# Sequence IVB Operational Analysis

By: Industry Stats Team

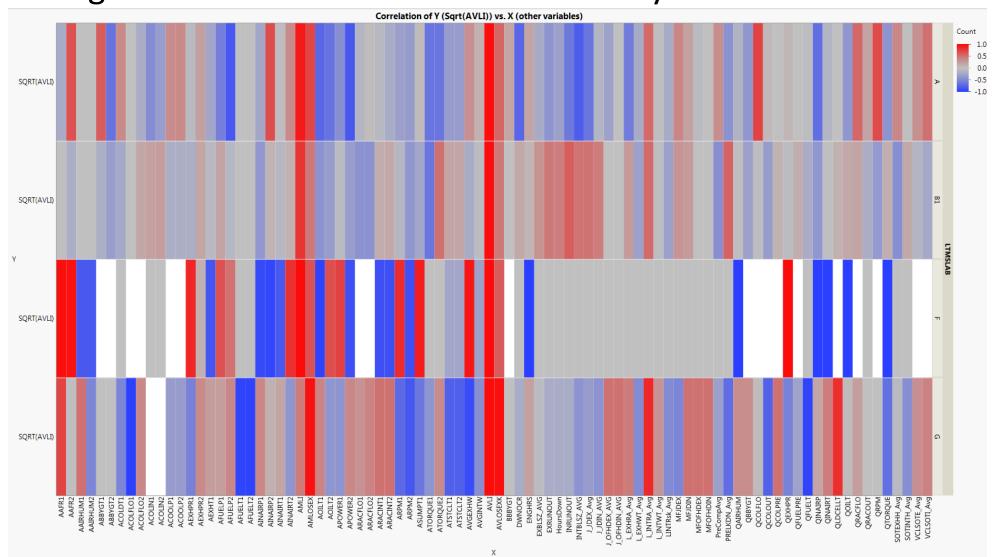
02-14-18

- All operational data was analyzed using Partial Least Squares (PLS)
  - Method is appropriate for multicollinear data and/or where the number of independent variables exceeds the number of observations
  - Some operational, surface finish, and camshaft related variable measurement data in analysis seems suspect (data entry error?), which will affect analysis results
- Factors identified in partial least squares does not imply root cause
  - It identifies factors that may be of interest for additional investigation
- PLS Model Related info:
  - Dependent variable analyzed: Sqrt(AVLI)
  - Number of observations = 28
  - Number of independent variables = 90
  - For the analysis, missing values were imputed using mean value substitution

 Excluding lab-Stand & oil factors, the top 20 variables identified in the PLS analysis of the Sqrt(AVLI) are summarized below:

	Top 20 Factors	Variable Description
1	INRUNOUT	Intake Camshasft Runout
2	L_INTRA_Avg	Lobe Intake Surface Finish Average Ra
3	EXRUNOUT	Exhaust Camshaft Runout
4	DWNOCR	Number of Downtime Occurrences
5	ARPM2	Average RPM - Phase 2
6	AAFR2	Avg Air/Fuel Ratio Phase 2
7	J_JDIN_AVG	Journal to Journal Dia Intake Avg
8	QOILT	EOT QI Oil Gallery Temp
9	PreCompAvg	Average Cyl Compression PreTest
10	EXBLSZ_AVG	Exhaust Lifter Bucket Size Average
11	J_JDEX_Avg	Journal to Journal Dia Exhaust Avg
12	ATORQUE1	Average Torque Phase 1
13	ACOOLP2	Average Engine Coolant Pressure Stage 2
14	ACOOLP1	Average Engine Coolant Pressure Stage 1
15	AFUELP2	Average Fuel Pressure Phase 2
16	SOTINTH_Avg	Start of Test Heel to Toe Intake Avg
17	MFJDEX	Main Feed Oil Hole Dia, Exhaust Cam
18	AINAIRT2	Avg Intake Air Temp Phase 2
19	QAIRHUM	EOT QI Intake Air Humidity
20	INTBLSZ_AVG	Avg Intake Bucket Lifter Size

