2) Private transport

August 8, 2023

1 1) Preparación previa

1.0.1 Carga de librerías

[1]:
```
# Se debe instalar mpu
import mpu #pip install git+https://github.com/MartinThoma/mpu.git
import pandas as pd
import re
import numpy as np
import seaborn as sns
```

1.0.2 Funciones a usar luego

[2]:
```
# La siguiente función nos permite definir la distancia en latitud y longitud␣
 ↪respecto de los puentes:
def distancia(lat, long):
    aux = []
    for index, row in puentes_pilar.iterrows():
        aux.append(
            mpu.haversine_distance(
                (row['Latitud'], row['Longitud']),
                (lat, long)
            )
        )
    return min(aux)

# La siguiente función nos permite aplicar íconos a los marcadores según su␣
 ↪quantil:
def marca_propiedad(lat, long, quantile):
    if quantile == 0:
        icono_prop = icon0
    elif quantile == 1:
        icono_prop = icon1
    elif quantile == 2:
        icono_prop = icon2
    else:
        icono_prop = icon3
```

```
    marker = Marker(location=(lat,long), draggable=False, icon=icono_prop)
    basic_map.add_layer(marker)
```

1.0.3 Lectura del dataset limpiado en la notebook de análisis

[3]:
```
data = pd.read_csv('DF_Final.csv')
data.head()
```

[3]:

	property_type	lat	lon	price	currency	\
0	PH	-34.661824	-58.508839	62000.0	USD	
1	apartment	-34.652262	-58.522982	72000.0	USD	
2	apartment	-38.002626	-57.549447	64000.0	USD	
3	PH	-34.532957	-58.521782	130000.0	USD	
4	apartment	-34.559873	-58.443362	138000.0	USD	

	price_aprox_local_currency	price_aprox_usd	surface_total_in_m2	\
0	1093959.0	62000.0	55.0	
1	1270404.0	72000.0	55.0	
2	1129248.0	64000.0	35.0	
3	2293785.0	130000.0	106.0	
4	2434941.0	138000.0	45.0	

	surface_covered_in_m2	price_usd_per_m2	price_per_m2	Pais	\
0	40.0	1127.272727	1550.000000	Argentina	
1	55.0	1309.090909	1309.090909	Argentina	
2	35.0	1828.571429	1828.571429	Argentina	
3	78.0	1226.415094	1666.666667	Argentina	
4	40.0	3066.666667	3450.000000	Argentina	

	Zona	Partido	Barrios	Country	Otra	TC	\
0	Capital Federal	Mataderos	NaN	NaN	NaN	17.6445	
1	Capital Federal	Mataderos	NaN	NaN	NaN	17.6445	
2	Buenos Aires Costa Atlántica	Mar del Plata	Centro	NaN	NaN	17.6445	
3	Bs.As. G.B.A. Zona Norte	Vicente López	Munro	NaN	NaN	17.6445	
4	Capital Federal	Belgrano	NaN	NaN	NaN	17.6445	

	superficie	Precio_USD_por_M2
0	55.0	1127.272727
1	55.0	1309.090909
2	35.0	1828.571429
3	106.0	1226.415094
4	45.0	3066.666667

1.0.4 Filtro del DF

[4]:
```
# Máscara para obtener los pertenecientes a Pilar
mascara_pilar = data.Partido == 'Pilar'
df_solo_pilar = data.loc[mascara_pilar, :]
df_solo_pilar.head()
```

[4]:
```
   property_type        lat        lon     price currency  \
15     apartment        NaN        NaN   82000.0      USD
19         house -34.479486 -58.984541  650000.0      USD
22         house -34.453857 -58.840181  178000.0      USD
28         house -34.463098 -58.902199  400000.0      USD
31         house -34.477862 -58.909167  128000.0      USD

    price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
15                   1446849.0          82000.0                 48.0
19                  11468925.0         650000.0                425.0
22                   3140721.0         178000.0                150.0
28                   7057800.0         400000.0                400.0
31                   2258496.0         128000.0                120.0

    surface_covered_in_m2  price_usd_per_m2  price_per_m2       Pais  \
15                   42.0       1708.333333   1952.380952  Argentina
19                  425.0       1529.411765   1529.411765  Argentina
22                  150.0       1186.666667   1186.666667  Argentina
28                  400.0       1000.000000   1000.000000  Argentina
31                  120.0       1066.666667   1066.666667  Argentina

                       Zona Partido              Barrios Country  Otra  \
15  Bs.As. G.B.A. Zona Norte   Pilar                Pilar     NaN   NaN
19  Bs.As. G.B.A. Zona Norte   Pilar  Estancias del Pilar     NaN   NaN
22  Bs.As. G.B.A. Zona Norte   Pilar                  NaN     NaN   NaN
28  Bs.As. G.B.A. Zona Norte   Pilar                Pilar     NaN   NaN
31  Bs.As. G.B.A. Zona Norte   Pilar                  NaN     NaN   NaN

         TC  superficie  Precio_USD_por_M2
15  17.6445        48.0        1708.333333
19  17.6445       425.0        1529.411765
22  17.6445       150.0        1186.666667
28  17.6445       400.0        1000.000000
31  17.6445       120.0        1066.666667
```

[5]:
```
# Máscara para obtener las viviendas que no son countries
pilar_partido = df_solo_pilar.isin({'Barrios':['Pilar', 'Del Viso', 'Derqui',␣
 ↪'Villa Rosa', 'Villa Stolfi', 'Manuel Alberti', 'Manzanares'] })
pilar_sincountry = df_solo_pilar[pilar_partido['Barrios']]
pilar_sincountry.head()
```

[5]:
```
   property_type        lat        lon     price currency  \
15     apartment        NaN        NaN   82000.0      USD
28         house -34.463098 -58.902199  400000.0      USD
32     apartment -34.444743 -58.795248  120000.0      USD
35         house -34.451624 -58.916545  320000.0      USD
36     apartment -34.464913 -58.859600   47000.0      USD

    price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
15                   1446849.0          82000.0                 48.0
28                   7057800.0         400000.0                400.0
32                   2117340.0         120000.0                138.0
35                   5646240.0         320000.0                209.0
36                    829291.5          47000.0                 30.0

    surface_covered_in_m2  price_usd_per_m2  price_per_m2       Pais  \
15                   42.0       1708.333333   1952.380952  Argentina
28                  400.0       1000.000000   1000.000000  Argentina
32                   74.0        869.565217   1621.621622  Argentina
35                  209.0       1531.100478   1531.100478  Argentina
36                   30.0       1566.666667   1566.666667  Argentina

                       Zona Partido   Barrios Country  Otra       TC  \
15  Bs.As. G.B.A. Zona Norte   Pilar     Pilar     NaN   NaN  17.6445
28  Bs.As. G.B.A. Zona Norte   Pilar     Pilar     NaN   NaN  17.6445
32  Bs.As. G.B.A. Zona Norte   Pilar  Del Viso     NaN   NaN  17.6445
35  Bs.As. G.B.A. Zona Norte   Pilar     Pilar     NaN   NaN  17.6445
36  Bs.As. G.B.A. Zona Norte   Pilar     Pilar     NaN   NaN  17.6445

    superficie  Precio_USD_por_M2
15        48.0        1708.333333
28       400.0        1000.000000
32       138.0         869.565217
35       209.0        1531.100478
36        30.0        1566.666667
```

[6]:
```
# Máscara para obtener las viviendas que son countries
pilar_country = df_solo_pilar[~pilar_partido ['Barrios']]
pilar_country.head()
```

