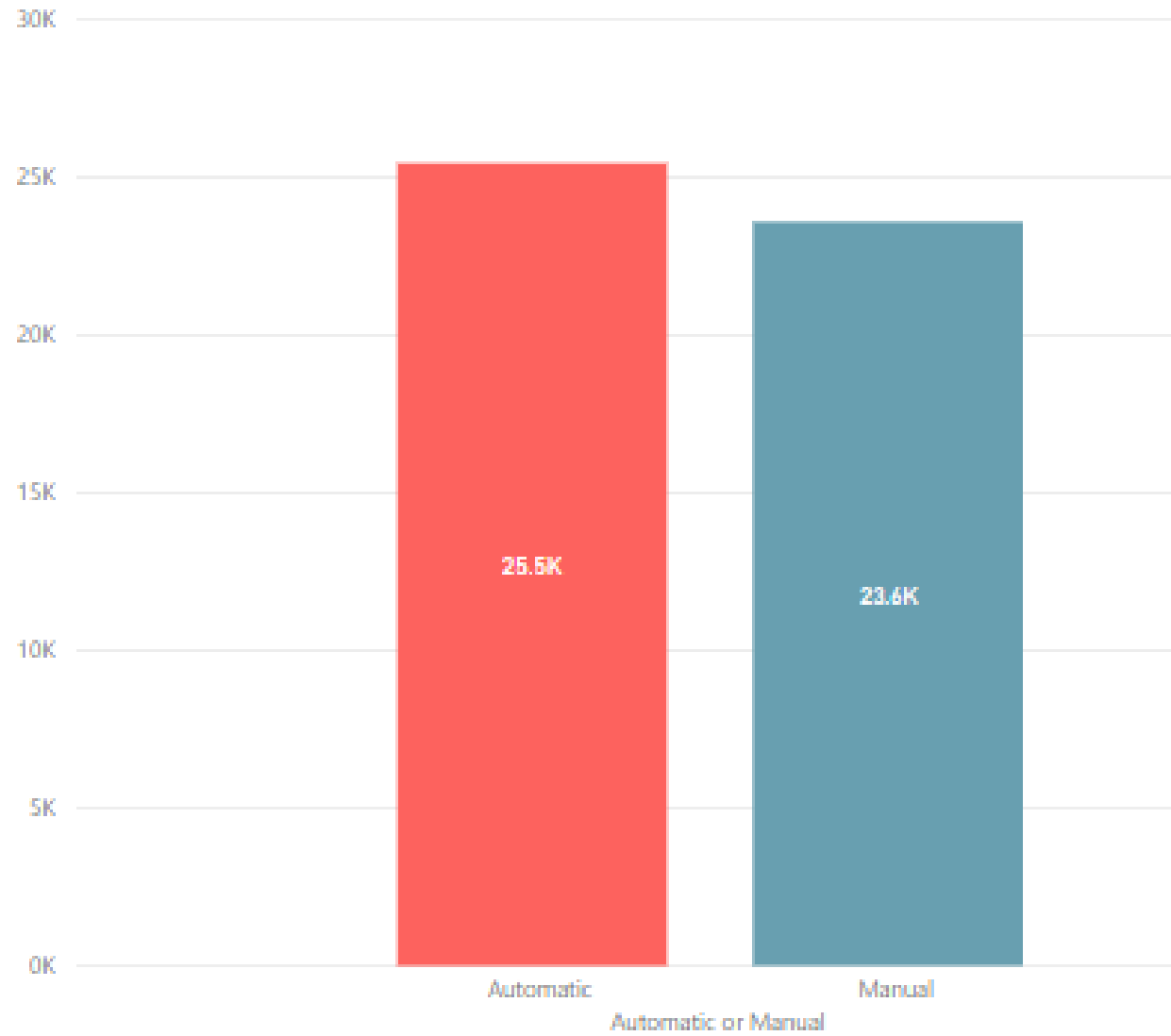


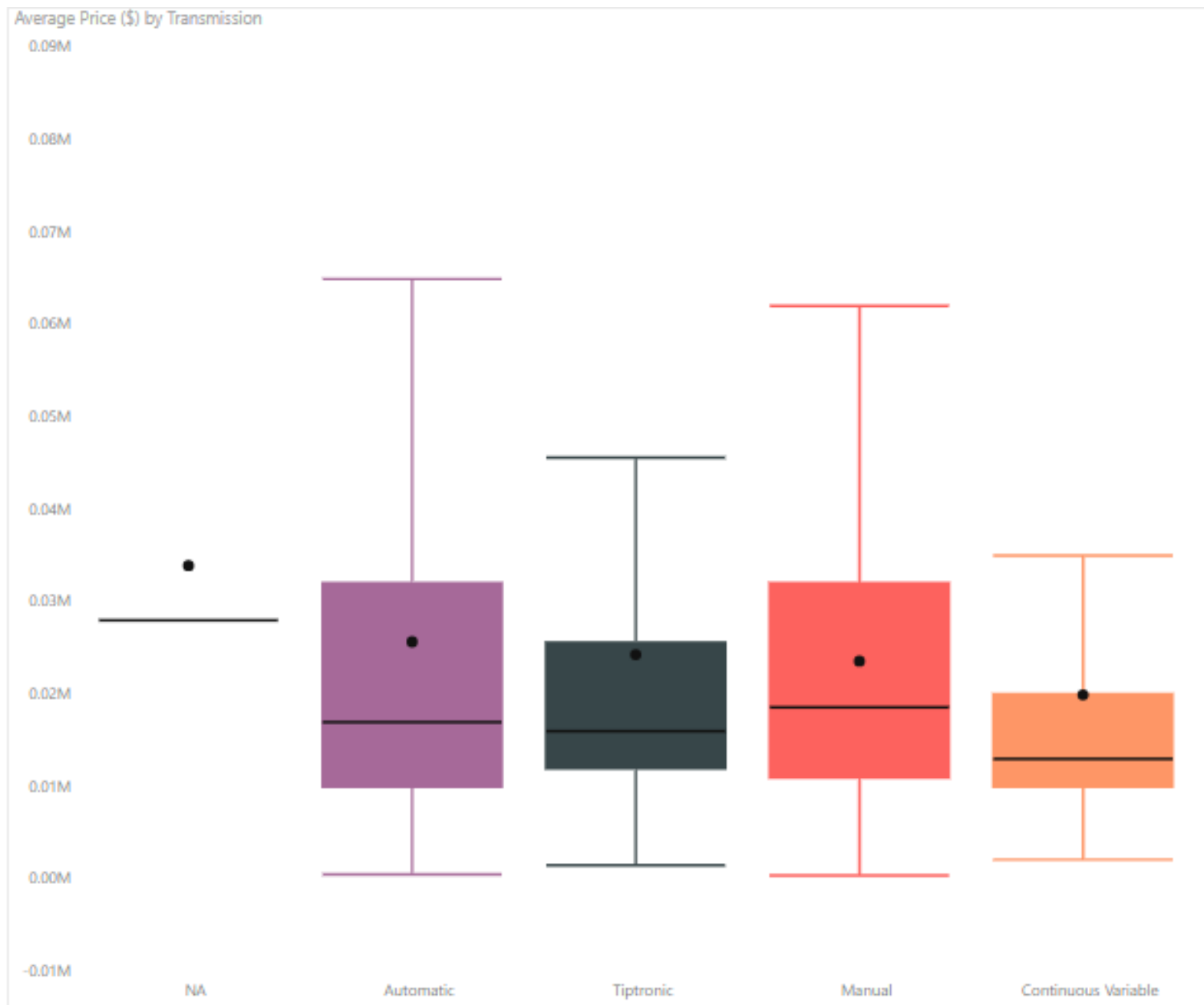
Number of Listings by