 A color heat map of the correlations between the Sqrt(AVLI) and the other remaining variables are summarized below - by test lab:



 Plots of all variables included in the analysis are provided in the following slides. **Graph Builder** SQRT(AVLI) vs. AAFR1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 15.0 16.5 14.0 14.5 15.5 16.0 17.0 17.5 AAFR1

**Graph Builder** SQRT(AVLI) vs. AAFR2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVL) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 14.1 14.2 14.5 14.4 14.3 14.6 AAFR2

**Graph Builder** SQRT(AVLI) vs. AAIRHUM1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 11.30 11.35 11.40 11.45 11.50 AAIRHUM1

**Graph Builder** SQRT(AVLI) vs. AAIRHUM2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 11.30 11.35 11.40 11.45 11.50 AAIRHUM2

**Graph Builder** SQRT(AVLI) vs. ABBYGT1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 29.3 28.9 29.0 29.1 29.2 ABBYGT1

**Graph Builder** SQRT(AVLI) vs. ABBYGT2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 28.75 28.80 28.85 28.90 28.95 29.00 29.05 29.10 29.15 ABBYGT2

**Graph Builder** SQRT(AVLI) vs. ACOLDT1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 1.2 14 1.6 2.0 1.8 2.2 ACOLDT1

**Graph Builder** SQRT(AVLI) vs. ACOLFLO1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 79.3 79.4 79.5 79.6 79.7 79.8 79.9 0.08 80.1 ACOLFLO1

**Graph Builder** SQRT(AVLI) vs. ACOLFLO2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 80.0 80.2 80.4 80.6 8.08 ACOLFLO2

**Graph Builder** SQRT(AVLI) vs. ACOLIN1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 49.3 49.4 49.5 49.6 49.7 49.8 49.9 50.0 50.1 50.2 ACOLIN1

**Graph Builder** SQRT(AVLI) vs. ACOLIN2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 48.8 49.0 49.2 49.4 49.6 49.8 50.0 50.2 ACOLIN2

**Graph Builder** SQRT(AVLI) vs. ACOOLP1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVL) **IND** 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 68 72 74 76 66 70 ACOOLP1

**Graph Builder** SQRT(AVLI) vs. ACOOLP2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVL) **IND** 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 68 72 74 76 66 70 ACOOLP2

**Graph Builder** SQRT(AVLI) vs. AEXHPR1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 98 97 99 100 101 102 103 104 AEXHPR1

**Graph Builder** SQRT(AVLI) vs. AEXHPR2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 102.5 103.0 103.5 104.0 104.5 105.0 105.5 106.0 AEXHPR2

**Graph Builder** SQRT(AVLI) vs. AEXHT1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 440 500 420 460 480 AEXHT1

**Graph Builder** SQRT(AVLI) vs. AFUELP1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 332 333 334 335 336 337 338 339 340 AFUELP1

**Graph Builder** SQRT(AVLI) vs. AFUELP2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 330 332 334 336 338 340 AFUELP2

**Graph Builder** SQRT(AVLI) vs. AFUELT1 • A-1 • A-2 1.6 B1-1 1.4 • B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 22.0 22.5 23.0 23.5 24.0 AFUELT1

**Graph Builder** SQRT(AVLI) vs. AFUELT2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 22.0 22.5 23.0 23.5 24.0 AFUELT2

**Graph Builder** SQRT(AVLI) vs. AINAIRP1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.14 0.16 0.18 0.20 0.22 0.24 0.26 0.28 AINAIRP1

**Graph Builder** SQRT(AVLI) vs. AINAIRP2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 1.4 (AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.30 0.35 0.20 0.25 AINAIRP2

