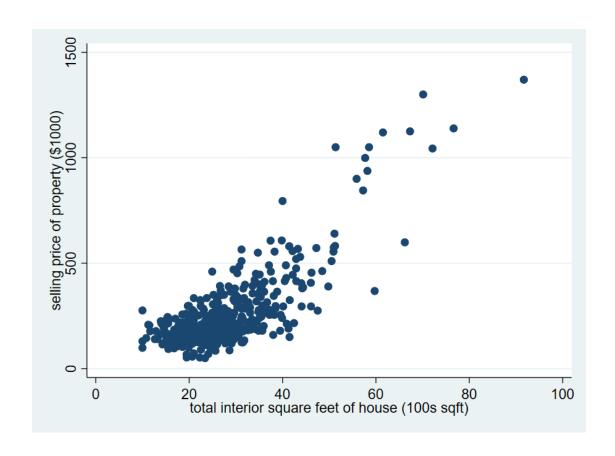## A. 繪製房屋大小與價格的散布圖。
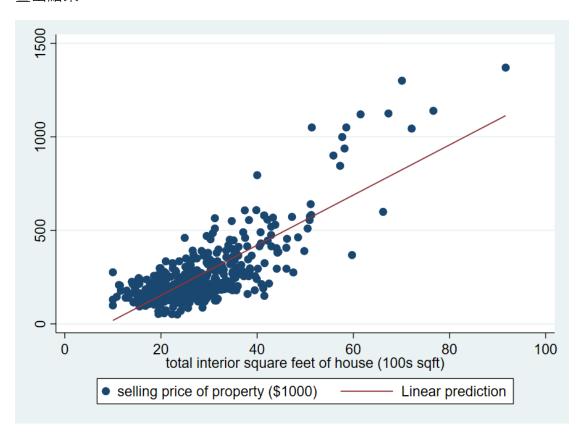

B. 估計線性歸模型 $PRICE = \beta_1 + \beta_2 SQFT + \epsilon$

```
. eststo: reg price sqft

      Source |       SS           df       MS      Number of obs   =       500
-------------+----------------------------------   F(1, 498)       =    890.41
       Model |  9409837.57          1  9409837.57   Prob > F        =    0.0000
    Residual |  5262846.95        498  10567.9658   R-squared       =    0.6413
-------------+----------------------------------   Adj R-squared   =    0.6406
       Total |  14672684.5        499  29404.1774   Root MSE        =     102.8

------------------------------------------------------------------------------
       price |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        sqft |   13.40294   .4491636    29.84   0.000     12.52045    14.28543
       _cons |  -115.4236   13.08815    -8.82   0.000    -141.1384   -89.70881
------------------------------------------------------------------------------
(est1 stored)
```

β_1	-115.4
β_2	12.3

畫出結果

斜率 > 0，表示隨著面積越大，房價就越貴

C. 估計二次歸模型 $PRICE = \beta_1 + \beta_2 SQFT^2 + \epsilon$

```
. eststo: reg price c.sqft#c.sqft

      Source |       SS           df       MS            Number of obs   =        500
-------------+----------------------------------         F(1, 498)       =    1232.55
       Model |  10450328.2          1  10450328.2        Prob > F        =     0.0000
    Residual |  4222356.35        498  8478.62721        R-squared       =     0.7122
-------------+----------------------------------         Adj R-squared   =     0.7117
       Total |  14672684.5        499  29404.1774        Root MSE        =     92.079

-------------+----------------------------------------------------------------
       price |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
c.sqft#c.sqft|    .184519   .0052558    35.11   0.000     .1741927    .1948453
       _cons |   93.56585   6.072226    15.41   0.000     81.63552    105.4962
-------------+----------------------------------------------------------------
(est2 stored)
```

β_1	0.184
β_2	93.56

```
. margin, dydx(*) at(sqft=20)

Conditional marginal effects                      Number of obs    =        500
Model VCE    : OLS

Expression   : Linear prediction, predict()
dy/dx w.r.t. : sqft
at           : sqft            =           20

-------------+----------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        sqft |    7.38076    .210232    35.11   0.000     6.967709    7.793811
-------------+----------------------------------------------------------------
```

兩回歸比較

	(1)	(2)
	price	price
sqft	13.40***	
	(29.84)	
c.sqft#c.sqft		0.185***
		(35.11)
_cons	-115.4***	93.57***
	(-8.82)	(15.41)
N	500	500

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$