

# [Statistics: correlation between retail online sales and total retail sales](https://assignbuster.com/statistics-correlation-between-retail-online-sales-and-total-retail-sales/)

Statistics: correlation between retail online sales and total retail sales To calculate the correlation coefficient for quarterly retail online sales and corresponding total retail sales for the recent few years, we use the formula:
Let Xi be total retail sales, and Yi - retail online sales for period i. N is total number of pairs of observations and is equal to total number of periods available, thus N = 19.
#
x
y
x\*y
x\*x
y\*y
1
787, 212
5, 335
4, 199, 776, 020
619, 702, 732, 944
28, 462, 225
2
714, 561
5, 663
4, 046, 558, 943
510, 597, 422, 721
32, 069, 569
3
774, 677
6, 185
4, 791, 377, 245
600, 124, 454, 329
38, 254, 225
4
768, 139
7, 009
5, 383, 886, 251
590, 037, 523, 321
49, 126, 081
5
812, 809
9, 143
7, 431, 512, 687
660, 658, 470, 481
83, 594, 449
6
724, 731
7, 893
5, 720, 301, 783
525, 235, 022, 361
62, 299, 449
7
802, 662
7, 794
6, 255, 947, 628
644, 266, 286, 244
60, 746, 436
8
779, 096
7, 821
6, 093, 309, 816
606, 990, 577, 216
61, 168, 041
9
850, 265
10, 755
9, 144, 600, 075
722, 950, 570, 225
115, 670, 025
10
738, 185
9, 549
7, 048, 928, 565
544, 917, 094, 225
91, 183, 401
11
814, 626
10, 005
8, 150, 333, 130
663, 615, 519, 876
100, 100, 025
12
818, 061
10, 734
8, 781, 066, 774
669, 223, 799, 721
115, 218, 756
13
859, 250
13, 999
12, 028, 640, 750
738, 310, 562, 500
195, 972, 001
14
767, 433
12, 115
9, 297, 450, 795
588, 953, 409, 489
146, 773, 225
15
852, 760
12, 718
10, 845, 401, 680
727, 199, 617, 600
161, 747, 524
16
867, 242
13, 651
11, 838, 720, 542
752, 108, 686, 564
186, 349, 801
17
912, 109
17, 512
15, 972, 852, 808
831, 942, 827, 881
306, 670, 144
18
834, 716
15, 515
12, 950, 618, 740
696, 750, 800, 656
240, 715, 225
19
919, 041
15, 654
14, 386, 667, 814
844, 636, 359, 681
245, 047, 716
Total
15, 397, 575
199, 050
164, 367, 952, 046
12, 538, 221, 738, 035
2, 321, 168, 318
First, we calculate x\*y, x\*x and y\*y for each pair (xi, yi) and fill out the three last column of the table about. Second, the total for each column is found. Now we have all the numbers necessary to determine the correlation coefficient:
R = (19\*164, 367, 952, 046 - 15, 397, 575\*199, 050)/ (19\*12, 538, 221, 738, 035 - 15, 397, 575\*15, 397, 575)\*(19\*2, 321, 168, 318 - 199, 050\*199, 050) =
= 58, 103, 785, 124/ 71, 503, 127, 739 = 0. 813
The correlation coefficient of 0. 813 indicates a strong positive between linear relationship retail online sales and total retail sales variables (X and Y). Therefore, we would expect for the year characterized by the higher level of total retail sales to have also higher level of online retail sales and vice versa. The relationship between two variables can be described using the linear equation.
Correlation is widely used in the everyday business situations when it is necessary to determine the presence and strength of the relationship between two variables. For example, correlation between the advertising expenditures or promotional activities in certain area and the total sales in the corresponding period in that area is of interest for the managers. They want to determine how effective is the advertising/promotion and forecast the sales given increase or decrease in advertising.
However, the correlation values should be treated carefully. It characterizes the strength of the linear relationship; therefore, if the relationship between two given variables is quadratic, logarithmic or exponential, then the correlation coefficient will not adequately reflect how strong the relationship is. Moreover, even the relationship between variables is linear, high positive value of the coefficient does not indicate which of the variables causes the change in the value of another. The situation when both of them are influenced by the third variable and change simultaneously is also possible.
In a business context, a lot of attention should be paid to the economic relationship between variables. For example if the correlation coefficient between sales figures and the amount of calls received by HR department indicates strong positive relationship, it can be a pure coincidence and should not be automatically considered as means to increase sales.