Does WTI explain the price movement in MPLX?
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This write-up explores the relationships between stock price *log returns* of WTI and MPLX. For this, we run a regression or daily log return of MPLX on contemporaneous daily log return of WTI. More precisely, let us define the net returns as $R_t^{MPLX}=\ln(P_t^{MPLX}/P_{t-1}^{MPLX})$ and $R_t^{WTI}=\ln(P_t^{WTI}/P_{t-1}^{WTI})$.
The relationships we explore is $R_t^{MPLX}=a+b*R_t^{WTI}+error_t$.

This table reports the results of the regression over the 2012-2019 time interval:

	Estimate	Standard deviation	T-stat	P-value
b	.2891	.0241	11.99	0
a	.00005	.0005	0.10	0.921

R^2=0.0756
Number of obs = 1760

The estimate of the coefficient *b* is highly significant with t-statistics equal 11.99, **which points to very strong relationships between returns of WTI and MPLX.** However, the R^2 is not high, only 7.5% that points to many other factors (unknown so far) that affect the returns of MPLX beyond the WTI.

This table reports the results of the regression over the 2012-2019 time interval:

	Estimate	Standard deviation	T-stat	P-value
b	.3011469	.0275144	10.95	0
a	-.0008871	.0006716	-1.32	0.187

R^2 = 0.0900
Number of obs = 1213
The estimate of the coefficient *b* is highly significant with t-statistics equal 10.95, **which points to very strong relationships between returns of WTI and MPLX.** However, the R^2 is not high, only 9% that points to many other factors (unknown so far) that affect the returns of MPLX beyond the WTI.

Appendix

1.Time interval 2012-2019

```
  Source |       SS       df       MS              Number of obs =    1760
-------------+------------------------------       F(  1,  1758) =  143.73
       Model |  .069859502     1   .069859502       Prob > F      =  0.0000
    Residual |  .854447432  1758  .000486034       R-squared     =  0.0756
-------------+------------------------------       Adj R-squared =  0.0751
       Total |  .924306933  1759  .000525473       Root MSE      =  .02205

------------------------------------------------------------------------------
ret_MPLX|      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    ret_WTI |   .2891951   .0241219    11.99   0.000     .2418844    .3365057
      _cons |   .0000523   .0005255     0.10   0.921    -.0009785     .001083
------------------------------------------------------------------------------
```

2.Time interval 2015-2019

```
. reg ret_MPLX_Close ret_WTI if n>548

      Source |       SS       df       MS              Number of obs =    1213
-------------+------------------------------       F(  1,  1211) =  119.79
       Model |  .065545546     1   .065545546       Prob > F      =  0.0000
    Residual |  .662599868  1211   .000547151       R-squared     =  0.0900
-------------+------------------------------       Adj R-squared =  0.0893
       Total |  .728145414  1212    .00060078       Root MSE      =  .02339

------------------------------------------------------------------------------
ret_MPLX   |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    ret_WTI  |   .3011469   .0275144    10.95   0.000     .2471657    .3551282
      _cons    |  -.0008871   .0006716    -1.32   0.187    -.0022047    .0004306
------------------------------------------------------------------------------
```