Economic Output and Risk Factors

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What is the relationship between health risk concentrations and economic output?

Calculate correlations between environmental exposures and farm sales (and/or other econ. variables) to understand economic linkages.

Correlation Coefficients between X and Crop Total Sales ($)

```
## # A tibble: 4 x 3
##   predictor                                          correlation  p_value
##   <chr>                                                    <dbl>    <dbl>
## 1 income_farmrelated_receipts_measured_in_$                0.803 3.31e-65
## 2 income_farmrelated_operations_with_receipts              0.751 6.24e-53
## 3 income_net_cash_farm_of_operations_net_income_measured_i~ 0.718 2.49e-46
## 4 income_net_cash_farm_of_operations_operations_with_net_i~ 0.443 3.75e-15

## # A tibble: 6 x 3
##   predictor                  correlation  p_value
##   <chr>                            <dbl>    <dbl>
## 1 farm_sales_(50000_to_99999_$)    0.383  2.88e-11
## 2 farm_sales_(25000_to_49999_$)    0.346  2.32e- 9
## 3 farm_sales_(less_than_2500_$)    0.211  3.29e- 4
## 4 farm_sales_(10000_to_24999_$)    0.126  3.44e- 2
## 5 farm_sales_(2500_to_4999_$)     -0.0594 3.20e- 1
## 6 farm_sales_(5000_to_9999_$)      0.0146 8.07e- 1

## # A tibble: 52 x 3
##    predictor                                          correlation  p_value
##    <chr>                                                    <dbl>    <dbl>
##  1 corn_grain_production_measured_in_bu                     0.776 8.04e-40
##  2 corn_grain_acres_harvested                              0.761 1.77e-37
##  3 wheat_operations_with_area_harvested                    0.686 1.01e-36
##  4 soybeans_production_measured_in_bu                      0.817 2.22e-32
##  5 soybeans_acres_harvested                                0.816 3.05e-32
##  6 soybeans_operations_with_area_harvested                 0.751 5.83e-29
##  7 corn_silage_operations_with_area_harvested              0.594 3.17e-23
##  8 wheat_production_measured_in_bu                         0.536 2.69e-18
##  9 wheat_spring_(excl_durum)_operations_with_area_harvested 0.525 1.20e-16
## 10 barley_operations_with_area_harvested                   0.510 7.38e-14
## # i 42 more rows

## # A tibble: 18 x 3
##   predictor                                     correlation  p_value
##   <chr>                                               <dbl>    <dbl>
## 1 hogs_inventory                                      0.596  1.20e-17
## 2 cattle_cows_milk_inventory                          0.495  9.00e-12
## 3 animal_totals_incl_products_sales_measured_in_$     0.378  3.94e-11
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##  4 cattle_incl_calves_inventory                        0.239   4.79e- 5
##  5 cattle_incl_calves_sales_measured_in_head           0.221   1.68e- 4
##  6 chickens_layers_operations_with_inventory          -0.190   1.33e- 3
##  7 cattle_incl_calves_operations_with_sales            0.178   2.57e- 3
##  8 cattle_cows_beef_operations_with_inventory          0.153   9.79e- 3
##  9 cattle_incl_calves_operations_with_inventory        0.145   1.42e- 2
## 10 sheep_incl_lambs_inventory                         -0.148   2.01e- 2
## 11 chickens_broilers_sales_measured_in_head            0.245   3.68e- 2
## 12 sheep_incl_lambs_operations_with_inventory         -0.0744  2.19e- 1
## 13 hogs_operations_with_sales                          0.0394  5.26e- 1
## 14 cattle_cows_milk_operations_with_inventory          0.0297  6.43e- 1
## 15 hogs_operations_with_inventory                     -0.0266  6.70e- 1
## 16 chickens_broilers_operations_with_sales            -0.0143  8.54e- 1
## 17 cattle_cows_beef_inventory                          0.0106  8.80e- 1
## 18 chickens_layers_inventory                           0.00204 9.74e- 1

## # A tibble: 8 x 3
##   predictor                                        correlation  p_value
##   <chr>                                                  <dbl>    <dbl>
## 1 ag_land_cropland_acres                                 0.829  2.40e-73
## 2 ag_land_cropland_number_of_operations                  0.627  1.63e-32
## 3 ag_land_cropland_harvested_number_of_operations        0.601  2.31e-29
## 4 ag_land_incl_buildings_operations_with_asset_value     0.443  3.75e-15
## 5 ag_land_incl_buildings_asset_value_measured_in_$_operati~  0.356  6.39e-10
## 6 ag_land_irrigated_number_of_operations                -0.291  9.43e- 7
## 7 ag_land_incl_buildings_asset_value_measured_in_$_acre   0.265  5.89e- 6
## 8 ag_land_irrigated_acres                               -0.0869 1.63e- 1

## # A tibble: 7 x 3
##   predictor                                        correlation  p_value
##   <chr>                                                  <dbl>    <dbl>
## 1 area_operated_(180_to_499_acres)                       0.572  3.24e-26
## 2 area_operated_(1000_or_more_acres)                     0.567  1.46e-25
## 3 area_operated_(50_to_179_acres)                        0.378  3.95e-11
## 4 farm_operations_area_operated_measured_in_acres_operatio~  0.285  9.70e- 7
## 5 area_operated_(1.0_to_9.9_acres)                      -0.118  5.07e- 2
## 6 area_operated_(10.0_to_49.9_acres)                     0.0600 3.13e- 1
## 7 farm_operations_area_operated_measured_in_acres_operation -0.0312 6.00e- 1

## # A tibble: 241 x 3
##    predictor                                       correlation  p_value
##    <chr>                                                 <dbl>    <dbl>
##  1 Drought...Exposure...Total                            0.910 4.36e-110
##  2 Winter.Weather...Exposure...Agriculture.Value         0.907 1.68e-108
##  3 Hail...Exposure...Agriculture.Value                   0.907 1.71e-108
##  4 Strong.Wind...Exposure...Agriculture.Value            0.907 1.71e-108
##  5 Tornado...Exposure...Agriculture.Value                0.907 1.71e-108
##  6 Cold.Wave...Exposure...Agriculture.Value              0.840 4.09e- 77
##  7 Winter.Weather...Expected.Annual.Loss...Agriculture.Va~ 0.743 2.27e- 51
##  8 Tornado...Expected.Annual.Loss...Agriculture.Value    0.700 2.56e- 43
##  9 Hail...Expected.Annual.Loss...Agriculture.Value       0.682 2.63e- 40
## 10 Strong.Wind...Expected.Annual.Loss...Agriculture.Value 0.637 7.93e- 34
## # i 231 more rows

## # A tibble: 1 x 3
##   predictor                                        correlation  p_value
```