[6]:
```
   property_type        lat        lon     price currency  \
19         house -34.479486 -58.984541  650000.0      USD
22         house -34.453857 -58.840181  178000.0      USD
31         house -34.477862 -58.909167  128000.0      USD
33         house        NaN        NaN   74000.0      USD
34     apartment -34.439434 -58.798703   79000.0      USD

    price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
```

```
19                  11468925.0         650000.0                425.0
22                   3140721.0         178000.0                150.0
31                   2258496.0         128000.0                120.0
33                   1305693.0          74000.0                 47.0
34                   1393915.5          79000.0                 32.0

    surface_covered_in_m2  price_usd_per_m2  price_per_m2       Pais  \
19                  425.0       1529.411765   1529.411765  Argentina
22                  150.0       1186.666667   1186.666667  Argentina
31                  120.0       1066.666667   1066.666667  Argentina
33                   47.0       1574.468085   1574.468085  Argentina
34                   32.0       2468.750000   2468.750000  Argentina

                        Zona Partido              Barrios Country  Otra  \
19  Bs.As. G.B.A. Zona Norte   Pilar  Estancias del Pilar     NaN   NaN
22  Bs.As. G.B.A. Zona Norte   Pilar                  NaN     NaN   NaN
31  Bs.As. G.B.A. Zona Norte   Pilar                  NaN     NaN   NaN
33  Bs.As. G.B.A. Zona Norte   Pilar                  NaN     NaN   NaN
34  Bs.As. G.B.A. Zona Norte   Pilar                  NaN     NaN   NaN

         TC  superficie  Precio_USD_por_M2
19  17.6445       425.0        1529.411765
22  17.6445       150.0        1186.666667
31  17.6445       120.0        1066.666667
33  17.6445        47.0        1574.468085
34  17.6445        32.0        2468.750000
```

[7]:
```
# Máscara para eliminar valores menores a 1
precio_pilar_sin_country = pilar_sincountry['price_aprox_usd'] > 0 # or np.isNan
df_ppsc = pilar_sincountry.loc[precio_pilar_sin_country, :]
# Verificación de valores NaN -> ppsc = partido pilar sin country
df_ppsc.sort_values(by = 'price_aprox_usd', ascending = False)
```

[7]:
```
      property_type        lat        lon      price currency  \
30846         store -34.457951 -58.914788  3500000.0      USD
44869         store        NaN        NaN  3400000.0      USD
36302         store        NaN        NaN  3200000.0      USD
36114         store        NaN        NaN  2400000.0      USD
20275         house        NaN        NaN  1800000.0      USD
…               …          …          …          …        …
5810          store -34.464691 -58.859894    40000.0      USD
4881          house -34.442445 -58.798133    40000.0      USD
5803          store -34.464691 -58.859894    38500.0      USD
4880          house        NaN        NaN   500000.0      ARS
4876      apartment        NaN        NaN    25000.0      USD

       price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
```

```
30846                61755750.00       3500000.00              1820.0
44869                59991300.00       3400000.00              2200.0
36302                56462400.00       3200000.00              5000.0
36114                42346800.00       2400000.00             10000.0
20275                31760100.00       1800000.00              3376.0
…                          …                 …                    …
5810                   705780.00         40000.00                38.0
4881                   705780.00         40000.00                80.0
5803                   679313.25         38500.00                40.0
4880                   494784.06         28041.83                64.0
4876                   441112.50         25000.00                35.0

       surface_covered_in_m2  price_usd_per_m2  price_per_m2       Pais  \
30846                 1820.0       1923.076923   1923.076923  Argentina
44869                 2200.0       1545.454545   1545.454545  Argentina
36302                 5000.0        640.000000    640.000000  Argentina
36114                 7788.0        240.000000    308.166410  Argentina
20275                  681.0        533.175355   2643.171806  Argentina
…                        …                …             …          …
5810                    38.0       1052.631579   1052.631579  Argentina
4881                    80.0        500.000000    500.000000  Argentina
5803                    40.0        962.500000    962.500000  Argentina
4880                    64.0        438.153594   7812.500000  Argentina
4876                    35.0        714.285714    714.285714  Argentina

                          Zona Partido     Barrios Country  Otra       TC  \
30846  Bs.As. G.B.A. Zona Norte   Pilar       Pilar     NaN   NaN  17.6445
44869  Bs.As. G.B.A. Zona Norte   Pilar       Pilar     NaN   NaN  17.6445
36302  Bs.As. G.B.A. Zona Norte   Pilar  Villa Rosa     NaN   NaN  17.6445
36114  Bs.As. G.B.A. Zona Norte   Pilar       Pilar     NaN   NaN  17.6445
20275  Bs.As. G.B.A. Zona Norte   Pilar    Del Viso     NaN   NaN  17.6445
…                          …     …          …     …   …      …
5810   Bs.As. G.B.A. Zona Norte   Pilar       Pilar     NaN   NaN  17.6445
4881   Bs.As. G.B.A. Zona Norte   Pilar    Del Viso     NaN   NaN  17.6445
5803   Bs.As. G.B.A. Zona Norte   Pilar       Pilar     NaN   NaN  17.6445
4880   Bs.As. G.B.A. Zona Norte   Pilar    Del Viso     NaN   NaN  17.6445
4876   Bs.As. G.B.A. Zona Norte   Pilar      Derqui     NaN   NaN  17.6445

       superficie  Precio_USD_por_M2
30846      1820.0        1923.076923
44869      2200.0        1545.454545
36302      5000.0         640.000000
36114     10000.0         240.000000
20275      3376.0         533.175355
…             …                  …
5810         38.0        1052.631579
4881         80.0         500.000000
```

```
5803         40.0         962.500000
4880         64.0         438.153594
4876         35.0         714.285714

[437 rows x 20 columns]
```

1.0.5 Eliminación de los valores nulos

[8]:
```
df_ppsc_latlon = df_ppsc.dropna(subset=['lat', 'lon'])
df_ppsc_latlon.shape
```

[8]:
```
(167, 20)
```

[9]:
```
# Se procede también con la columna 'Precio_USD_por_M2'
df_ppsc_latlon_con_precio = df_ppsc_latlon[df_ppsc_latlon['Precio_USD_por_M2'].
 ↪notna()]
df_ppsc_latlon_con_precio
```

[9]:
```
      property_type        lat        lon     price currency  \
28            house -34.463098 -58.902199  400000.0      USD
32        apartment -34.444743 -58.795248  120000.0      USD
35            house -34.451624 -58.916545  320000.0      USD
36        apartment -34.464913 -58.859600   47000.0      USD
37               PH -34.451855 -58.903567  165000.0      USD
…               …        …         …       …        …
58666     apartment -34.421330 -58.889259  120000.0      USD
60155     apartment -34.425468 -58.886273  123000.0      USD
60201     apartment -34.454642 -58.859689   80000.0      USD
60822         house -34.442290 -58.755595  174000.0      USD
61784     apartment -34.455906 -58.908329   79000.0      USD

       price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
28                      7057800.0         400000.0                400.0
32                      2117340.0         120000.0                138.0
35                      5646240.0         320000.0                209.0
36                       829291.5          47000.0                 30.0
37                      2911342.5         165000.0                140.0
…                             …                …                   …
58666                   2117340.0         120000.0                102.0
60155                   2170273.5         123000.0                 79.0
60201                   1411560.0          80000.0                 30.0
60822                   3070143.0         174000.0                190.0
61784                   1393915.5          79000.0                 67.0

       surface_covered_in_m2  price_usd_per_m2  price_per_m2       Pais  \
28                     400.0       1000.000000   1000.000000  Argentina
32                      74.0        869.565217   1621.621622  Argentina
```

```
35                    209.0       1531.100478   1531.100478  Argentina
36                     30.0       1566.666667   1566.666667  Argentina
37                    140.0       1178.571429   1178.571429  Argentina
…                     …               …             …         …
58666                  62.0       1176.470588   1935.483871  Argentina
60155                  59.0       1556.962025   2084.745763  Argentina
60201                  30.0       2666.666667   2666.666667  Argentina
60822                 120.0        915.789474   1450.000000  Argentina
61784                  67.0       1179.104478   1179.104478  Argentina

                          Zona Partido         Barrios Country  Otra  \
28     Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN   NaN
32     Bs.As. G.B.A. Zona Norte   Pilar        Del Viso     NaN   NaN
35     Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN   NaN
36     Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN   NaN
37     Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN   NaN
…                          …     …               …     …   …
58666  Bs.As. G.B.A. Zona Norte   Pilar      Villa Rosa     NaN   NaN
60155  Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN   NaN
60201  Bs.As. G.B.A. Zona Norte   Pilar          Derqui     NaN   NaN
60822  Bs.As. G.B.A. Zona Norte   Pilar  Manuel Alberti     NaN   NaN
61784  Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN   NaN

            TC  superficie  Precio_USD_por_M2
28     17.6445       400.0        1000.000000
32     17.6445       138.0         869.565217
35     17.6445       209.0        1531.100478
36     17.6445        30.0        1566.666667
37     17.6445       140.0        1178.571429
…        …          …                …
58666  17.6445       102.0        1176.470588
60155  17.6445        79.0        1556.962025
60201  17.6445        30.0        2666.666667
60822  17.6445       190.0         915.789474
61784  17.6445        67.0        1179.104478

[167 rows x 20 columns]
```