**Graph Builder** SQRT(AVLI) vs. AINAIRT1 • A-1 • A-2 1.6 B1-1 1.4 • B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 31.95 31.90 32.00 32.05 32.10 AINAIRT1

**Graph Builder** SQRT(AVLI) vs. AINAIRT2 • A-1 • A-2 1.6 B1-1 1.4 • B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 31.90 31.95 32.00 32.05 32.10 AINAIRT2

**Graph Builder** SQRT(AVLI) vs. APOWER1 A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 2.0 2.5 3.5 3.0 APOWER1

**Graph Builder** SQRT(AVLI) vs. APOWER2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 1.2 1.2 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 10.0 10.5 11.0 11.5 APOWER2

**Graph Builder** SQRT(AVLI) vs. ARACFLO1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 118.5 119.0 119.5 120.0 ARACFLO1

**Graph Builder** SQRT(AVLI) vs. ARACFLO2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 119.5 120.0 120.5 121.0 ARACFLO2

**Graph Builder** SQRT(AVLI) vs. ARACINT1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 (AVLI) 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 19.6 19.7 19.8 19.9 20.0 ARACINT1

**Graph Builder** SQRT(AVLI) vs. ARACINT2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 (AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 19.6 20.0 19.7 19.8 19.9 ARACINT2

**Graph Builder** SQRT(AVLI) vs. ARPM1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 790 800 810 820 830 840 ARPM1

**Graph Builder** SQRT(AVLI) vs. ARPM2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 4285 4290 4295 4300 4305 4310 ARPM2

**Graph Builder** SQRT(AVLI) vs. ASUMPT1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 59.5 61.0 61.5 60.0 60.5 62.0 ASUMPT1

**Graph Builder** SQRT(AVLI) vs. ATORQUE1 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 24.90 24.80 24.85 24.95 25.00 25.05 25.10 25.15 25.20 ATORQUE1

**Graph Builder** SQRT(AVLI) vs. ATORQUE2 • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 **IND** 1.0 8.0 1.6 1.4 1.2 1.0 8.0 24.80 24.85 24.90 24.95 25.00 ATORQUE2

**Graph Builder** SQRT(AVLI) vs. ATSTCLT1 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 25 30 35 40 ATSTCLT1

**Graph Builder** SQRT(AVLI) vs. ATSTCLT2 A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 25 30 35 40 ATSTCLT2

**Graph Builder** SQRT(AVLI) vs. AVGEXHW A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 5 2 3 0 4 AVGEXHW

**Graph Builder** SQRT(AVLI) vs. AVGINTW • A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 ź 8 0 AVGINTW

**Graph Builder** SQRT(AVLI) vs. DWNOCR A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 10 15 0 **DWNOCR** 

**Graph Builder** SQRT(AVLI) vs. ENGHRS • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 800 200 400 600 1000 **ENGHRS** 

**Graph Builder** SQRT(AVLI) vs. EXBLSZ\_AVG A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 34 35 40 32 33 36 37 38 39 41 EXBLSZ\_AVG

**Graph Builder** SQRT(AVLI) vs. EXRUNOUT A-1 1.8 • A-2 B1-1 1.6 B1-2 300 1.4 B1-3 • F-1 1.2 • G-1 1.0 -Smooth 8.0 1.8 ORT(AVL) 1.4 1.2 1011 IND 1.0 8.0 1.8 1.6 1.4 1.2 1.0 8.0 -0.005 0.000 0.005 0.010 0.015 0.020 0.025 0.030 0.035 **EXRUNOUT** 

**Graph Builder** SQRT(AVLI) vs. HoursDown • A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 -0.1 0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 8.0 HoursDown

**Graph Builder** SQRT(AVLI) vs. INRUNOUT • A-1 1.8 • A-2 B1-1 1.6 B1-2 300 1.4 • B1-3 • F-1 1.2 • G-1 1.0 ---Smooth 8.0 1.8 ORT(AVL) 1.4 1.2 **IND** 1.0 8.0 1.8 1.6 1.4 1.2 1.0 8.0 0.00 0.01 0.02 0.03 0.04 INRUNOUT

