## **HENRY PI1**

## Reporte

```
In [1]: # Detectar modulos locales
import sys
sys.path.append('../')
```

Nota:\ Voy a dejar el link de github para cada funcion que cree para resolver los ejercicos\ \
Recomendacion:\ Para entender que hace cada funcion o clase, me tome el trabajo de documentalas todas\*\*

con el siguiente metodo aplicado a las funciones se podran leer o su editor de codigo ya vendra incluido con esta caracteristica

```
In [2]: from src.docs import test_docs
print(test_docs.__doc__)

Documentacion.
Esto es una prueba, intenta con otras funciones

>>> func().__doc__
```

En la realizacion del proyecto se utilizo la siguiente API

## estadisticasbcra

\ Para llamar a esta y traerme todos los datos, cree un objeto llamado API() que interactua de forma asyncronica\ link del codigo

```
In [2]: from src.api import API
from src.dtypes import Endpoints

points: list[Endpoints] = [
          "usd",
          "usd_of",
          "var_usd_vs_usd_of",
          "inflacion_mensual_oficial",
          "var_usd_anual",
          "var_usd_of_anual",
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]

api = API()
test = api.jupyter_query(*points)
```

In [3]: test

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                                 1.99
                2002-03-05
                2002-03-06
           2
                                 2.05
           3
                2002-03-07
                                 2.14
           4
                2002-03-08
                                 2.20
           . . .
                                  . . .
           5011 2022-07-29
                              131.23
           5012 2022-08-01
                              131.94
           5013 2022-08-02
                              132.18
           5014 2022-08-03
                              132.41
           5015 2022-08-04
                              132.64
           [5016 \text{ rows } \times 2 \text{ columns}],
           'var_usd_vs_usd_of':
                                                date
           0
                2002-03-04
                                 5.4726
                2002-03-05
           1
                                 6.5327
           2
                2002-03-06
                                 4.3902
           3
                2002-03-07
                                 3.7383
           4
                2002-03-08
                                 3.1818
                                    . . .
           . . .
                         . . .
           5005 2022-07-29
                              125.5582
           5006 2022-08-01
                              113.7335
           5007 2022-08-02
                              120.1543
           5008 2022-08-03
                              125.0585
           5009 2022-08-04
                              119.3908
           [5010 \text{ rows } \times 2 \text{ columns}],
           'inflacion_mensual_oficial':
                                                        date
           0
               1990-01-31
                            79.2
           1
               1990-02-28
                             61.6
           2
               1990-03-31
                             95.5
           3
               1990-04-30
                             11.4
           4
               1990-05-31
                             13.6
           385 2022-02-28
                              4.7
           386 2022-03-31
                              6.7
           387 2022-04-30
                              6.0
           388 2022-05-31
                              5.1
           389 2022-06-30
                              5.3
           [390 \text{ rows } \times 2 \text{ columns}],
           'var_usd_anual':
                                           date
                                                         ٧
                2000-05-24
                              -0.1299
           1
                2000-05-25
                              -0.1299
```

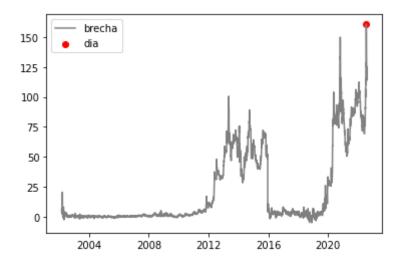
```
3
     2000-05-29
                  -0.0899
4
     2000-05-30
                  -0.0899
                       . . .
. . .
             . . .
5372 2022-02-07
                  41.7219
5373 2022-02-08
                  42.3841
5374 2022-02-09
                  42.7632
5375 2022-02-10
                  42.7152
5376 2022-02-11
                  44.6309
[5377 \text{ rows } \times 2 \text{ columns}],
'var usd of anual':
                                  date
0
     2002-03-04
                  59.2040
1
     2002-03-05
                  59.2965
2
     2002-03-06
                  55.1220
3
     2002-03-07
                  48.1308
4
     2002-03-08
                  43.1818
4821 2022-02-07
                  20.1000
4822 2022-02-08
                  19.9955
4823 2022-02-09
                  19.9705
4824 2022-02-10
                  19.9751
4825 2022-02-11
                  19.9661
[4826 \text{ rows } \times 2 \text{ columns}],
'milestones':
                         date
                                                                 е
                                                                       t
                                  Roque Fernández
   1991-02-05
                                                     bcra
1
   1991-04-01
                                  Domingo Cavallo
                                                     econ
2
   1995-08-08
                                Carlos Saúl Menem
                                                     pres
3
   1996-08-05
                                         Pedro Pou
                                                     bcra
4
   1996-08-06
                                  Roque Fernández
                                                     econ
5
   1999-12-10
                               José Luis Machinea
                                                     econ
6
   1999-12-10
                               Fernando De la Rúa
                                                     pres
7
   2001-03-05
                            Ricardo López Murphy
                                                     econ
   2001-03-20
                                  Domingo Cavallo
                                                     econ
   2001-04-25
9
                                  Roque Maccarone
                                                     bcra
10 2001-12-03
                                         Corralito
                                                    misc
11 2001-12-21
                                 Jorge Capitanich
                                                     econ
12 2001-12-21
                                     Ramón Puerta
                                                     pres
13 2001-12-23
                                  Rodolfo Frigeri
                                                     fina
14 2001-12-23
                            Adolfo Rodríguez Saá
                                                     pres
15 2002-01-02
                                  Eduardo Duhalde
                                                     pres
16 2002-01-03
                              Jorge Remes Lenicov
                                                     econ
                       Fin de la Convertibilidad
17 2002-01-06
                                                     misc
                                     Mario Blejer
18 2002-01-21
                                                     bcra
19 2002-04-27
                                  Roberto Lavagna
                                                     econ
20 2002-07-01
                                  Aldo Pignanelli
                                                     bcra
21 2002-12-02
                                Fin del Corralito
                                                     misc
22 2002-12-11
                                 Alfonso Prat-Gay
                                                     bcra
23 2002-12-11
                                 Alfonso Prat-Gay
                                                     bcra
24 2003-05-25
                                  Néstor Kirchner
                                                     pres
25 2004-09-24
                    Hernán Martín Pérez Redrado
                                                     bcra
26 2005-11-28
                                    Felisa Miceli
                                                     econ
27 2007-01-16
                          Intervención del INDEC
                                                     misc
28 2007-07-17
                                   Miguel Peirano
                                                     econ
29 2007-12-10
                                  Martín Lousteau
                                                     econ
30 2007-12-10
                 Cristina Fernández de Kirchner
                                                     pres
31 2008-04-25
                                 Carlos Fernández
                                                     econ
32 2009-07-08
                                     Amado Boudou
                                                     econ
33 2010-02-03
                         Mercedes Marcó Del Pont
                                                     bcra
                                                     econ
```