Number of Doors



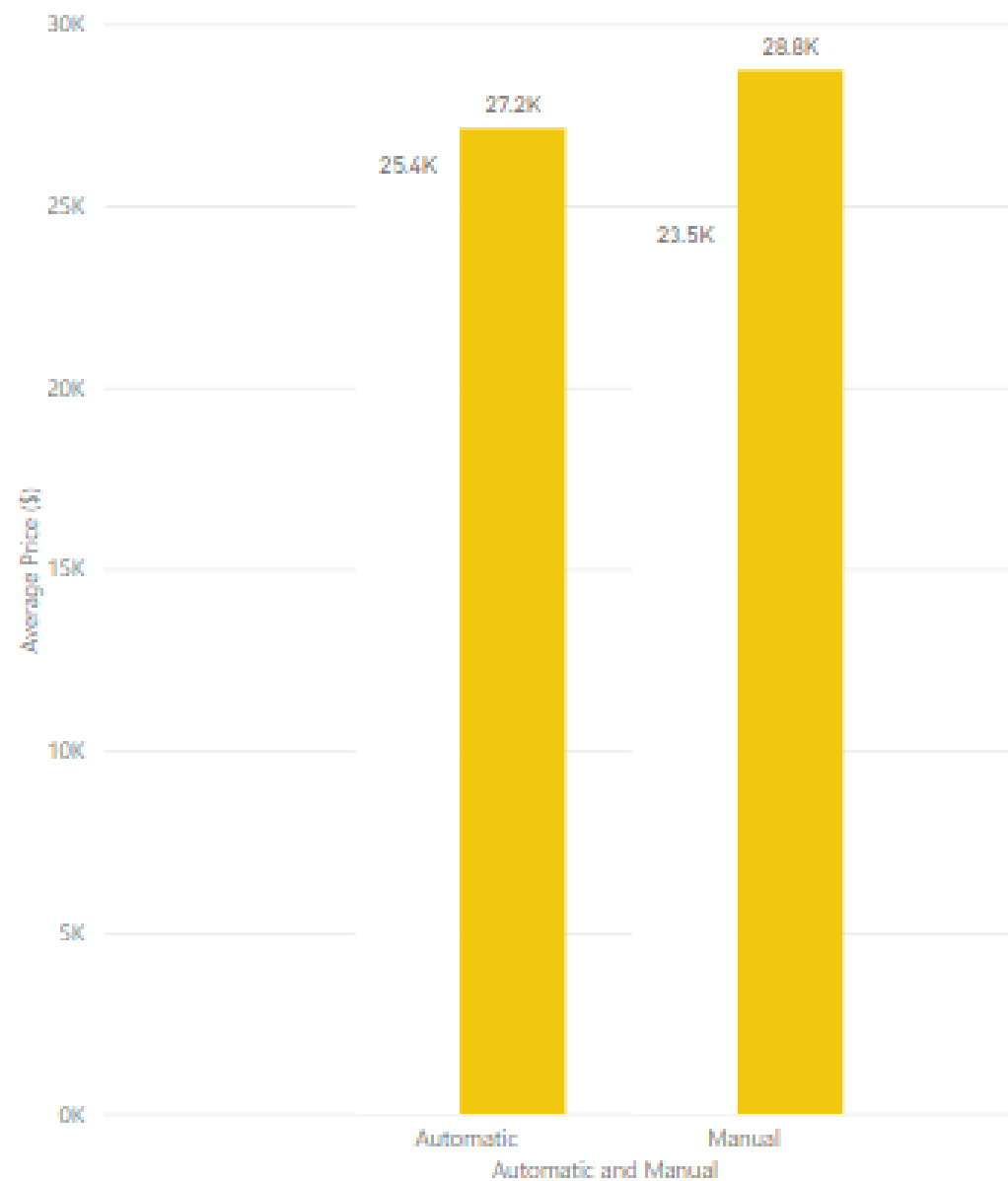
Average Price (\$) of Automatic and Manual