**Graph Builder** SQRT(AVLI) vs. INTBLSZ\_AVG • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 28 30 31 26 27 29 32 33 34 INTBLSZ\_AVG

**Graph Builder** SQRT(AVLI) vs. J\_JDEX\_Avg • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 22.950 22.955 22.960 22.965 J\_JDEX\_Avg

**Graph Builder** SQRT(AVLI) vs. J\_JDIN\_AVG • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 22.952 22.954 22.956 22.958 22.960 22.962 22.964 22.966 J\_JDIN\_AVG

**Graph Builder** SQRT(AVLI) vs. J\_OFHDEX\_AVG • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 (AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.0 0.5 1.0 2.0 1.5 J\_OFHDEX\_AVG

**Graph Builder** SQRT(AVLI) vs. J\_OFHDIN\_AVG • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 1.2 1.2 1011 N 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 0.0 0.5 1.0 1.5 2.0 J\_OFHDIN\_AVG

**Graph Builder** SQRT(AVLI) vs. L\_EXHRA\_Avg • A-1 • A-2 1.6 B1-1 1.4 B1-2 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 5 10 15 20 25 0 30 L\_EXHRA\_Avg

**Graph Builder** SQRT(AVLI) vs. L\_EXHWT\_Avg A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1011 NB 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 10 25 40 15 20 30 35 45 0 5 L\_EXHWT\_Avg

**Graph Builder** SQRT(AVLI) vs. L\_INTRA\_Avg • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 L\_INTRA\_Avg

**Graph Builder** SQRT(AVLI) vs. L\_INTWT\_Avg A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 —Smooth 8.0 1.6 SQRT(AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 10 15 5 20 0 L\_INTWT\_Avg

**Graph Builder** SQRT(AVLI) vs. LINTRsk\_Avg A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 —Smooth 8.0 1.6 SQRT(AVLI) 1011 NB 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 10 25 40 15 20 30 35 45 0 5 LINTRsk\_Avg

**Graph Builder** SQRT(AVLI) vs. MFJDEX • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 33.952 33.954 33.956 33.958 33.960 33.962 MFJDEX

**Graph Builder** SQRT(AVLI) vs. MFJDIN • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 33.955 33.960 33.965 33.970 MFJDIN

**Graph Builder** SQRT(AVLI) vs. MFOFHDEX A-1 • A-2 1.6 B1-1 1.4 • B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 (AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.0 0.5 1.5 2.0 1.0 MFOFHDEX

**Graph Builder** SQRT(AVLI) vs. MFOFHDIN • A-1 • A-2 1.6 B1-1 1.4 B1-2 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 N 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 0.0 0.5 1.0 1.5 2.0 MFOFHDIN

**Graph Builder** SQRT(AVLI) vs. PreCompAvg • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 1400 1500 1550 1600 1650 1700 1750 1800 1450 PreCompAvg

**Graph Builder** SQRT(AVLI) vs. PRELKDN\_Avg • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 (AVLI) 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 ź 0 8 PRELKDN\_Avg

**Graph Builder** SQRT(AVLI) vs. QAIRHUM • A-1 • A-2 1.6 B1-1 1.4 B1-2 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 QAIRHUM

**Graph Builder** SQRT(AVLI) vs. QBBYGT A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 0.0 0.2 0.4 0.6 8.0 1.0 QBBYGT

**Graph Builder** SQRT(AVLI) vs. QCOLFLO • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.0 1.0 1.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.5 QCOLFLO

**Graph Builder** SQRT(AVLI) vs. QCOLOUT • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.800 0.825 0.850 0.875 0.900 0.925 0.950 QCOLOUT