```
35 2011-12-10
                         Cristina Fernández de Kirchner
                                                          pres
         36 2012-08-13
                                           Cepo al Dolar
                                                          misc
         37 2013-11-18
                                     Juan Carlos Fábrega
                                                          bcra
         38 2013-11-18
                                           Axel Kicillof
                                                          econ
         39 2014-10-01
                                        Alejandro Vanoli
                                                          bcra
                                  Federico Sturzenegger
         40 2015-12-10
                                                          bcra
         41 2015-12-10
                                       Alfonso Prat-Gay
                                                          fina
         42 2015-12-10
                                          Mauricio Macri
                                                          pres
         43 2015-12-17 Levantamiento del Cepo al Dolar
                                                          misc
         44 2017-01-10
                                             Luis Caputo
                                                         fina
         45 2017-01-10
                                         Nicolas Dujovne
                                                          trea
         46 2018-06-14
                                             Luis Caputo
                                                          bcra
         47 2018-09-25
                                         Guido Sandleris
                                                         bcra
         48 2019-07-01
                                          Hernán Lacunza trea
                                          Cepo al Dollar
         49 2019-09-01
                                                          misc
         50 2019-12-10
                                     Miguel Ángel Pesce bcra
         51 2019-12-10
                                           Martín Guzmán econ
                                      Alberto Fernández pres
         52 2019-12-10
         53 2022-07-04
                                        Silvina Batakis
                                                          econ
         54 2022-07-28
                                            Sergio Massa econ}
In [7]:
        data.usd.head(1) # Ahora puedo llamar a los dataframes de tal manera
                date
                        V
Out[7]:
        0 2000-05-24 1.0005
```

## Consignas

a) Día con mayor variación en la brecha del ultimo año

link del codigo



### b) Retorna los 5 días con mayor volatilidad del ultimo año

link del codigo\ \ \ Dolar Blue



```
b(data.usd_of, 'v')
In [22]:
                   date volatility
Out[22]:
             2022-04-18 0.006620
          1 2022-06-21 0.006407
          2 2022-08-01 0.005396
          3 2022-07-18 0.005211
          4 2022-07-25 0.004920
```

### c) Semana con mayor variación en la brecha del ultimo año

link de codigo