carAutomatic ● 0 ● 1

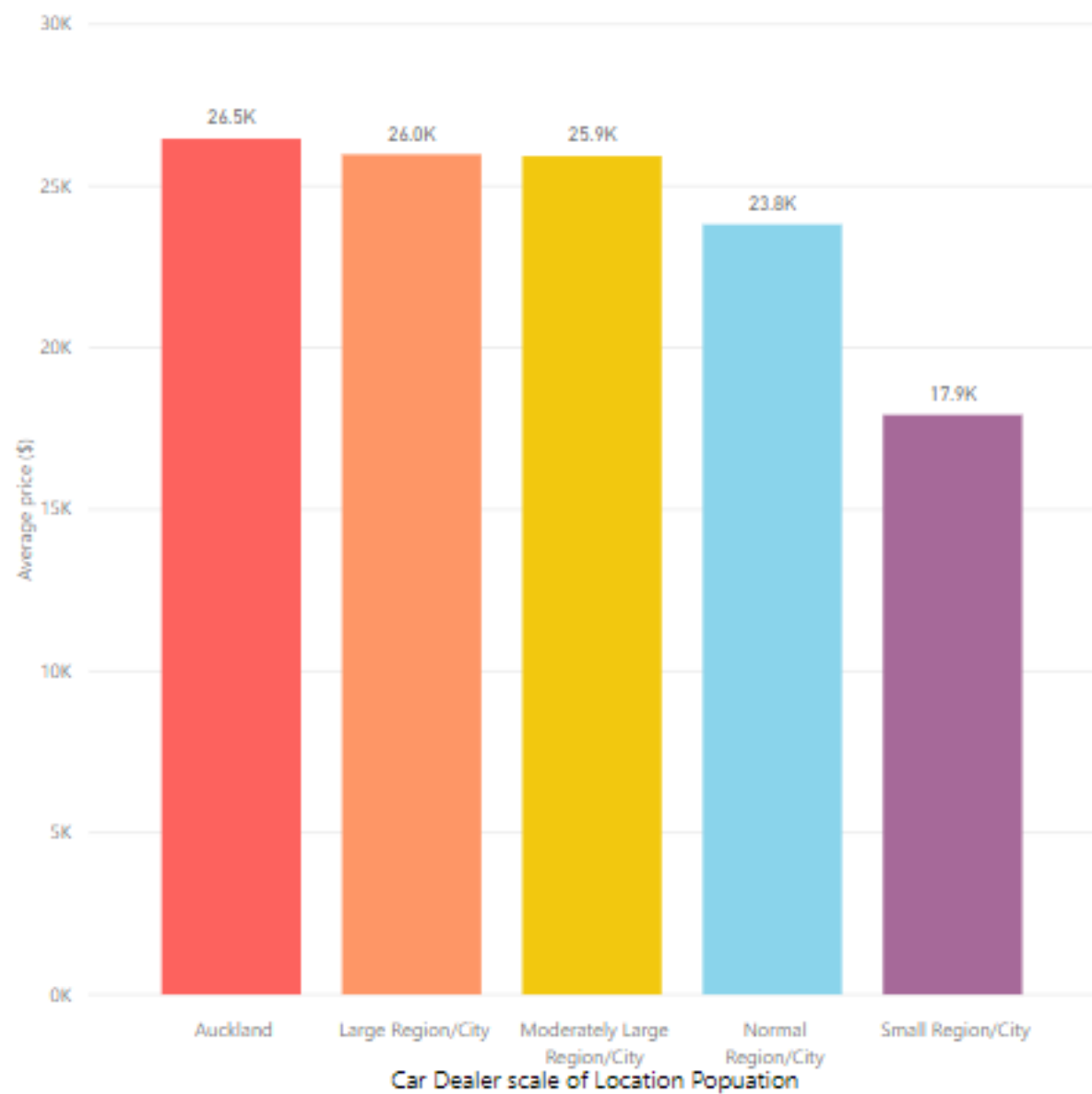




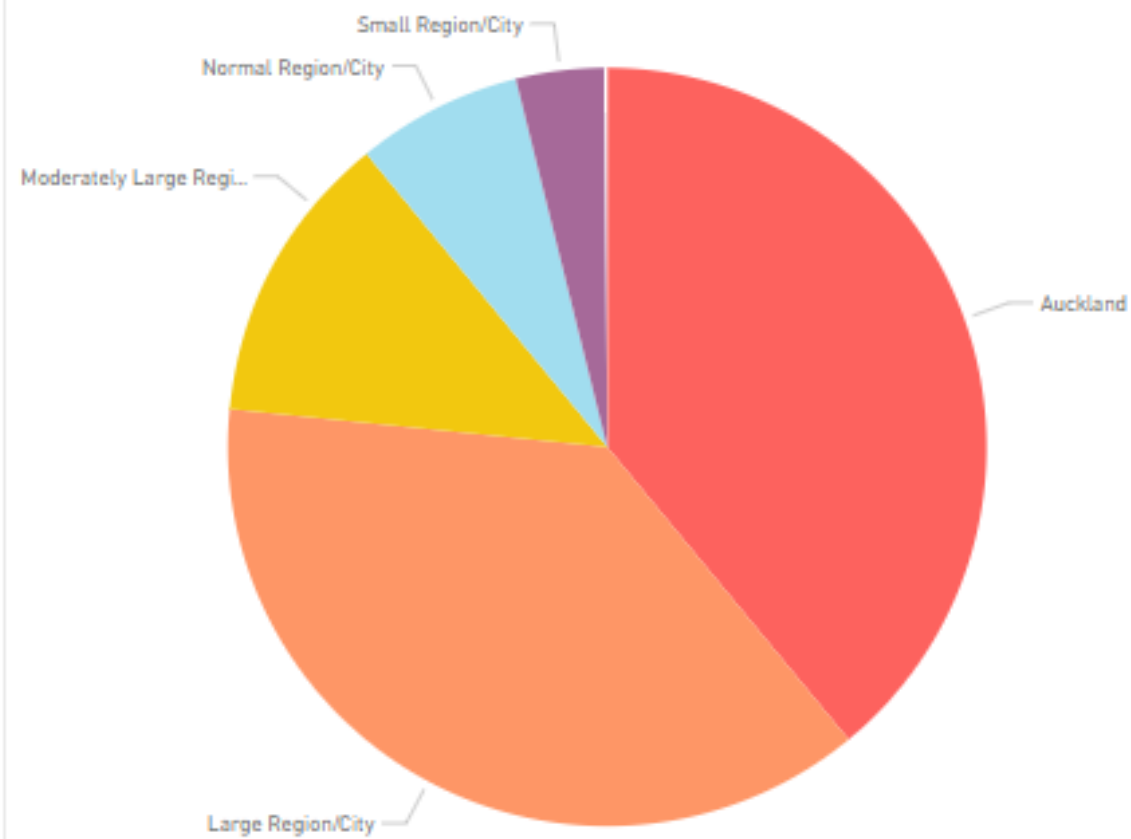
Average Price (\$) of models with both automatic and manual transmissions



