Fama三因子模型

讀入資料

- 讀入retdata資料，並擷取其中所需的資料

```
import pandas as pd
```

```
stock=pd.read_csv('retdata.csv',sep='\t')
stock.head(n=3)
```

	Date	Hon Hai Precision	TSMC	Uni-President
0	2014-01-02	0.3745	-0.9479	0.5587
1	2014-01-03	-1.2438	-1.9139	-0.9259
2	2014-01-06	-0.5038	0.0000	0.0000

```
stock.index = pd.to_datetime(stock.Date)
UniPresident = stock.iloc[:,3]
UniPresident.head(n=3)
```

```
Date
2014-01-02    0.5587
2014-01-03   -0.9259
2014-01-06    0.0000
Name: Uni-President, dtype: float64
```

讀入三因子資料

```
#讀入三因子資料
factors=pd.read_csv('factors.csv')
factors.head(n=3)
```

	Security Name	CoName	YY/MM/DD	Market Risk Premium	Size Factor (3 Factor)	Book to Market Factor	Risk-free Interest Rate
0	Z8888	TSEC+GreTai Non-Banking index	2014/01/02	0.0145	0.7197	0.3039	1.355
1	Z8888	TSEC+GreTai Non-Banking index	2014/01/03	-0.5858	0.6868	1.0533	1.355
2	Z8888	TSEC+GreTai Non-Banking index	2014/01/06	-0.4534	0.5783	0.4498	1.355

```
factors.index =pd.to_datetime(factors['YY/MM/DD'])
factors.columns
```

```
Index(['Security Name', 'CoName', 'YY/MM/DD', 'Market Risk Premium',
       'Size Factor (3 Factor)', 'Book to Market Factor',
       'Risk-free Interest Rate'],
      dtype='object')
```

將年無風險利率轉化成日無風險利率

```
#將年無風險利率轉化成日無風險利率
factors['Risk-free Interest Rate']=(factors['Risk-free Interest Rate']**(1/360)-1)*100
factors.head(n=3)
```

YY/MM/DD	Security Name	CoName	YY/MM/DD	Market Risk Premium	Size Factor (3 Factor)	Book to Market Factor
2014-01-02	Z8888	TSEC+GreTai Non-Banking index	2014/01/02	0.0145	0.7197	0.3039
2014-01-03	Z8888	TSEC+GreTai Non-Banking index	2014/01/03	-0.5858	0.6868	1.0533
2014-01-06	Z8888	TSEC+GreTai Non-Banking index	2014/01/06	-0.4534	0.5783	0.4498

合併個股收益率數據與因子收益率數據，並計算統一股票的超額收益率

```
data=pd.concat([UniPresident,factors.iloc[:,1:]],axis=1).dropna()
data.tail(n=3)
```

	Uni-President	CoName	YY/MM/DD	Market Risk Premium	Si
2014-12-29	1.1134	TSEC+GreTai Non-Banking index	2014/12/29	0.7341	
2014-12-30	0.1001	TSEC+GreTai Non-Banking index	2014/12/30	-0.1990	
2014-12-31	0.4000	TSEC+GreTai Non-Banking index	2014/12/31	0.4774	

```
data['Uni-President'] = data['Uni-President'] - data['Risk-free Interest Rate']
data['Uni-President']
```

```
2014-01-02    2.611555
2014-01-03    1.126955
2014-01-06    2.052855
2014-01-07    1.865955
2014-01-08    1.678355
                ...
2014-12-26    2.052855
2014-12-27    2.052855
2014-12-29    3.166255
2014-12-30    2.152955
2014-12-31    2.452855
Name: Uni-President, Length: 248, dtype: float64
```

跑迴歸模型

```
import statsmodels.api as sm
#parif=data.iloc[:,3:6]
regThrFac=sm.OLS(data['Uni-President'],sm.add_constant(data.iloc[:,3:6]))
result=regThrFac.fit()
result.summary()
```

呼叫樣本其中幾欄變數

Covariance Type: nonrobust

	coef	std err	t	P>|t|	[0.025	0.975]
const	-0.0330	0.076	-0.433	0.665	-0.183	0.117
Market Risk Premium	1.0794	0.112	9.622	0.000	0.858	1.300
Size Factor (3 Factor)	-0.0568	0.159	-0.357	0.722	-0.371	0.257
Book to Market Factor	-0.0142	0.208	-0.068	0.946	-0.424	0.396

Omnibus:	46.399	Durbin-Watson:	2.153
Prob(Omnibus):	0.000	Jarque-Bera (JB):	344.846
Skew:	0.435	Prob(JB):	1.31e-75
Kurtosis:	8.711	Cond. No.	2.88

利用params提取模型係數

```
#利用params提取模型係數
result.params
```

```
const                          -0.032954
Market Risk Premium             1.079372
Size Factor (3 Factor)         -0.056831
Book to Market Factor          -0.014195
dtype: float64
```