```
from src.consignas import c
Loading [MathJax]/jax/output/CommonHTML/fonts/TeX/fontdata.js
```

```
max_var_week = """
Desde %s hasta %s
con una variacion de %.2f%%
""" % c(data.var_usd_vs_usd_of)
print(max_var_week)
```

Desde 2022-07-18 hasta 2022-07-22 con una variación de 34.72%

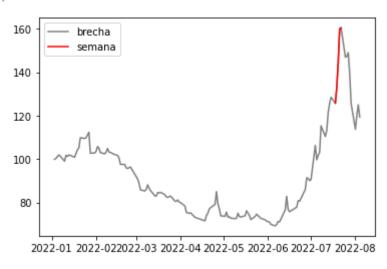
```
In [206... # Filtro por 'mayor a 2021' para visualizar mejor este pico
    cut_data = data.var_usd_vs_usd_of.date.dt.year > 2021
    max_week = c(data.var_usd_vs_usd_of[cut_data])

X_week = data.var_usd_vs_usd_of[cut_data].date
    y_week = data.var_usd_vs_usd_of[cut_data].v

mask = (data.var_usd_vs_usd_of.date >= max_week[0]) & (data.var_usd_vs_usd_of.cut_data).v

plt.plot(X_week, y_week, color='grey')
    plt.plot(data.var_usd_vs_usd_of[mask].date, data.var_usd_vs_usd_of[mask].v, col
    plt.legend(['brecha', 'semana'])
```

Out[206]: <matplotlib.legend.Legend at 0x7ff45f596380>



## d) Día de la semana donde hay mayor variación en la brecha del ultimo año

link de codigo

```
In [74]: from src.consignas import d d(data.var_usd_vs_usd_of)

Out[74]: v

date

Miercoles 93.742204

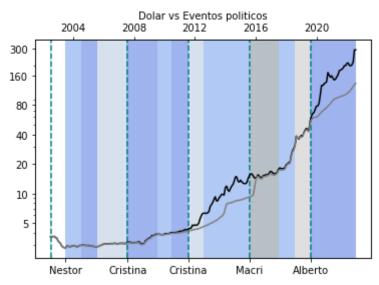
Jueves 93.615828
```

| date   |           |
|--------|-----------|
| Martes | 92.120416 |
| Lunes  | 91.474823 |

e) Con la info histórica del valor del dólar y del blue, realizar un análisis exploratorio. Cruzar la data con sucesos importantes a nivel político-económico y graficar mes a mes.

link de codigo

### link de grafico



<Figure size 432x288 with 0 Axes>

Tuve problemas para definir el "legend" pero el grafico se explica de la siguiente manera:

- Azul = Cambio de ministro de economia
- Celeste = Cambio de presidente del banco central
- Celeste-gris = Medidas economicas
- gris = Ministro de finanzas
- gris-claro = ministro de hacienda
- Lineas punteadas = cambio de presidente

#### Observaciones

Este analisis es objetivo, sin ideologia.

Gracias a este grafico se puede sacar mucha data. Pero creo que la mas importante es como se comporta la brecha entre dolares en los distintos gobiernos. Por ejemplo podemos ver que los gobiernos peronistas tienden a agrandar esa brecha. Es muy impresionante ver como cuando el precio "llega" a la linea punteada de, por ejemplo, Cristina o Alberto la brecha se dispara. Otra observacion que no podemos dejar pasar es como al cambiar de ministros, el precio tiende a variar o estancarse. Mira, cuando asume Nestor el dolar estaba al alza, hasta que cambia el ministro de economia y retrocede bastante. Tambien podemos ver el comienzo del ciclo de alta variacion (brecha), cuando asume el ministro de economia justo antes de que asuma cristina

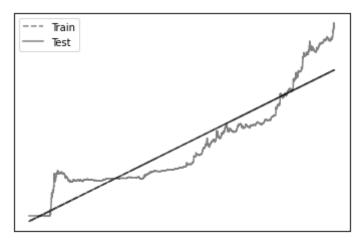
#### **Conclusiones**

- El evento que mas afecta al precio es el nombramiento de nuevos presidentes. Ya que no solo sube o baja, sino que hasta crece la variacion entre los dolares
- El segundo evento mas importante son los ministros de economia, logrando retrocesos e impulsos en los precios
- Podemos decir que los precios si cuentan con una correlacion con los eventos, Pero esta solo es momentaña.

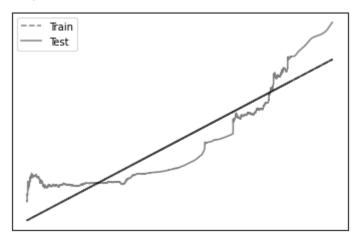
# f) Implementar una regresión lineal (una para cada tipo de dólar) para predecir el valor del dólar a 3, 6 y 12 meses:

link de codigo