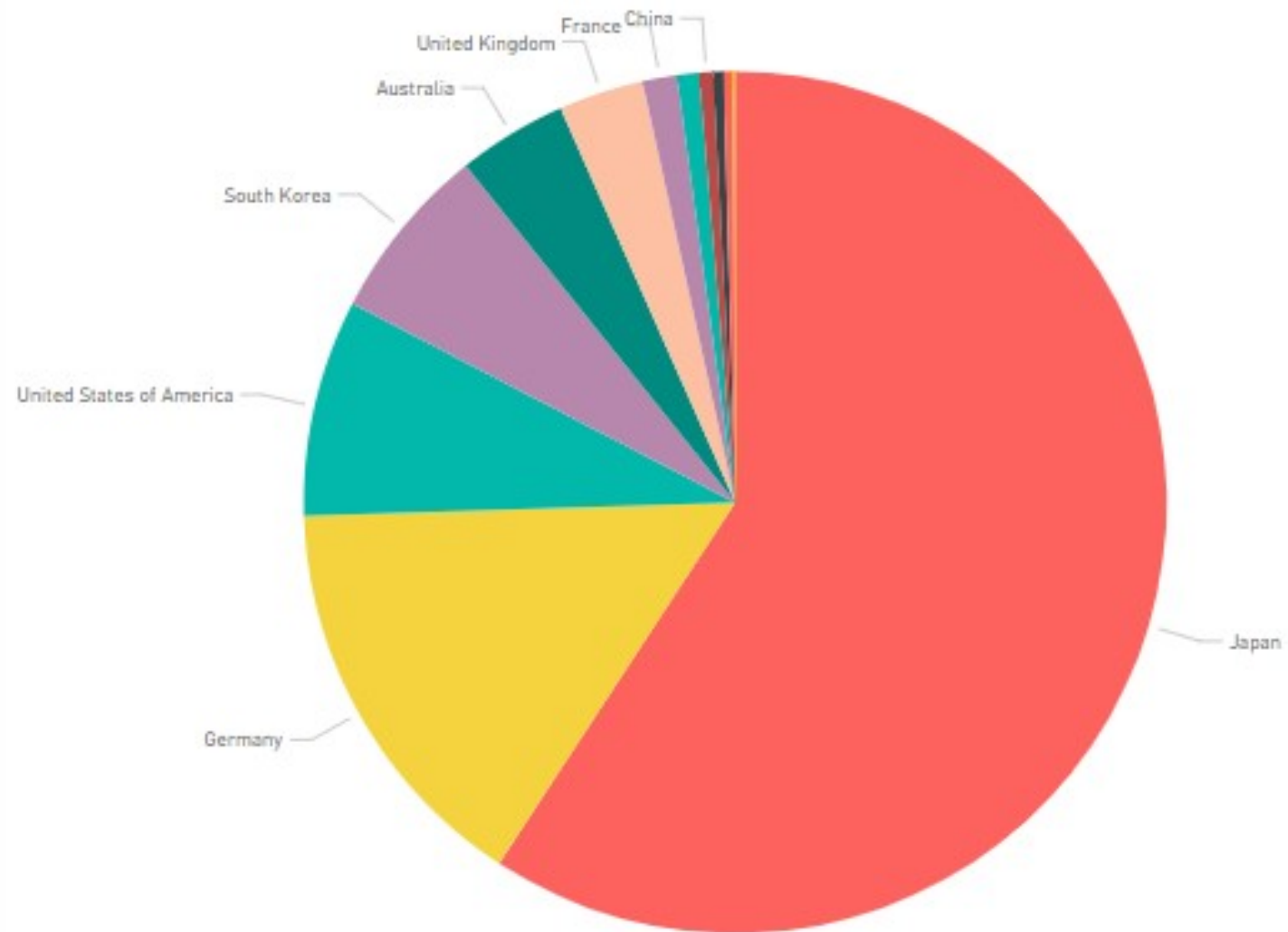
Average price (\$) by Car Dealer scale of Location Population