2 2) Análisis del DF sin countries

2.0.1 Definición de cuantiles

[10]:
```
df_ppsc_latlon_con_precio['quantile'] = pd.
 ↪qcut(df_ppsc_latlon_con_precio['Precio_USD_por_M2'], 4, labels=False)
df_ppsc_latlon_con_precio.round(3)
```

[10]:

	property_type	lat	lon	price	currency	\
28	house	-34.463	-58.902	400000.0	USD	
32	apartment	-34.445	-58.795	120000.0	USD	
35	house	-34.452	-58.917	320000.0	USD	
36	apartment	-34.465	-58.860	47000.0	USD	
37	PH	-34.452	-58.904	165000.0	USD	
…	…	…	…	…	…	
58666	apartment	-34.421	-58.889	120000.0	USD	
60155	apartment	-34.425	-58.886	123000.0	USD	
60201	apartment	-34.455	-58.860	80000.0	USD	
60822	house	-34.442	-58.756	174000.0	USD	
61784	apartment	-34.456	-58.908	79000.0	USD	

	price_aprox_local_currency	price_aprox_usd	surface_total_in_m2	\
28	7057800.0	400000.0	400.0	
32	2117340.0	120000.0	138.0	
35	5646240.0	320000.0	209.0	
36	829291.5	47000.0	30.0	
37	2911342.5	165000.0	140.0	
…	…	…	…	
58666	2117340.0	120000.0	102.0	
60155	2170273.5	123000.0	79.0	
60201	1411560.0	80000.0	30.0	
60822	3070143.0	174000.0	190.0	
61784	1393915.5	79000.0	67.0	

	surface_covered_in_m2	price_usd_per_m2	…	Pais	\
28	400.0	1000.000	…	Argentina	
32	74.0	869.565	…	Argentina	
35	209.0	1531.100	…	Argentina	
36	30.0	1566.667	…	Argentina	
37	140.0	1178.571	…	Argentina	
…	…	…	…	…	
58666	62.0	1176.471	…	Argentina	
60155	59.0	1556.962	…	Argentina	
60201	30.0	2666.667	…	Argentina	
60822	120.0	915.789	…	Argentina	
61784	67.0	1179.104	…	Argentina	

	Zona	Partido	Barrios	Country	Otra	TC	\
28	Bs.As. G.B.A. Zona Norte	Pilar	Pilar	NaN	NaN	17.644	
32	Bs.As. G.B.A. Zona Norte	Pilar	Del Viso	NaN	NaN	17.644	
35	Bs.As. G.B.A. Zona Norte	Pilar	Pilar	NaN	NaN	17.644	
36	Bs.As. G.B.A. Zona Norte	Pilar	Pilar	NaN	NaN	17.644	
37	Bs.As. G.B.A. Zona Norte	Pilar	Pilar	NaN	NaN	17.644	
…	…	…	…	…	…	…	
58666	Bs.As. G.B.A. Zona Norte	Pilar	Villa Rosa	NaN	NaN	17.644	

```
60155  Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN  NaN  17.644
60201  Bs.As. G.B.A. Zona Norte   Pilar          Derqui     NaN  NaN  17.644
60822  Bs.As. G.B.A. Zona Norte   Pilar  Manuel Alberti     NaN  NaN  17.644
61784  Bs.As. G.B.A. Zona Norte   Pilar           Pilar     NaN  NaN  17.644

       superficie  Precio_USD_por_M2  quantile
28          400.0           1000.000         1
32          138.0            869.565         0
35          209.0           1531.100         2
36           30.0           1566.667         2
37          140.0           1178.571         1
…               …                  …       …
58666       102.0           1176.471         1
60155        79.0           1556.962         2
60201        30.0           2666.667         3
60822       190.0            915.789         0
61784        67.0           1179.104         1

[167 rows x 21 columns]
```

2.0.2 Métricas generales del DF sin countries

[11]:
```
medidas_ppsc = df_ppsc_latlon_con_precio[["Precio_USD_por_M2"]].describe().
↪round(2)
medidas_ppsc
```

[11]:
```
       Precio_USD_por_M2
count             167.00
mean             1379.50
std               996.66
min                83.33
25%               930.12
50%              1333.33
75%              1727.27
max             10428.57
```

2.0.3 Agrupación según barrios

[12]:
```
df_ppsc_agrup = df_ppsc_latlon_con_precio.groupby('Barrios')
df_ppsc_agrup
```

[12]:
```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x0000022F2EE1EB50>
```

2.0.4 Métricas del DF agrupado sin countries

[13]:
```
medidas_ppsc_agrup = df_ppsc_agrup[["Precio_USD_por_M2"]].describe().round(2)
medidas_ppsc_agrup
```

[13]:

	Precio_USD_por_M2						
	count	mean	std	min	25%	50%	75%	max
Barrios								
Del Viso	19.0	892.60	924.66	98.48	420.08	659.26	1037.97	4411.76
Derqui	13.0	2110.17	951.14	190.00	2061.14	2196.05	2601.62	3636.36
Manuel Alberti	4.0	624.02	475.29	83.33	307.02	648.68	965.69	1115.38
Manzanares	10.0	1044.50	497.43	200.00	982.57	1074.53	1331.25	1727.27
Pilar	108.0	1494.31	1027.80	225.00	1081.08	1460.28	1744.50	10428.57
Villa Rosa	13.0	896.79	532.87	96.47	350.00	959.75	1359.22	1692.31

[14]:
```
# Orden según la media
medidas_ppsc_agrup.sort_values(by=[('Precio_USD_por_M2', 'mean')], ascending =␣
↪False)
```

[14]:

	Precio_USD_por_M2						
	count	mean	std	min	25%	50%	75%	max
Barrios								
Derqui	13.0	2110.17	951.14	190.00	2061.14	2196.05	2601.62	3636.36
Pilar	108.0	1494.31	1027.80	225.00	1081.08	1460.28	1744.50	10428.57
Manzanares	10.0	1044.50	497.43	200.00	982.57	1074.53	1331.25	1727.27
Villa Rosa	13.0	896.79	532.87	96.47	350.00	959.75	1359.22	1692.31
Del Viso	19.0	892.60	924.66	98.48	420.08	659.26	1037.97	4411.76
Manuel Alberti	4.0	624.02	475.29	83.33	307.02	648.68	965.69	1115.38

3 3) Preparación del DF con countries

3.0.1 Eliminación de valores inconsistentes

[15]:
```
# Máscara para eliminar valores menores a 1 | ppc = partido pilar countries
precio_pilar_country = pilar_country['price_aprox_usd'] > 1
df_ppc = pilar_country.loc[precio_pilar_country, :]
# Verificación de valores NaN
df_ppc.sort_values(by = 'price_aprox_usd', ascending = False)
```

[15]:

	property_type	lat	lon	price	currency	\
56100	house	NaN	NaN	3000000.0	USD	
47565	house	NaN	NaN	2400000.0	USD	
18156	house	-34.452847	-58.736390	2200000.0	USD	
19686	house	-34.452847	-58.736390	2200000.0	USD	
47718	house	NaN	NaN	2000000.0	USD	
…	…	…	…	…	…	
23518	house	-34.436673	-58.798789	450000.0	ARS	
28926	apartment	NaN	NaN	23000.0	USD	
54170	house	NaN	NaN	385000.0	ARS	
6127	house	-34.387635	-58.870692	220000.0	ARS	
7034	house	-34.439894	-58.947104	150000.0	ARS	

	price_aprox_local_currency	price_aprox_usd	surface_total_in_m2	\
56100	52933500.00	3000000.00	360.0	
47565	42346800.00	2400000.00	837.0	
18156	38817900.00	2200000.00	1266.0	
19686	38817900.00	2200000.00	647.0	
47718	35289000.00	2000000.00	864.0	
…	…	…	…	
23518	445305.71	25237.65	240.0	
28926	405823.50	23000.00	450.0	
54170	380983.74	21592.21	300.0	
6127	217704.89	12338.40	179.0	
7034	148435.23	8412.55	154.0	