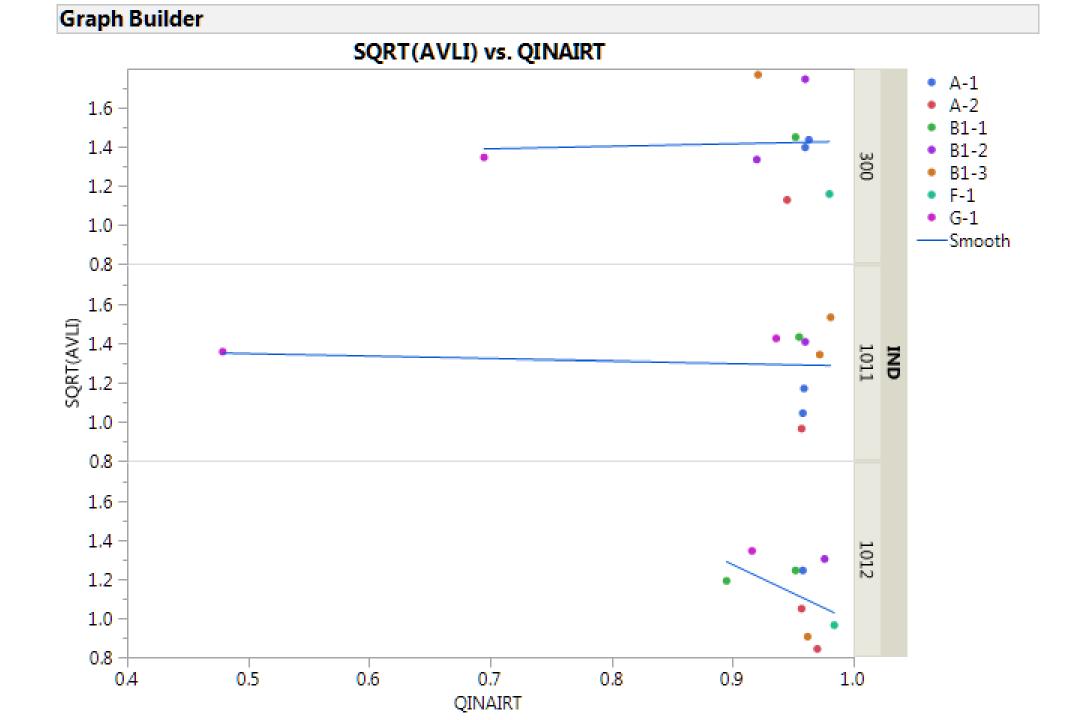
**Graph Builder** SQRT(AVLI) vs. QCOLPRE A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 -0.5 0.5 1.0 0.0 QCOLPRE

**Graph Builder** SQRT(AVLI) vs. QEXHPR A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 -0.5 -1.0 0.0 0.5 1.0 QEXHPR