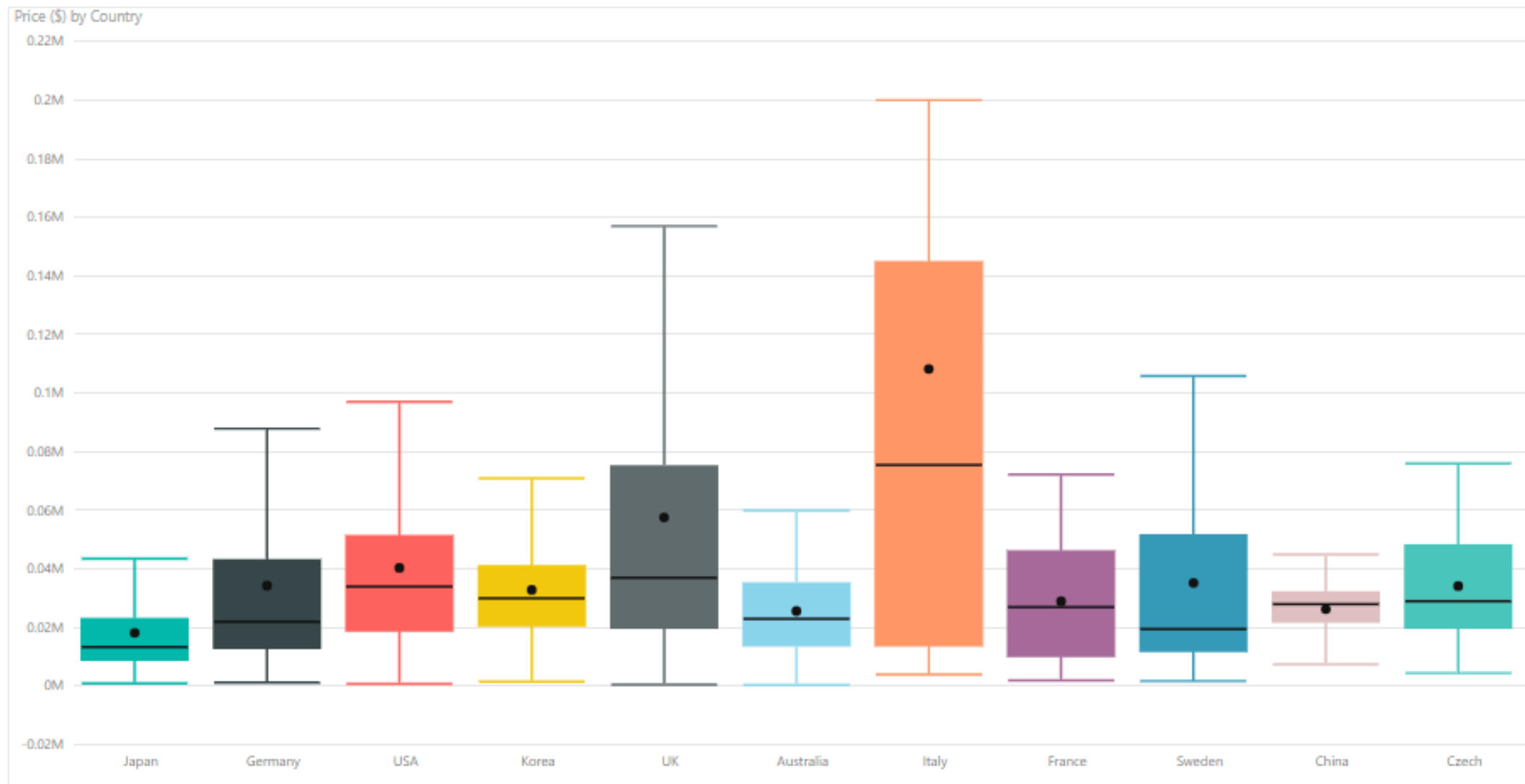


Distribution of Car Dealer's location by scale of Location Population

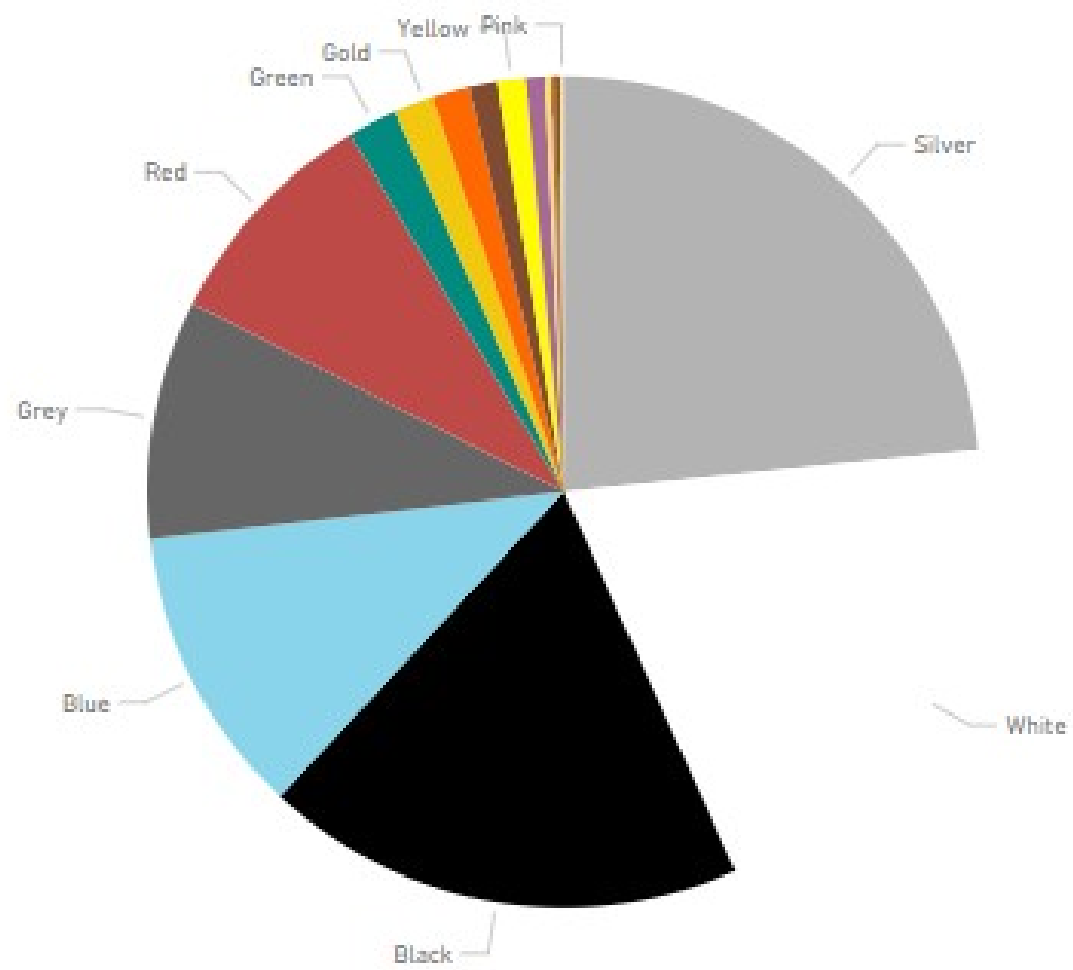


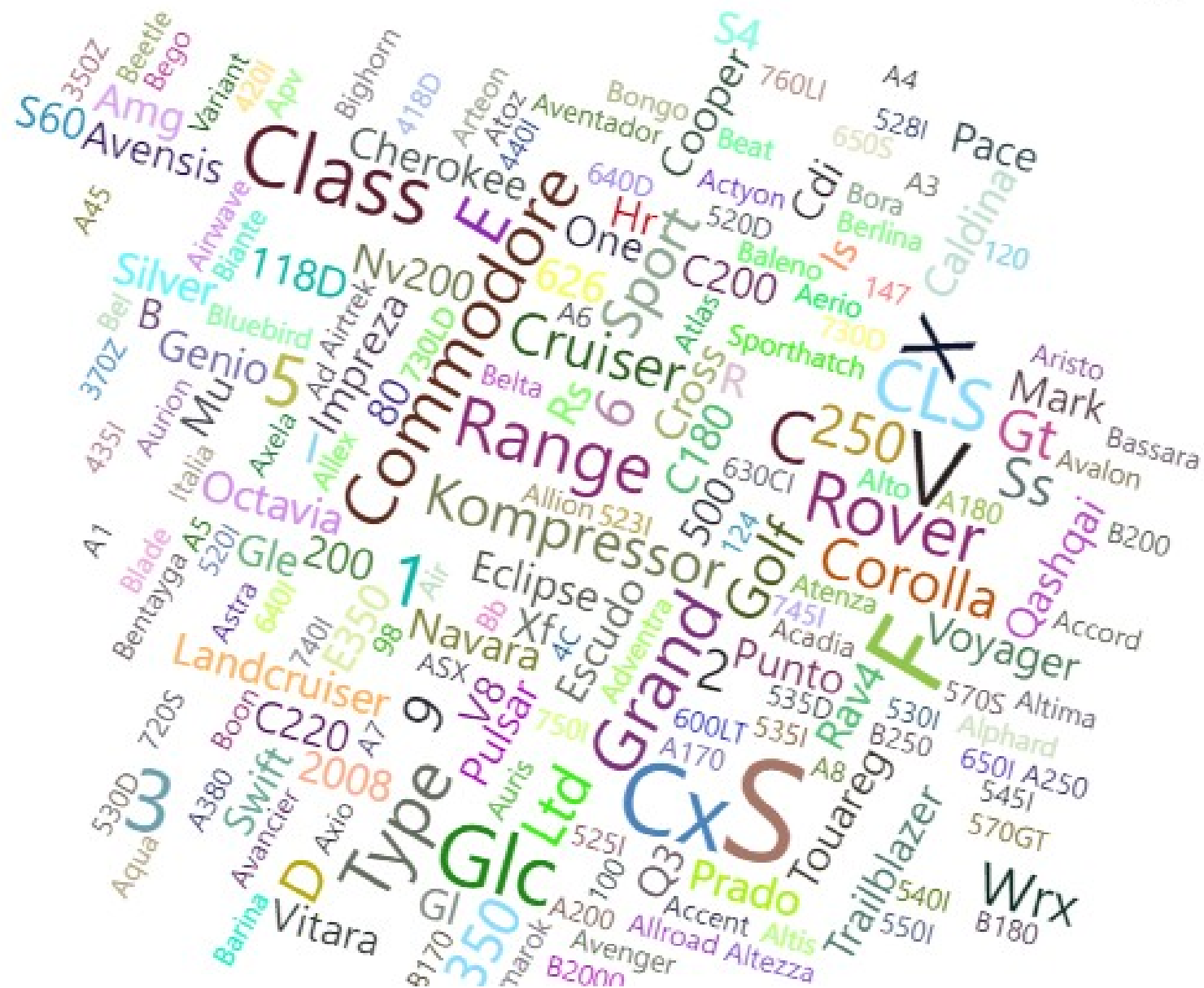
Proportion of listings by Country





Proportion of listings by Colour





Advanced Features

- Generate a dataset with more than 3,000 observations using web scraping techniques, each with 10 or more

Number of products scrapped: 14940

Total number of products scraped: 14940

1

	X	year	brand	model	price....	mileage..	door_num	engine_si	fuel_type	bodystyle	transmissi	colour	seller_typ	seller_loc	page	page_ran	link
1	1	1998	BMW	528i	9995	45101	4	2800	Petrol	Sedan	Automatic	NA	Dealer	Wellington	1	1	https://www
2	2	2004	BMW	525i	11999	117065	4	2500	Petrol	Sedan	Tiptronic	NA	Dealer	Hawkes B	1	2	https://www
3	3	2004	BMW	530i	17999	161684	4	3000	Petrol	Sedan	Automatic	NA	Dealer	Hawkes B	1	3	https://www
4	4	1999	Honda	Odyssey	4995	89036	5	3000	Petrol	People M	Automatic	Silver	Dealer	Wellington	1	4	https://www
5	5	2001	Mercedes	E240	6995	111251	4	2600	Petrol	Sedan	Automatic	Silver	Dealer	Wellington	1	5	https://www
6	6	1998	Toyota	Corolla	5350	90156	NA	1330	Petrol	Hatchback	Automatic	NA	Dealer	Auckland	1	6	https://www
7	7	2000	Honda	Odyssey	5800	103660	5	2250	Petrol	People M	Tiptronic	NA	Dealer	Hawkes B	1	7	https://www
9	9	2000	Volkswag	Passat	5995	112024	5	1800	Petrol	Wagon	Automatic	Green	Dealer	Wellington	1	9	https://www
10	10	1996	Fiat	Brava	4999	132639	5	1581	Petrol	Hatchback	Manual	White	Dealer	Hawkes B	1	10	https://www
11	11	2001	Suzuki	Aerio	4995	54250	5	1500	Petrol	Wagon	Automatic	Gold	Dealer	Wellington	1	11	https://www

Advanced Features

- At least three regular expression functions have been performed to extract information.

```
def get_price(product):  
    # includes regex expressions to extract the price as a value away from the  
    '$' and ','  