	surface_covered_in_m2	price_usd_per_m2	price_per_m2	Pais	\
56100	360.0	8333.333333	8333.333333	Argentina	
47565	688.0	2867.383513	3488.372093	Argentina	
18156	683.0	1737.756714	3221.083455	Argentina	
19686	647.0	3400.309119	3400.309119	Argentina	
47718	704.0	2314.814815	2840.909091	Argentina	
…	…	…	…	…	
23518	240.0	105.156875	1875.000000	Argentina	
28926	450.0	51.111111	51.111111	Argentina	
54170	270.0	71.974033	1425.925926	Argentina	
6127	179.0	68.929609	1229.050279	Argentina	
7034	100.0	54.626948	1500.000000	Argentina	

```
                            Zona Partido                          Barrios  \
56100  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
47565  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
18156  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
19686  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
47718  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
…                          …     …                                  …
23518  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
28926  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
54170  Bs.As. G.B.A. Zona Norte   Pilar                              NaN
6127   Bs.As. G.B.A. Zona Norte   Pilar  Barrio Cerrado Las Casuarinas
7034   Bs.As. G.B.A. Zona Norte   Pilar                              NaN

      Country  Otra         TC  superficie  Precio_USD_por_M2
56100     NaN   NaN  17.644500       360.0        8333.333333
47565     NaN   NaN  17.644500       837.0        2867.383513
18156     NaN   NaN  17.644500      1266.0        1737.756714
19686     NaN   NaN  17.644500       647.0        3400.309119
47718     NaN   NaN  17.644500       864.0        2314.814815
…         …   …         …          …                  …
23518     NaN   NaN  17.644500       240.0         105.156875
28926     NaN   NaN  17.644500       450.0          51.111111
54170     NaN   NaN  17.644500       300.0          71.974033
6127      NaN   NaN  17.644499       179.0          68.929609
7034      NaN   NaN  17.644499       154.0          54.626948

[1764 rows x 20 columns]
```

[16]:
```
# Eliminación de los nulos de la columna LAT y LON
df_ppc_latlon = df_ppc.dropna(subset=['lat', 'lon'])
df_ppc_latlon.shape
```

[16]:
```
(809, 20)
```

3.0.2 Creación de nuevo DF con puentes

[17]:
```
# Ubicación de los puentes de la panamericana - ramal pilar
puentes_pilar = pd.DataFrame({
    'Nombre': ['Separacion', 'Tortugas', '26', 'Camaño', 'Palmas', '25',␣
 ↪'Manzanares','6'],
    'Latitud': [-34.468040, -34.448354, -34.440682, -34.436667, -34.443766, -34.
 ↪449550, -34.441083, -34.395740],
    'Longitud': [-58.685014, -58.748577, -58.782740, -58.828145, -58.872848,␣
 ↪-58.905720, -58.966898, -59.022886]
})
```

[18]:
```
print(puentes_pilar)
```

```
      Nombre    Latitud   Longitud
0  Separacion -34.468040 -58.685014
1    Tortugas -34.448354 -58.748577
2          26 -34.440682 -58.782740
3      Camaño -34.436667 -58.828145
4      Palmas -34.443766 -58.872848
5          25 -34.449550 -58.905720
6  Manzanares -34.441083 -58.966898
7           6 -34.395740 -59.022886
```

3.0.3 Cálculo de la distancia hacia los puentes

[19]:
```
%%capture output
# Cálculo d la distancia de las propiedades hacia los puentes en una nueva␣
 ↪columna
df_ppc_latlon['distancia'] = df_ppc_latlon.apply(lambda x: distancia(x['lat'],␣
 ↪x['lon']), axis=1)
df_ppc_latlon
```

3.0.4 Eliminación de los nulos del precio por metro cuadrado

[20]:
```
df_ppc_latlon_con_precio = df_ppc_latlon[df_ppc_latlon['Precio_USD_por_M2'].
 ↪notna()]
df_ppc_latlon_con_precio
```

[20]:
```
      property_type        lat        lon     price currency  \
19            house -34.479486 -58.984541  650000.0      USD
22            house -34.453857 -58.840181  178000.0      USD
31            house -34.477862 -58.909167  128000.0      USD
34        apartment -34.439434 -58.798703   79000.0      USD
226           house -34.477862 -58.909167  285000.0      USD
…               …        …        …       …        …
61840         house -34.477862 -58.909167  205000.0      USD
61886         house -34.374953 -58.870534  125000.0      USD
61887         house -34.426117 -58.790351  890000.0      USD
61889         house -34.426117 -58.790351  269000.0      USD
62018         house -34.477862 -58.909167  320000.0      USD

       price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
19                     11468925.0         650000.0                425.0
22                      3140721.0         178000.0                150.0
31                      2258496.0         128000.0                120.0
34                      1393915.5          79000.0                 32.0
226                     5028682.5         285000.0                192.0
…                             …                …                   …
```

```
61840                   3617122.5         205000.0                170.0
61886                   2205562.5         125000.0                800.0
61887                  15703605.0         890000.0               2900.0
61889                   4746370.5         269000.0               1200.0
62018                   5646240.0         320000.0                312.0

       surface_covered_in_m2  price_usd_per_m2  …       Pais  \
19                     425.0       1529.411765  …  Argentina
22                     150.0       1186.666667  …  Argentina
31                     120.0       1066.666667  …  Argentina
34                      32.0       2468.750000  …  Argentina
226                    172.0       1484.375000  …  Argentina
…                      …               …  …       …
61840                  140.0       1205.882353  …  Argentina
61886                  100.0        156.250000  …  Argentina
61887                  470.0        306.896552  …  Argentina
61889                  180.0        224.166667  …  Argentina
62018                  312.0       1025.641026  …  Argentina

                           Zona Partido                    Barrios Country  \
19     Bs.As. G.B.A. Zona Norte   Pilar         Estancias del Pilar     NaN
22     Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
31     Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
34     Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
226    Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
…                          …     …                       …     …
61840  Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
61886  Bs.As. G.B.A. Zona Norte   Pilar                      Zelaya     NaN
61887  Bs.As. G.B.A. Zona Norte   Pilar  Highland Park Country Club     NaN
61889  Bs.As. G.B.A. Zona Norte   Pilar  Highland Park Country Club     NaN
62018  Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN

      Otra       TC  superficie  Precio_USD_por_M2  distancia
19     NaN  17.6445       425.0        1529.411765   4.566353
22     NaN  17.6445       150.0        1186.666667   2.207200
31     NaN  17.6445       120.0        1066.666667   3.163984
34     NaN  17.6445        32.0        2468.750000   1.470444
226    NaN  17.6445       192.0        1484.375000   3.163984
…    …      …          …               …        …
61840  NaN  17.6445       170.0        1205.882353   3.163984
61886  NaN  17.6445       800.0         156.250000   7.654613
61887  NaN  17.6445      2900.0         306.896552   1.763531
61889  NaN  17.6445      1200.0         224.166667   1.763531
62018  NaN  17.6445       312.0        1025.641026   3.163984

[809 rows x 21 columns]
```

3.0.5 Eliminación de outliers

[21]:
```
mask_latlon_con_precio = df_ppc_latlon_con_precio['distancia'] < 90
df_ppc_latlon_con_precio = df_ppc_latlon_con_precio.loc[mask_latlon_con_precio,␣
↪:]
```

3.0.6 Eliminación de barrios nulos

[22]:
```
mask_nulos = df_ppc_latlon_con_precio['Barrios'] != ""
df_final_countries = df_ppc_latlon_con_precio.loc[mask_nulos, :]
df_final_countries
```