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##    <chr>                                                    <dbl>    <dbl>
## 1 expense_totals_operating_expense_measured_in_$_operation  0.750 9.15e-53

## # A tibble: 10 x 3
##    predictor                                              correlation p_value
##    <chr>                                                        <dbl>   <dbl>
##  1 Expected.Annual.Loss.Rate...Agriculture...Composite          0.322  2.60e-8
##  2 Expected.Annual.Loss...Score...Composite                     0.286  9.21e-7
##  3 Expected.Annual.Loss...Total...Composite                     0.286  9.21e-7
##  4 Expected.Annual.Loss.Rate...Population...Composite           0.254  1.44e-5
##  5 Expected.Annual.Loss.Rate...National.Percentile...Compos~    0.247  2.48e-5
##  6 Expected.Annual.Loss...State.Percentile...Composite          0.220  1.83e-4
##  7 Expected.Annual.Loss...Building.Value...Composite            0.216  2.37e-4
##  8 Expected.Annual.Loss.Rate...Building...Composite             0.215  2.60e-4
##  9 Expected.Annual.Loss...Population...Composite                0.0882 1.37e-1
## 10 Expected.Annual.Loss...Population.Equivalence...Composite    0.0882 1.37e-1

## # A tibble: 1 x 3
##   predictor                    correlation  p_value
##   <chr>                              <dbl>    <dbl>
## 1 farm_operations_acres_operated     0.213 0.000293

## # A tibble: 2 x 3
##   predictor                                    correlation    p_value
##   <chr>                                              <dbl>      <dbl>
## 1 National.Risk.Index...Score...Composite            0.270 0.00000367
## 2 National.Risk.Index...State.Percentile...Composite 0.211 0.000333

## # A tibble: 6 x 3
##   predictor                                        correlation  p_value
##   <chr>                                                  <dbl>    <dbl>
## 1 Community.Resilience...Value                           0.369  1.30e-10
## 2 Social.Vulnerability.and.Community.Resilience.Adjusted.E~  0.231  8.59e- 5
## 3 Community.Resilience...State.Percentile                0.179  2.47e- 3
## 4 Community.Risk.Factor...Value                         -0.0762 2.00e- 1
## 5 Social.Vulnerability...Score                          -0.0627 2.92e- 1
## 6 Social.Vulnerability...State.Percentile                0.0616 3.00e- 1

## # A tibble: 11 x 3
##    predictor                                       correlation   p_value
##    <chr>                                                 <dbl>     <dbl>
##  1 Agriculture.Value....                                 0.907  1.71e-108
##  2 commodity_totals_sales_measured_in_$                  0.907  1.76e-108
##  3 govt_programs_federal_operations_with_receipts        0.826  1.60e- 71
##  4 machinery_totals_asset_value_measured_in_$_operation  0.751  7.07e- 53
##  5 commodity_totals_sales_measured_in_$_operation        0.745  1.13e- 51
##  6 govt_programs_federal_receipts_measured_in_$          0.746  1.47e- 50
##  7 Shape__Length                                        -0.255  1.35e-  5
##  8 Area..sq.mi.                                         -0.241  3.82e-  5
##  9 Shape__Area                                          -0.184  1.81e-  3
## 10 Building.Value....                                    0.108  6.84e-  2
## 11 Population..2020.                                    -0.0447 4.53e-  1
```