    product_price = 'N/A'  
    try:  
        product_price = product.find('p', {'class', 'price'}).text  
    except AttributeError:  
        print('missing price')  
    if product_price.find('$') != -1:  
        p = product_price.split("$")  
        car_price = p[1]  
        price = int(car_price.replace(',', ''))  
        return price  
    else:  
        return product_price
```

2015 Mazda Axela

\$22,690

- 26,312km
- Black Hatchback
- 2000cc Automatic
- Petrol

VALVE TIMING ENGINE (VVT) ENGINE
TORQUE 6 SPEED AUTOMATIC
IC +SAFETY FEATURES+ DYNAMIC

Dealer, MANAWATU WANGANUI

CALL NOW: 06 8264200

Advanced Features

- At least three regular expression functions have been performed to extract information.

```
def get_title(product):  
    #includes regex expression to extract brand, year, and model separately  
    list_brands = ["Alfa Romeo", "Asia", "Aston Martin", "Audi", "Bentley", "BMW", "Buick", "Cadillac", "Chery", "Chevrolet", "Chrysler", "Citroen", "Daihatsu", "Dodge", "Ferrari", "Fiat", "Ford", "Foton", "Geely", "GMC", "Great Wall", "Haval", "Hino", "Holden", "Honda", "HSV", "Hummer", "Hyundai", "Infiniti", "Isuzu", "Jaguar", "Jeep", "Kia", "Lamborghini", "LDV", "Lexus", "Lincoln", "Mahindra", "Maserati", "Mazda", "McLaren", "Mercedes-Benz", "MG", "Mini", "Mitsubishi", "Nissan", "Oldsmobile", "Opel", "Peugeot", "Pontiac", "Porsche", "Ram", "Renault", "Rolls-Royce", "Rover", "Saab", "Skoda", "Smart", "Ssangyong", "Subaru", "Suzuki", "Tesla", "Toyota", "Triumph", "Vauxhall", "Volkswagen", "Volvo", "Chrysler Jeep", "Range Rover", "Land Rover"]  
    product_title = 'N/A'  
    try:  
        product_title = product.find('p', {'class', 'title'}).text  
    except AttributeError:  
        print('missing title')  
    t = product_title.split(" ", 2)  
    caryear = t[0]  
    for brand in list_brands:  
        if product_title.find(brand) != -1:
```