[22]:

	property_type	lat	lon	price	currency	\
19	house	-34.479486	-58.984541	650000.0	USD	
22	house	-34.453857	-58.840181	178000.0	USD	
31	house	-34.477862	-58.909167	128000.0	USD	
34	apartment	-34.439434	-58.798703	79000.0	USD	
226	house	-34.477862	-58.909167	285000.0	USD	
…	…	…	…	…	…	
61840	house	-34.477862	-58.909167	205000.0	USD	
61886	house	-34.374953	-58.870534	125000.0	USD	
61887	house	-34.426117	-58.790351	890000.0	USD	
61889	house	-34.426117	-58.790351	269000.0	USD	
62018	house	-34.477862	-58.909167	320000.0	USD	

	price_aprox_local_currency	price_aprox_usd	surface_total_in_m2	\
19	11468925.0	650000.0	425.0	
22	3140721.0	178000.0	150.0	
31	2258496.0	128000.0	120.0	
34	1393915.5	79000.0	32.0	
226	5028682.5	285000.0	192.0	
…	…	…	…	
61840	3617122.5	205000.0	170.0	
61886	2205562.5	125000.0	800.0	
61887	15703605.0	890000.0	2900.0	
61889	4746370.5	269000.0	1200.0	
62018	5646240.0	320000.0	312.0	

	surface_covered_in_m2	price_usd_per_m2	…	Pais	\
19	425.0	1529.411765	…	Argentina	
22	150.0	1186.666667	…	Argentina	
31	120.0	1066.666667	…	Argentina	
34	32.0	2468.750000	…	Argentina	
226	172.0	1484.375000	…	Argentina	
…	…	…	…	…	
61840	140.0	1205.882353	…	Argentina	
61886	100.0	156.250000	…	Argentina	
61887	470.0	306.896552	…	Argentina	

```
61889                  180.0        224.166667  …  Argentina
62018                  312.0       1025.641026  …  Argentina

                            Zona Partido                     Barrios Country  \
19     Bs.As. G.B.A. Zona Norte   Pilar         Estancias del Pilar     NaN
22     Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
31     Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
34     Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
226    Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
…                          …     …                          …     …
61840  Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN
61886  Bs.As. G.B.A. Zona Norte   Pilar                      Zelaya     NaN
61887  Bs.As. G.B.A. Zona Norte   Pilar  Highland Park Country Club     NaN
61889  Bs.As. G.B.A. Zona Norte   Pilar  Highland Park Country Club     NaN
62018  Bs.As. G.B.A. Zona Norte   Pilar                         NaN     NaN

      Otra       TC  superficie  Precio_USD_por_M2  distancia
19     NaN  17.6445       425.0        1529.411765   4.566353
22     NaN  17.6445       150.0        1186.666667   2.207200
31     NaN  17.6445       120.0        1066.666667   3.163984
34     NaN  17.6445        32.0        2468.750000   1.470444
226    NaN  17.6445       192.0        1484.375000   3.163984
…    …      …          …                …         …
61840  NaN  17.6445       170.0        1205.882353   3.163984
61886  NaN  17.6445       800.0         156.250000   7.654613
61887  NaN  17.6445      2900.0         306.896552   1.763531
61889  NaN  17.6445      1200.0         224.166667   1.763531
62018  NaN  17.6445       312.0        1025.641026   3.163984

[808 rows x 21 columns]
```

4 4) Análisis del DF con countries

4.0.1 Armado de cuantiles

[23]:
```
df_final_countries['quantile'] = pd.
 ↪qcut(df_final_countries['Precio_USD_por_M2'], 4, labels=False)
df_final_countries.round(3)
```

[23]:
```
      property_type     lat     lon     price currency  \
19            house -34.479 -58.985  650000.0      USD
22            house -34.454 -58.840  178000.0      USD
31            house -34.478 -58.909  128000.0      USD
34        apartment -34.439 -58.799   79000.0      USD
226           house -34.478 -58.909  285000.0      USD
…             …     …     …        …      …
61840         house -34.478 -58.909  205000.0      USD
```

```
61886         house -34.375 -58.871  125000.0      USD
61887         house -34.426 -58.790  890000.0      USD
61889         house -34.426 -58.790  269000.0      USD
62018         house -34.478 -58.909  320000.0      USD

       price_aprox_local_currency  price_aprox_usd  surface_total_in_m2  \
19                     11468925.0         650000.0                425.0
22                      3140721.0         178000.0                150.0
31                      2258496.0         128000.0                120.0
34                      1393915.5          79000.0                 32.0
226                     5028682.5         285000.0                192.0
…                             …                …                    …
61840                   3617122.5         205000.0                170.0
61886                   2205562.5         125000.0                800.0
61887                  15703605.0         890000.0               2900.0
61889                   4746370.5         269000.0               1200.0
62018                   5646240.0         320000.0                312.0

       surface_covered_in_m2  price_usd_per_m2  …                    Zona  \
19                     425.0          1529.412  …  Bs.As. G.B.A. Zona Norte
22                     150.0          1186.667  …  Bs.As. G.B.A. Zona Norte
31                     120.0          1066.667  …  Bs.As. G.B.A. Zona Norte
34                      32.0          2468.750  …  Bs.As. G.B.A. Zona Norte
226                    172.0          1484.375  …  Bs.As. G.B.A. Zona Norte
…                          …                 …  …                       …
61840                  140.0          1205.882  …  Bs.As. G.B.A. Zona Norte
61886                  100.0           156.250  …  Bs.As. G.B.A. Zona Norte
61887                  470.0           306.897  …  Bs.As. G.B.A. Zona Norte
61889                  180.0           224.167  …  Bs.As. G.B.A. Zona Norte
62018                  312.0          1025.641  …  Bs.As. G.B.A. Zona Norte

      Partido                     Barrios Country Otra      TC  superficie  \
19      Pilar         Estancias del Pilar     NaN  NaN  17.644       425.0
22      Pilar                         NaN     NaN  NaN  17.644       150.0
31      Pilar                         NaN     NaN  NaN  17.644       120.0
34      Pilar                         NaN     NaN  NaN  17.644        32.0
226     Pilar                         NaN     NaN  NaN  17.644       192.0
…       …                           …     …  …     …         …
61840   Pilar                         NaN     NaN  NaN  17.644       170.0
61886   Pilar                      Zelaya     NaN  NaN  17.644       800.0
61887   Pilar  Highland Park Country Club     NaN  NaN  17.644      2900.0
61889   Pilar  Highland Park Country Club     NaN  NaN  17.644      1200.0
62018   Pilar                         NaN     NaN  NaN  17.644       312.0

       Precio_USD_por_M2  distancia  quantile
19              1529.412      4.566         2
22              1186.667      2.207         1
```

```
31              1066.667      3.164          1
34              2468.750      1.470          3
226             1484.375      3.164          2
…                    …          …          …
61840           1205.882      3.164          1
61886            156.250      7.655          0
61887            306.897      1.764          0
61889            224.167      1.764          0
62018           1025.641      3.164          1

[808 rows x 22 columns]
```

4.0.2 Métricas generales del DF con countries

[24]:
```
medidas_ppc = df_final_countries[["Precio_USD_por_M2"]].describe().round(2)
medidas_ppc
```

[24]:
```
       Precio_USD_por_M2
count             808.00
mean             1349.66
std               653.07
min                18.85
25%              1010.20
50%              1333.33
75%              1666.67
max              3745.90
```

4.0.3 Agrupación según barrios

[25]:
```
df_ppc_agrup = df_final_countries.groupby('Barrios')
df_ppc_agrup
```

[25]:
```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x0000022F2EEB6D10>
```

4.0.4 Métricas específicas del DF con countries agrupado

[26]:
```
medidas_ppc_agrup = df_ppc_agrup[["Precio_USD_por_M2"]].describe().round(2)
```

[27]:
```
# Orden según la media
medidas_ppc_agrup.sort_values(by=[('Precio_USD_por_M2', 'mean')], ascending =␣
↪False)
```

[27]:
```
                                  Precio_USD_por_M2                  \
                                              count     mean     std
Barrios
Pilar Golf Country Club                         1.0  3000.00     NaN
Altos del Pilar                                 1.0  2214.29     NaN
```

