Initialization

```
SetDirectory["to be adapted"]

Needs["JLink`"]
ReinstallJava[JVMArguments → "-Xmx10g"];
```

Sales (σ)

```
sorig = (*Import dataset as shown below from STATA*);

salesorig =
  Cases[sorig, {gvkey_, y_, sales_ /; MemberQ[{0, Null}, sales] == False, isic_} :>
    {gvkey, y, sales, isic}];
salesorig // TableForm[#[[1 ;; 5]]] &
```

Out[1]=

gvkey	year	sale	ssicb1
1078	1979	680.4	2834
1078	1979	830.4	2834
1078	1979	172.4	2834
1078	1979	138.4	2834

```
firms = Union[salesorig[[All, 1]]];

sales2Digits = Flatten[{#[[1, 1 ;; 3]], Total[#[[All, 4]]]} & /@
    GatherBy[({#1, #2, #3, Floor[#4/100]} & @@@ Rest[salesorig]), #[[1 ;; 3]] &]];

Clear[prodcat];
prodcat[2] = Union[sales2Digits[[All, -1]]];


Clear[S];
(S[#1, #2, #4] = #3) & @@@ sales2Digits;
```

Moving Average 3 years

```
Table[Sales2DigitMA3[f, y, p] = If[# == {}, 0, Total[#]/3] &[
    {S[f, y - 1, p], S[f, y, p], S[f, y + 1, p]} /. S -> Nothing],
  {f, firms[[1 ;;]]}, {p, prodcat[2]}, {y, 1984, 2005}];
```

Growth Rates by industry

```
Clear[GRindustry];
Table[
  Flatten[{GRindustry[2, #, y] = If[Sum[Sales2DigitMA3[f, y - 1, #], {f, firms}] == 0,
        0, (Sum[Sales2DigitMA3[f, y, #], {f, firms}] -
           Sum[Sales2DigitMA3[f, y - 1, #], {f, firms}])/Sum[
          Sales2DigitMA3[f, y - 1, #], {f, firms}]]} & /@ prodcat[2]], {y, 1985, 2005}];
```

Growth Rates "salesWideGR"

```
Clear[salesWideGR];
salesWideGR[2] =
  Flatten[#, 1] &@Table[Flatten[{f, y, If[Sales2DigitMA3[f, y - 1, #] == 0,
          0, (Sales2DigitMA3[f, y, #] - Sales2DigitMA3[f, y - 1, #])/
            Sales2DigitMA3[f, y - 1, #]]} & /@
      prodcat[2]}], {f, firms}, {y, 1985, 2005}}];
```

Growth Rates minus industry average "salesWideGRcorr"

```
Clear[salesWideGRcorr];
salesWideGRcorr[2] =
  Flatten[#, 1] &@Table[Flatten[{f, y, If[Sales2DigitMA3[f, y - 1, #] == 0, 0,
          (Sales2DigitMA3[f, y, #] - Sales2DigitMA3[f, y - 1, #])/
            Sales2DigitMA3[f, y - 1, #] - GRindustry[2, #, y]] & /@
      prodcat[2]}], {f, firms}, {y, 1985, 2005}}];
```

Cleaning: only sales in more than two product categories "salesCleanedGR"

```
salesCleanedGR[2] = Pick[salesWideGR[2],
   (Length[#] ≥ 2) & /@ Map[# > 0 /. False → Nothing &, salesWideGR[2][[1 ;;]], {2}]];
```

Cleaning: only sales in more than two product categories minus industry average "salesCleanedGRcorr"

```
salesCleanedGRcorr[2] = Pick[salesWideGRcorr[2],
   (Length[#] ≥ 2) & /@ Map[# > 0 /. False → Nothing &, salesWideGRcorr[2][[1 ;;]], {2}]];
```

How many firms per year

```
Clear[CorrNoZero];
CorrNoZero[data_] := Module[{d = data, tuples, tuples1, tuples2},
  tuples = Union[Cases[Sort /@ Tuples[d, 2], {a_, b_} /; a ≠ b]];
  tuples1 = Select[{Join[{#[[1, 1]]}, #[[2, 1 ;; 2]]], Cases[#[[All, 3 ;;]]^T,
        {_?Positive, _?Positive}]} & /@ tuples, Length[#[[2]]] ≥ 2 &];
  tuples2 = Select[{#1, #2^T} &@@@ tuples1, StandardDeviation[#[[2, 1]]] != 0 &&
      StandardDeviation[#[[2, 2]]] != 0 &];
  Flatten[{#1, Correlation[#[[1]], #[[2]]] &@#2} &@@@ tuples2

 ];
```

Correlation "KorrelationGR"

```
Clear[KorrelationGR];

KorrelationGR[2] =
  Flatten[Parallelize@Table[With[{d = GroupBy[salesCleanedGR[2], #[[2]] &]},
      CorrNoZero[d[y]]], {y, 1985, 2005}], 1];
```

Correlation minus industry average “KorrelationGRcorr”

```
Clear[KorrelationGRcorr];

KorrelationGRcorr[2] =
  Flatten[Parallelize@Table[With[{d = GroupBy[salesCleanedGRcorr[2], #[[2]] &]},
      CorrNoZero[d[y]]], {y, 1985, 2005}], 1];
```

Export back to STATA

Export KorrelationGRcorr[2] back to STATA. Label: sigma_2_digits"