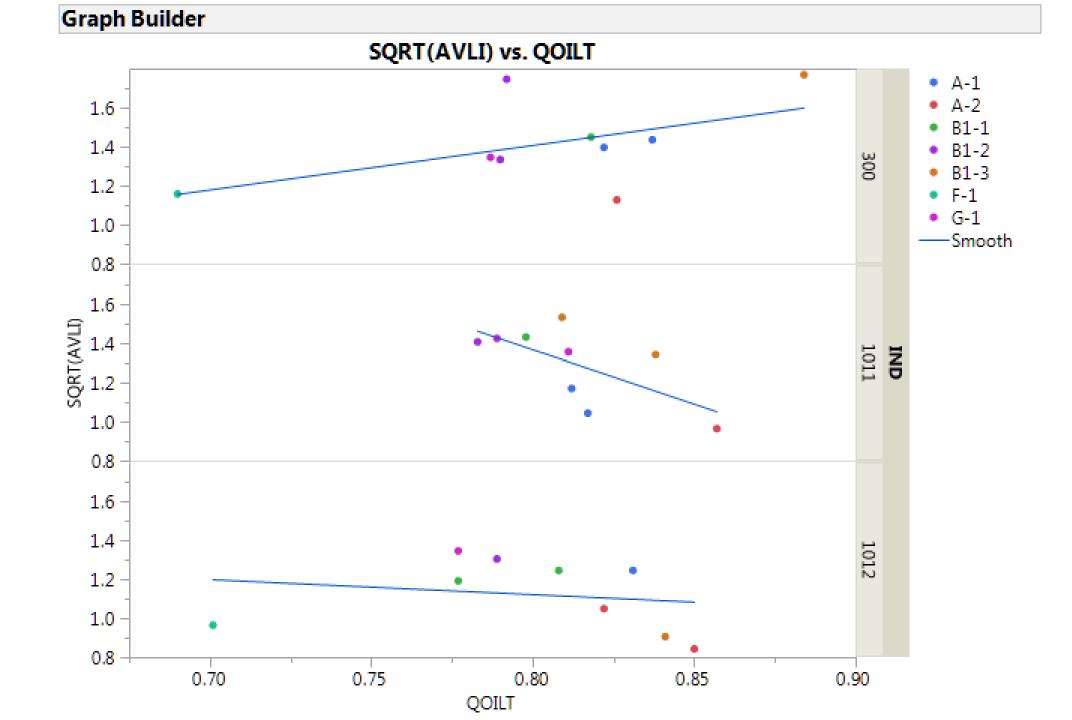
**Graph Builder** SQRT(AVLI) vs. QFUELPRE • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.75 0.80 0.85 0.90 0.95 1.00 QFUELPRE

**Graph Builder** SQRT(AVLI) vs. QFUELT A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 -5 -20 -15 -10 QFUELT

**Graph Builder** SQRT(AVLI) vs. QINAIRP • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 QINAIRP



**Graph Builder** SQRT(AVLI) vs. QLDCELLT • A-1 • A-2 1.6 B1-1 1.4 B1-2 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.85 0.90 0.95 1.00 QLDCELLT



**Graph Builder** SQRT(AVLI) vs. QRACFLO A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 1.4 1.2 1.2 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.0 0.2 0.4 0.6 1.0 8.0 QRACFLO

**Graph Builder** SQRT(AVLI) vs. QRACOUT • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 1.4 (AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 1.05 QRACOUT

**Graph Builder** SQRT(AVLI) vs. QRPM A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 0.70 0.75 0.80 0.85 0.90 0.95 1.00 QRPM

**Graph Builder** SQRT(AVLI) vs. QTORQUE • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 A 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 1.00 0.70 0.75 0.80 0.85 0.90 0.95 QTORQUE

**Graph Builder** SQRT(AVLI) vs. SOTEXHH\_Avg • A-1 • A-2 1.6 B1-1 1.4 • B1-2 300 • B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 10 5 15 20 25 30 35 40 45 0 SOTEXHH\_Avg

**Graph Builder** SQRT(AVLI) vs. SOTINTH\_Avg A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1.4 1011 1.0 8.0 1.6 1.4 1.2 1.0 8.0 36.705 36.710 36.720 36.725 36.730 36.735 36.745 36.715 36.740 SOTINTH\_Avg

**Graph Builder** SQRT(AVLI) vs. VCLSOTE\_Avg • A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 ---Smooth 8.0 1.6 SQRT(AVLI) 1011 IND 1.0 8.0 1.6 1.4 1012 1.2 1.0 8.0 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35 VCLSOTE\_Avg

**Graph Builder** SQRT(AVLI) vs. VCLSOTI\_Avg A-1 • A-2 1.6 B1-1 1.4 B1-2 300 B1-3 1.2 • F-1 • G-1 1.0 -Smooth 8.0 1.6 SQRT(AVLI) 1011 IND 1.0 8.0 1.6 1.4 1.2 1.0 8.0 0.10 0.00 0.05 0.15 0.20 VCLSO∏\_Avg