```
from src.regression import regression
  In [130...
            # Regresion sobre el dolar blue
            out_reg_blue: str = regression(
                 data.usd, 3, verbose=True, plot=True
            out_reg_blue += "\n" + regression(data.usd, 6)
            out_reg_blue += "\n" + regression(data.usd, 12)
            plt.clf()
            # Regresion sobre el dolar oficial
            out_reg_of: str = regression(
                 data.usd_of, 3, verbose=True, plot=True
            out_reg_of += "\n" + regression(data.usd_of, 6)
            out_reg_of += "\n" + regression(data.usd_of, 12)
            plt.clf()
            print(f"""
            Dolar Blue
             {out_reg_blue}
            Dolar Oficial
Loading [MathJax]/jax/output/CommonHTML/fonts/TeX/fontdata.js
```



<Figure size 432x288 with 0 Axes>



## Dolar Blue

Error en Train: 0.26 Error en Test: 0.26 Score test: 0.86 Score train: 0.87

Prediccion a 3 meses: 85.95 Prediccion a 6 meses: 90.52 Prediccion a 12 meses: 100.23

#### Dolar Oficial -----

Error en Train: 0.23 Error en Test: 0.23 Score test: 0.84 Score train: 0.83

Prediccion a 3 meses: 58.18 Prediccion a 6 meses: 60.95 Prediccion a 12 meses: 66.78

<Figure size 432x288 with 0 Axes>

#### bestiales

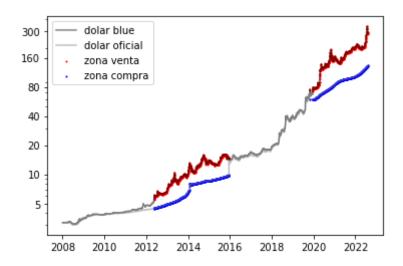
Esto se debe a que el precio del dolar cada ves que se hace mas alto, menos le cuesta variar o aumentar\ (no es lo mismo 20 pesos de subida en un dolar que vale 40. (50%), que 20 pesos de subida en un dolar que vale 200. (10%))\ Se va tornando exponencial, por eso use logaritmo natural\ Y Tambien ese es el motivo por el cual una regresion lineal arroja un mal resultado

## h) Mejor momento para comprar dolár oficial y venderlo a dolár blue

\ Como vimos en el punto e, nos conviene comprar al oficial y vender al blue en un gobierno peronista. Para ser mas claros, cuando existe una expansion de la brecha entre los tipos de cambio. Grafiquemos!

```
import matplotlib
In [209...
         import numpy as np
         usd_h = data.usd.copy()[data.usd.date.dt.year > 2007]
         usdof_h = data.usd_of.copy()[data.usd_of.date.dt.year > 2007]
         var_h = data.var_usd_vs_usd_of.copy()[data.var_usd_vs_usd_of.date.dt.year > 200
         var_price = (
             pd.merge(
                 pd.merge(usd_h, usdof_h, on='date'), var_h, on='date'
         ).rename(columns={'v_x': 'blue', 'v_y': 'oficial', 'v': 'brecha'})
         price_result = var_price[var_price.brecha > 20]
         #plt.plot(var_h.date, var_h.v)
         _, ax = plt.subplots()
         ax.plot(var_price.date, var_price.blue, color='black', alpha=0.5)
         ax.plot(var_price.date, var_price.oficial, color='grey', alpha=0.5)
         ax.scatter(price_result.date, price_result.blue, s=1, color='red')
         ax.scatter(price_result.date, price_result.oficial, s=1, color='blue')
         ax.set_yscale('log')
         ax.set_yticks([5, 10, 20, 40, 80, 160, 300])
         ax.qet_yaxis().set_major_formatter(matplotlib.ticker.ScalarFormatter())
         ax.legend(['dolar blue', 'dolar oficial', 'zona venta', 'zona compra'])
```

Out[209]: <matplotlib.legend.Legend at 0x7ff45f2def50>



Estos son buenos precios de compra (azul) y venta (rojo)\ Las zonas fueron determinadas por la brecha, este sistema toma como validas opciones de compra y venta cuando la variacion entre los activos supera el 20%

**Author: Nicolas Palermo** 

Nota: Deje el ejercicio opcional sin resolver. Pienso hacerlo con un modelo de deep learning