Country Farm Club	2.0	1911.11	0.00
Martindale Country Club	6.0	1873.62	443.56
Mayling Club de Campo	23.0	1607.44	296.47
Barrio Cerrado "Ayres Plaza"	12.0	1533.29	307.39
Barrio Cerrado "SpringDale"	1.0	1487.18	NaN
Pilar Green Park	5.0	1449.74	580.41
Barrio Cerrado "La Tranquera"	2.0	1442.37	98.74
Barrio Cerrado "La Cautiva del Pilar"	3.0	1418.36	182.70
Haras del Pilar - Las Praderas 1 y 2	15.0	1408.02	292.72
Barrio Cerrado "La Delfina"	15.0	1397.15	220.69
Barrio La Cuesta	2.0	1393.16	229.66
Bermudas Country Club	2.0	1363.07	197.51
Barrio Cerrado "Los Senderos"	2.0	1347.86	51.98
Estancias del Pilar	21.0	1340.04	384.73
Armenia Country Club	5.0	1281.51	305.17
Barrio Parque Almirante Irízar	1.0	1266.67	NaN
La Martinica	4.0	1251.73	303.80
Campo Grande Country Club	1.0	1250.00	NaN
Pilar del Lago	4.0	1247.87	412.09
Barrio Cerrado "La Montura"	8.0	1233.31	360.96
Los Sauces Country Club	1.0	1232.76	NaN
La Madrugada	10.0	1228.10	326.60
Barrio Cerrado "Los Alcanfores"	3.0	1207.06	143.69
Village Golf & Tennis Country Club	4.0	1156.82	390.86
La Angélica	3.0	1156.77	240.82
La Peregrina	6.0	1139.42	182.55
Barrio Cerrado Las Casuarinas	28.0	1104.64	287.83
Haras del Pilar - La Caballeriza	3.0	1101.19	131.63
Haras del Pilar - El Establo	7.0	1084.00	172.81
Highland Park Country Club	13.0	1082.71	671.74
Mapuche Country Club	13.0	1069.95	458.20
Altos de Manzanares 1 y 2	2.0	1050.28	149.86
Los Pilares - Barrio Privado	6.0	1045.45	353.43
Los Tres Coniles	1.0	1032.61	NaN
San Francisco Club de Campo	2.0	1026.71	119.36
Galapagos Country Club	4.0	1014.91	507.68
Barrio Privado "Lomas de Fátima"	3.0	944.92	156.36
Medal Country Club	4.0	922.95	136.06
Barrio Cerrado "Roble Joven"	2.0	837.77	0.00
Altos del Golf	4.0	811.78	645.42
Barrio Cerrado "Los Potrillos"	5.0	786.76	443.04
La Lonja	5.0	769.56	515.17
Barrio Cerrado "Soles de Pilar"	2.0	765.22	516.50
Pilar Village	3.0	739.55	443.77
Los Lagartos Country Club	8.0	629.55	514.56
Golfer's Country Club	9.0	623.99	454.26
Boca Ratón	6.0	549.32	462.13

Zelaya	3.0	438.19	545.23
Saint Matthews	1.0	360.11	NaN
Barrio Cerrado "Villa Rosa"	1.0	266.02	NaN
Barrio San Eduardo - Pilar del Este	1.0	260.00	NaN
Fátima	1.0	219.99	NaN
Haras del Sol - Barrio Privado	1.0	122.22	NaN
Villa Astolfi	1.0	32.68	NaN

\

Barrios	min	25%	50%	75%
Pilar Golf Country Club	3000.00	3000.00	3000.00	3000.00
Altos del Pilar	2214.29	2214.29	2214.29	2214.29
Country Farm Club	1911.11	1911.11	1911.11	1911.11
Martindale Country Club	1500.00	1535.38	1758.25	2020.47
Mayling Club de Campo	996.15	1438.64	1633.99	1794.85
Barrio Cerrado "Ayres Plaza"	818.55	1417.85	1570.38	1674.64
Barrio Cerrado "SpringDale"	1487.18	1487.18	1487.18	1487.18
Pilar Green Park	1089.04	1187.50	1200.00	1292.13
Barrio Cerrado "La Tranquera"	1372.55	1407.46	1442.37	1477.28
Barrio Cerrado "La Cautiva del Pilar"	1230.77	1329.67	1428.57	1512.16
Haras del Pilar - Las Praderas 1 y 2	902.78	1219.98	1400.00	1530.49
Barrio Cerrado "La Delfina"	948.91	1271.21	1371.95	1501.60
Barrio La Cuesta	1230.77	1311.97	1393.16	1474.36
Bermudas Country Club	1223.40	1293.24	1363.07	1432.90
Barrio Cerrado "Los Senderos"	1311.11	1329.49	1347.86	1366.24
Estancias del Pilar	330.04	1290.85	1354.84	1529.41
Armenia Country Club	972.22	1088.71	1169.35	1450.00
Barrio Parque Almirante Irízar	1266.67	1266.67	1266.67	1266.67
La Martinica	966.67	1000.42	1259.26	1510.57
Campo Grande Country Club	1250.00	1250.00	1250.00	1250.00
Pilar del Lago	804.35	1008.78	1207.21	1446.31
Barrio Cerrado "La Montura"	416.77	1142.52	1357.27	1440.80
Los Sauces Country Club	1232.76	1232.76	1232.76	1232.76
La Madrugada	675.00	989.27	1186.91	1521.55
Barrio Cerrado "Los Alcanfores"	1041.67	1160.04	1278.41	1289.76
Village Golf & Tennis Country Club	602.41	1080.35	1252.02	1328.48
La Angélica	1012.40	1017.77	1023.14	1228.96
La Peregrina	859.38	1063.84	1140.21	1239.22
Barrio Cerrado Las Casuarinas	68.93	1031.46	1159.78	1250.00
Haras del Pilar - La Caballeriza	1000.00	1026.79	1053.57	1151.79
Haras del Pilar - El Establo	837.32	977.79	1132.35	1181.36
Highland Park Country Club	187.08	306.90	1115.38	1658.54
Mapuche Country Club	235.39	972.22	1086.96	1351.35
Altos de Manzanares 1 y 2	944.31	997.29	1050.28	1103.26
Los Pilares - Barrio Privado	383.50	1025.00	1110.00	1231.92
Los Tres Coniles	1032.61	1032.61	1032.61	1032.61

San Francisco Club de Campo	942.31	984.51	1026.71	1068.91
Galapagos Country Club	255.10	992.84	1244.38	1266.45
Barrio Privado "Lomas de Fátima"	764.53	896.55	1028.57	1035.12
Medal Country Club	763.05	833.62	941.96	1031.29
Barrio Cerrado "Roble Joven"	837.77	837.77	837.77	837.77
Altos del Golf	247.50	260.67	772.53	1323.64
Barrio Cerrado "Los Potrillos"	324.21	347.22	875.00	1054.05
La Lonja	219.51	347.01	705.18	1148.94
Barrio Cerrado "Soles de Pilar"	400.00	582.61	765.22	947.83
Pilar Village	268.66	534.33	800.00	975.00
Los Lagartos Country Club	182.39	283.45	330.75	955.00
Golfer's Country Club	103.33	287.50	463.84	1030.04
Boca Ratón	151.92	255.28	310.12	884.70
Zelaya	91.67	123.96	156.25	611.46
Saint Matthews	360.11	360.11	360.11	360.11
Barrio Cerrado "Villa Rosa"	266.02	266.02	266.02	266.02
Barrio San Eduardo - Pilar del Este	260.00	260.00	260.00	260.00
Fátima	219.99	219.99	219.99	219.99
Haras del Sol - Barrio Privado	122.22	122.22	122.22	122.22
Villa Astolfi	32.68	32.68	32.68	32.68

Barrios	max
Pilar Golf Country Club	3000.00
Altos del Pilar	2214.29
Country Farm Club	1911.11
Martindale Country Club	2656.25
Mayling Club de Campo	2123.89
Barrio Cerrado "Ayres Plaza"	2049.18
Barrio Cerrado "SpringDale"	1487.18
Pilar Green Park	2480.00
Barrio Cerrado "La Tranquera"	1512.20
Barrio Cerrado "La Cautiva del Pilar"	1595.74
Haras del Pilar - Las Praderas 1 y 2	2101.06
Barrio Cerrado "La Delfina"	1881.72
Barrio La Cuesta	1555.56
Bermudas Country Club	1502.73
Barrio Cerrado "Los Senderos"	1384.62
Estancias del Pilar	1875.00
Armenia Country Club	1727.27
Barrio Parque Almirante Irízar	1266.67
La Martinica	1521.74
Campo Grande Country Club	1250.00
Pilar del Lago	1772.73
Barrio Cerrado "La Montura"	1531.25
Los Sauces Country Club	1232.76

```
La Madrugada                              1620.69
Barrio Cerrado "Los Alcanfores"           1301.12
Village Golf & Tennis Country Club        1520.83
La Angélica                               1434.78
La Peregrina                              1386.14
Barrio Cerrado Las Casuarinas             1500.00
Haras del Pilar - La Caballeriza          1250.00
Haras del Pilar - El Establo              1300.00
Highland Park Country Club                2000.00
Mapuche Country Club                      1740.74
Altos de Manzanares 1 y 2                 1156.25
Los Pilares - Barrio Privado              1400.00
Los Tres Coniles                          1032.61
San Francisco Club de Campo               1111.11
Galapagos Country Club                    1315.79
Barrio Privado "Lomas de Fátima"          1041.67
Medal Country Club                        1044.84
Barrio Cerrado "Roble Joven"               837.77
Altos del Golf                            1454.55
Barrio Cerrado "Los Potrillos"            1333.33
La Lonja                                  1427.14
Barrio Cerrado "Soles de Pilar"           1130.43
Pilar Village                             1150.00
Los Lagartos Country Club                 1475.00
Golfer's Country Club                     1250.00
Boca Ratón                                1210.53
Zelaya                                    1066.67
Saint Matthews                             360.11
Barrio Cerrado "Villa Rosa"                266.02
Barrio San Eduardo - Pilar del Este        260.00
Fátima                                     219.99
Haras del Sol - Barrio Privado             122.22
Villa Astolfi                               32.68
```