2015 Mazda Axela

\$22,690

- 26,312km
- Black Hatchback
- 2000cc Automatic
- Petrol

VALVE TIMING ENGINE (VVT) ENGINE
TORQUE 6 SPEED AUTOMATIC
C +SAFETY FEATURES+ DYNAMIC

Dealer, MANAWATU WANGANUI

CALL NOW: 06 8264200

Advanced Features

- At least three regular expression functions have been performed to extract information.

```
def split_feature(features):  
    #splits the sting returned from get_features by using several regex expressi  
    ons to extract details about the car  
    #list of features extracted from https://www.autotrader.co.nz/advanced-search  
    h  
    feature = features.split("\n")  
    listBodytype = ["4X4", "4x4", "Convertible", "Coupe", "Hatchback", "People M  
over", "Sedan", "Small Truck", "SUV", "Suv", "Ute", "Van And Minivan", "Wagon"]  
    listTransmission = ["Automatic", "Continuous Variable", "Manual", "Tiptroni  
c"]  
    listcolour = ["Beige", "Black", "Blue", "Bronze", "Brown", "Gold", "Green",  
"Grey", "Maroon", "Orange", "Pink", "Purple", "Red", "Silver", "White", "Yellow"]  
    listfueltype = ["Diesel", "Dual Fuel", "Electric", "Hybrid", "Lpg", "Petrol"  
, "Unleaded"]
```

2015 Mazda Axela

\$22,690

- 26,312km
- Black Hatchback
- 2000cc Automatic
- Petrol

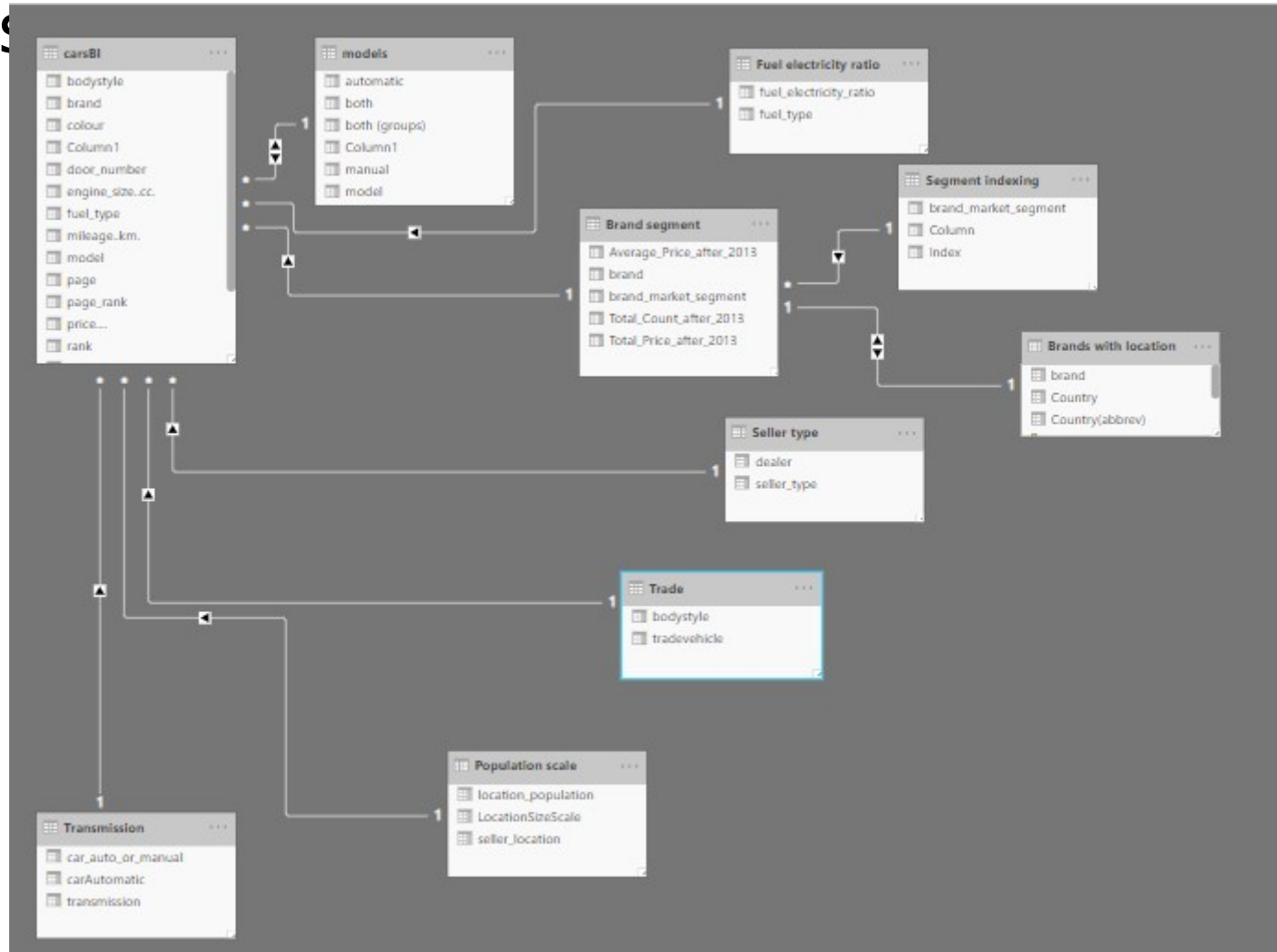
VALVE TIMING ENGINE (VVT) ENGINE
TORQUE 6 SPEED AUTOMATIC
C +SAFETY FEATURES+ DYNAMIC