5 4) Gráficos

5.0.1 Preparación de las variables a usar

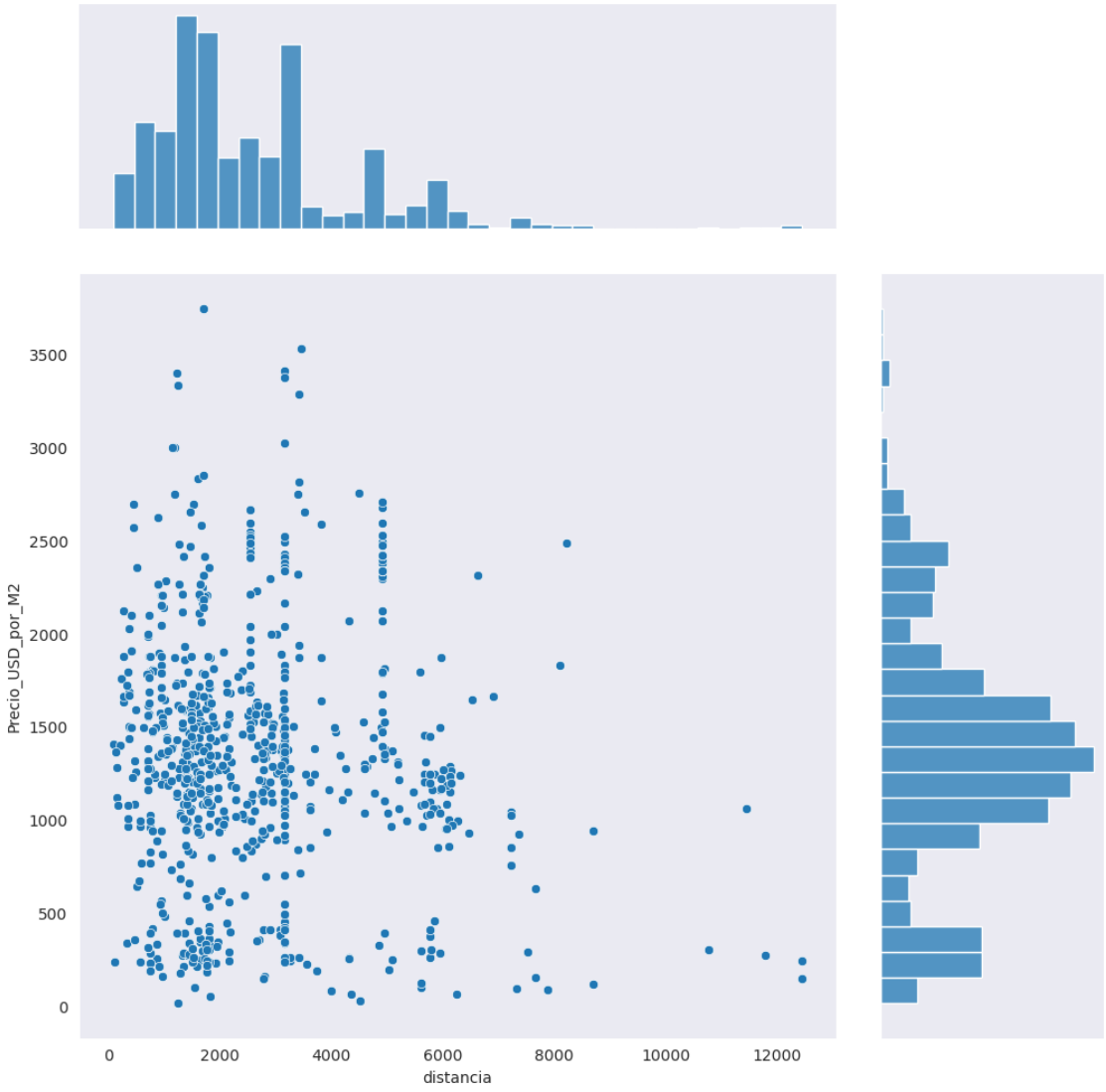
[28]:
```
distancia_graf = df_ppc_latlon_con_precio['distancia']*1000
distancia_graf = distancia_graf.astype(int)

Precio_USD_por_M2 = np.around(df_ppc_latlon_con_precio['Precio_USD_por_M2'])
price_aprox_usd= np.around(df_ppc_latlon_con_precio['price_aprox_usd'])

b2=Precio_USD_por_M2.mean()
c2=distancia_graf.mean()
a2=price_aprox_usd.mean()
```

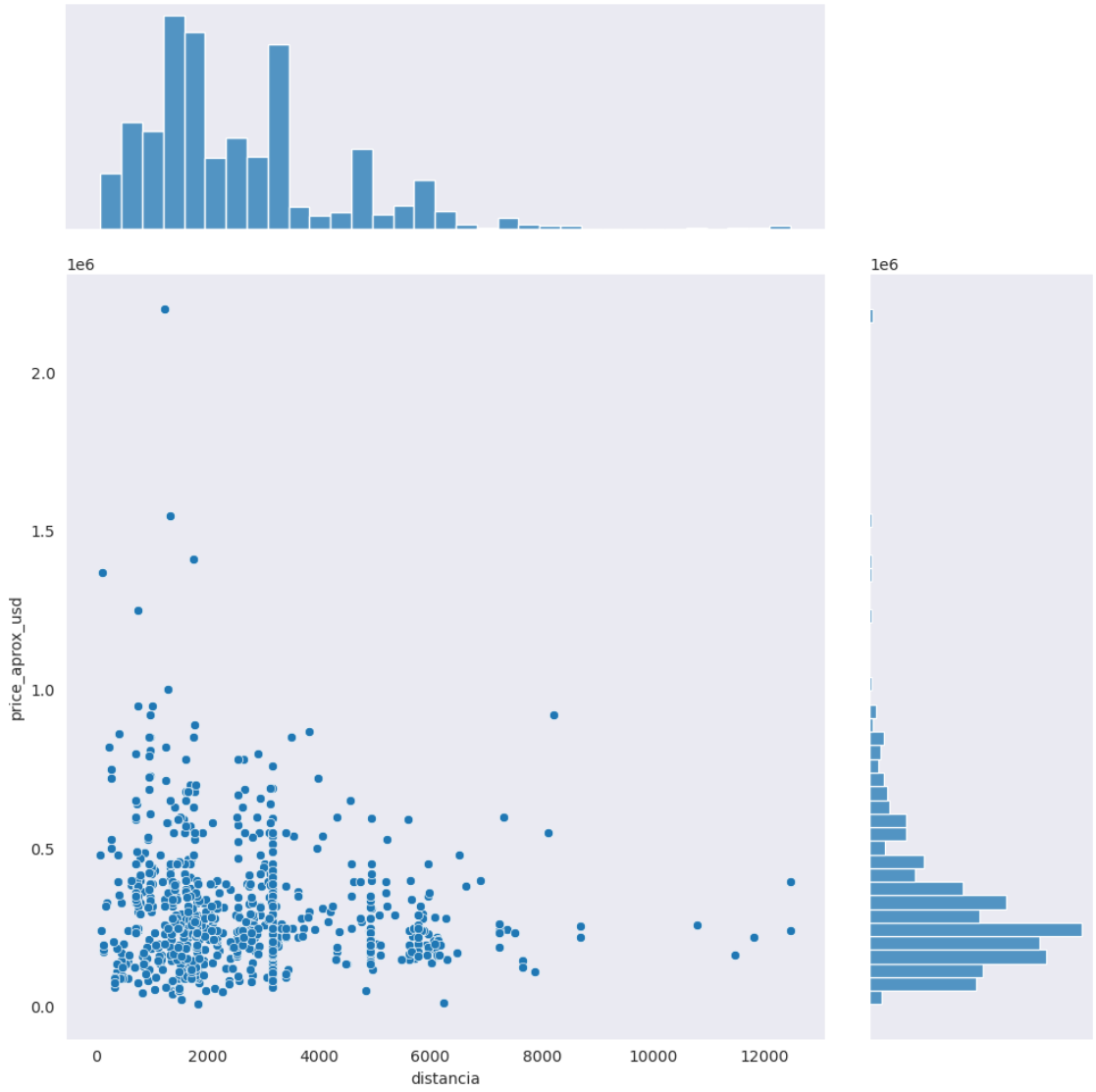
```
b3=Precio_USD_por_M2.median()
c3=distancia_graf.median()
a3=price_aprox_usd.median()

a3,b3,c3
```