Dealer, MANAWATU WANGANUI

CALL NOW: 06 8264200

Advanced Features

- Include at least three relational datasets in your Power BI reports



seller_location ▾	location_population ▾	LocationSizeScale ▾
Auckland	1695900	Auckland
Bay Of Plenty	305700	Moderately Large Region/City
Canterbury	624200	Large Region/City
Hawkes Bay	165900	Normal Region/City
Manawatu Wanganui	243700	Moderately Large Region/City
Marlborough	46600	Small Region/City
Nelson	51900	Small Region/City
Northland	179100	Normal Region/City
Otago	229200	Moderately Large Region/City
Southland	99100	Normal Region/City
Taranaki	119600	Normal Region/City
Tauranga	135000	Normal Region/City
Waikato	468800	Large Region/City
Wairarapa	10450	Small Region/City
Wellington	521500	Large Region/City
West Coast	32600	Small Region/City

brand ▼	Country ▼	Country(abbrev) ▼
Alfa Romeo	Italy	Italy
Asia	South Korea	Korea
Aston Martin	United Kingdom	UK
Audi	Germany	Germany
Bentley	United Kingdom	UK
BMW	Germany	Germany
Buick	United States of America	USA
Cadillac	United States of America	USA
Chery	China	China
Chevrolet	United States of America	USA
Chrysler	United States of America	USA
Citroen	France	France

brand ▼	Total_Price_after_2013 ▼	Total_Count_after_2013 ▼	Average_Price_after_2013 ▼	brand_market_segment ▼
Alfa Romeo	996455	11	90586	Prestige
Aston Martin	1787965	7	255423	Luxury
Audi	8305456	135	61521	Premium
Bentley	1120990	5	224198	Luxury
BMW	11776286	208	56616	Premium
Buick				
Cadillac				
Chery	45685	4	11421	Budget
Chevrolet	2208345	21	105159	Prestige

Advanced Features

- Use at least three DAX formula in your Power BI modelling

```
1 Total_Price_after_2013 = CALCULATE(Sum(carsBI[price....]), FILTER (FILTER(all(carsBI), 'Brand segment'[brand] = carsBI[brand]), carsBI[year] >= 2013))
```

Total_Price_after_2013	Total_Count_after_2013	Average_Price_after_2013	brand_market_segment
996455	11	90586	Prestige
1787065	7	255123	Luxury

Advanced Features

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```
1 Total_Count_after_2013 = CALCULATE(Count(carsBI[brand]), FILTER (FILTER(all(carsBI), 'Brand segment'[brand] = carsBI[brand]), carsBI[year] >= 2013))
```

Total_Price_after_2013 ▼ Total_Count_after_2013 ▼ Average_Price_after_2013 ▼ brand_market_segment ▼

Advanced Features

- Use at least three DAX formula in your Power BI modelling.

```
1 Average_Price_after_2013 = INT('Brand segment'[Total_Price_after_2013] / 'Brand segment'[Total_Count_after_2013])
```

Total_Price_after_2013 ▼

Total_Count_after_2013 ▼

Average_Price_after_2013 ▼

brand_market_segment ▼

Advanced Features

- Use at least three DAX formula in your Power BI modelling.

<div>✕ ✓</div> <div>1 brand_market_segment = IF('Brand segment'[brand] = "Range Rover", "Prestige", IF('Brand segment'[Average_Price_after_2013] > 150000, "Luxury", IF('Brand segment'[Average_Price_after_2013] > 90000, "Prestige", IF('Brand segment'[Average_Price_after_2013] > 50000, "Premium", IF('Brand segment'[Average_Price_after_2013] > 40000, "Mid Level", IF('Brand segment'[Average_Price_after_2013] > 30000, "Economy", IF('Brand segment'[Average_Price_after_2013] > 20000, "Entry Level", IF('Brand segment'[Average_Price_after_2013] > 0, "Budget"))))))))</div>					
brand	Total_Price_after_2013	Total_Count_after_2013	Average_Price_after_2013	brand_market_segment	
Alfa Romeo	996455	11	90586	Prestige	
Aston Martin	1787965	7	255423	Luxury	

Advanced Features

- Use at least three DAX formula in your Power BI modelling

✕

✓

1 LocationSizeScale = IF('Population scale'[location_population] > 1000000, "Auckland", IF('Population scale'[location_population] > 400000, "Large Region/City" , IF('Population scale'[location_population] > 200000, "Moderately Large Region/City" , IF('Population scale'[location_population] > 90000, "Normal Region/City", "Small Region/City"))))

seller_location	location_population	LocationSizeScale
Auckland	1695900	Auckland
Bay Of Plenty	305700	Moderately Large Region/City
Canterbury	624200	Large Region/City
Hawkes Bay	165900	Normal Region/City
Manawatu Wanganui	243700	Moderately Large Region/City
Marlborough	46600	Small Region/City
Nelson	51900	Small Region/City
Northland	179100	Normal Region/City
Otago	229200	Moderately Large Region/City
Southland	99100	Normal Region/City
Taranaki	119600	Normal Region/City
Tauranga	135000	Normal Region/City
Waikato	468800	Large Region/City
Wairarapa	10450	Small Region/City
Wellington	521500	Large Region/City

Advanced Features

- Use at least three DAX formula in your Power BI modelling.

✕

✓

1 tradevehicle = IF('Trade'[bodystyle] = "People Mover" || 'Trade'[bodystyle] = "Small Truck" || 'Trade'[bodystyle] = "Ute" || 'Trade'[bodystyle] = "Van And Minivan" || 'Trade'[bodystyle] = "Wagon","Trade", "Non_Trade")

bodystyle	tradevehicle
4X4	Non_Trade
Convertible	Non_Trade
Coupe	Non_Trade
Hatchback	Non_Trade
People Mover	Trade
Sedan	Non_Trade
Small Truck	Trade
Suv	Non_Trade
Ute	Trade
Van And Minivan	Trade
Wagon	Trade

Advanced Features

- Use at least three DAX formula in your Power BI modelling.

<div>✕ ✓</div> <div>1 car_auto_or_manual = IF(Transmission[carAutomatic] = 1,"Manual", "Automatic")</div>		
transmission	carAutomatic	car_auto_or_manual
Manual	1	Manual
Automatic	0	Automatic
Continuous Variable	0	Automatic
Tiptronic	0	Automatic

Thanks for your time!

- Q/A