[28]: (250000.0, 1333.0, 2033.0)

5.0.2 Gráfico bivariable de distancia vs precio por m² y precio total

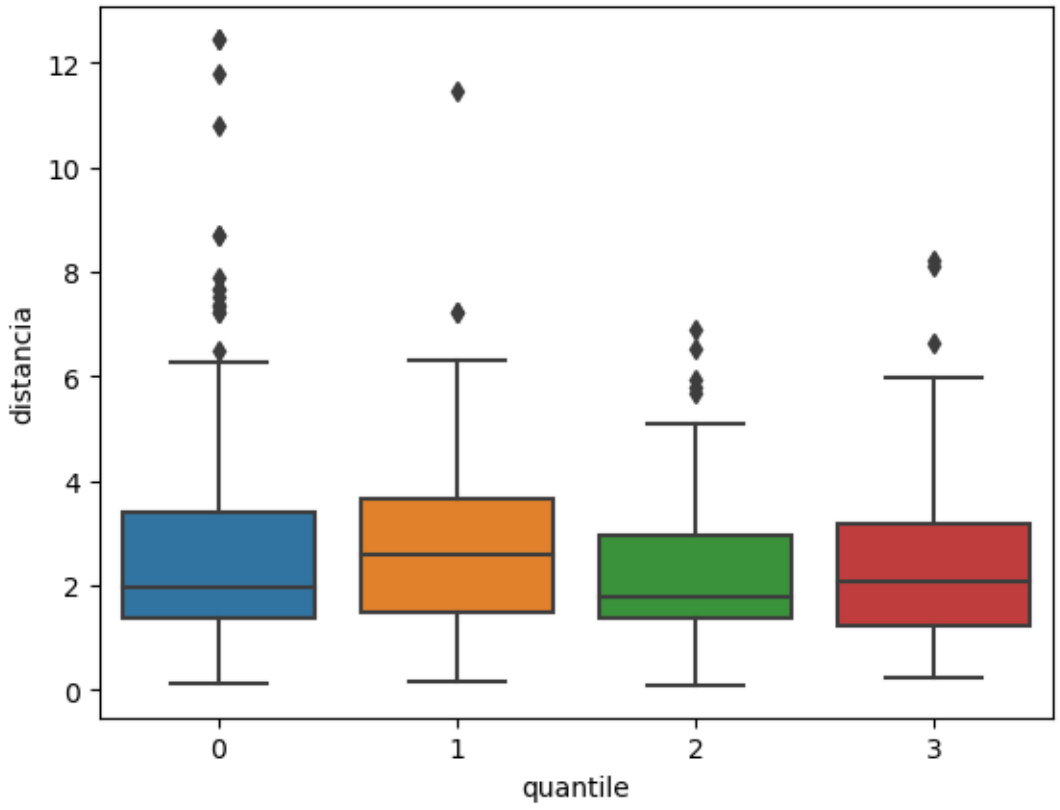
[29]:
```
with sns.axes_style('dark'):
    g =sns.jointplot( x=distancia_graf, y=Precio_USD_por_M2 , height=10,␣
 ↪ratio=3 )
    f= sns.jointplot( x=distancia_graf, y=price_aprox_usd , height=10, ratio=3 )
```



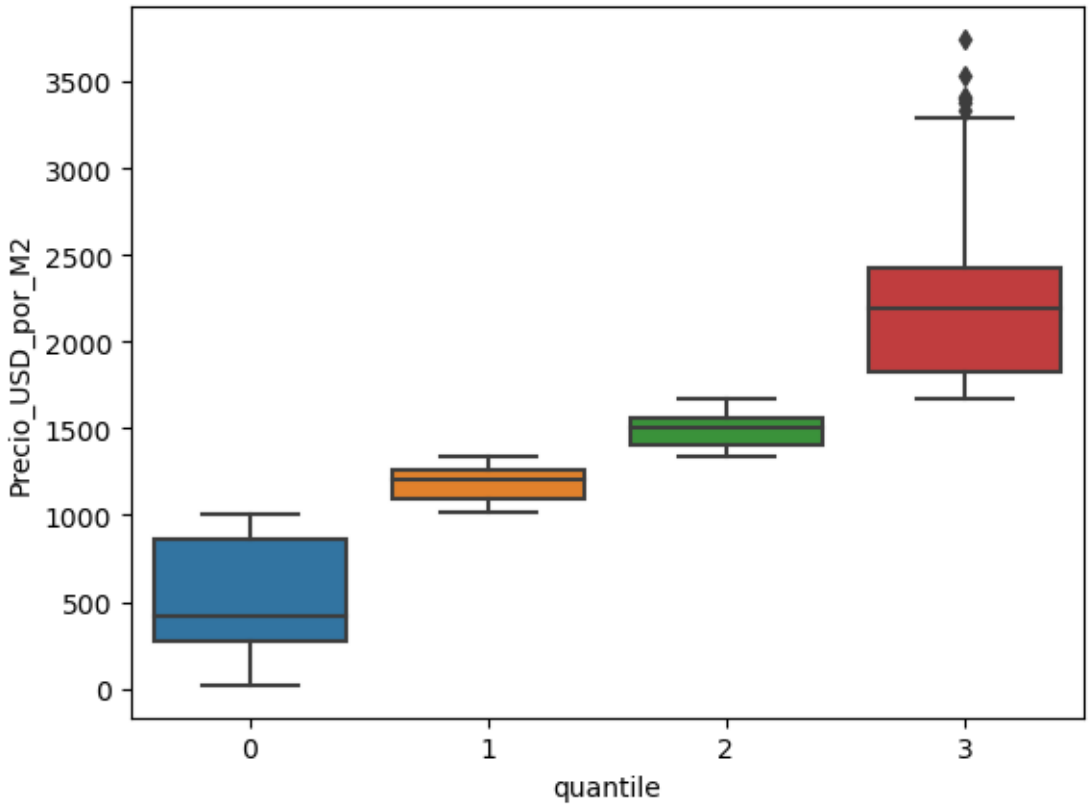


5.0.3 Gráfico de quantiles

[30]:
```
quantile1 = np.around(df_final_countries['quantile'])
bx = sns.boxplot(x = quantile1, y = df_final_countries['distancia'])
```



[31]:
```
ax = sns.boxplot(x = quantile1, y = Precio_USD_por_M2)
```



5.0.4 Gráfico de cercanía a la panamericana

[32]:
```
import folium

# Se crea un mapa
map = folium.Map(location=[-34.44349933885334, -58.86776001513485],␣
 ↪zoom_start=13)

# Se agregan los íconos para los puentes
url = 'https://raw.githubusercontent.com/Agustin-Bulzomi/Projects/main/
 ↪Programming/Digital%20House%20(Python)/Support%20Files/Project%201/
 ↪%C3%8Dcono%20puente.png'
for index, row in puentes_pilar.iterrows():
    folium.Marker([row['Latitud'], row['Longitud']], icon=folium.features.
 ↪CustomIcon(url, icon_size=(28, 28)), zindex_offset=2000).add_to(map)

# Se agregan los íconos para las casas
for index, row in df_final_countries.iterrows():
    if row['quantile'] == 0:
```

```
        folium.Marker([row['lat'], row['lon']], icon=folium.Icon(icon='home',␣
↪color='green'), z_index_offset = -1000).add_to(map)
    elif row['quantile'] == 1:
        folium.Marker([row['lat'], row['lon']], icon=folium.Icon(icon='home',␣
↪color='beige'), z_index_offset = -1000).add_to(map)
    elif row['quantile'] == 2:
        folium.Marker([row['lat'], row['lon']], icon=folium.Icon(icon='home',␣
↪color='orange'), z_index_offset = -1000).add_to(map)
    else:
        folium.Marker([row['lat'], row['lon']], icon=folium.Icon(icon='home',␣
↪color='red'), z_index_offset = -1000).add_to(map)

display(map)
```