Know Your Quartiles

Indiana School Data based on Quartile Rank to help leaders and boards work together.

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Making Data informed decisions regarding data on financial health.

- In Indiana the school board must organize a board of finance after they organize the school board.
- Our presentation explores how we can better on board new superintendents and board members.

Indiana Code Title 5. State and Local Administration § 5-13-7-6

Current as of January 02, 2024 | Updated by FindLaw Staff

Sec. 6. (a) Each local board of finance shall meet annually after the first Monday and on or before the last day of January. At the annual meeting the board of finance shall do the following:

(1) Elect from the board's membership:

(A) a president; and

(B) a secretary.

The officers elected hold office until the officers' successors are elected and qualified.

(2) Receive and review the report required by section 7 of this chapter.

(3) In the case of a board of finance of a school corporation, receive and review the report submitted under section 8 of this chapter.

(b) A majority of the members of each board of finance constitutes a quorum for the transaction of business. Each board of finance shall hold additional sessions whenever necessary to discharge its duties and to accomplish the purposes of this chapter. The president of each board shall convene the board whenever requested to do so by one (1) of the members, or whenever necessary to the performance of the duties imposed by this chapter.

(c) All meetings of the boards of finance must be open to the public, and the records of the boards shall be subject to public inspection in accordance with IC 5-14-3 and IC 5-15-2, respectively. The secretary of each board shall keep a record of the proceedings, which shall be approved and signed by the president of the board and attested by the secretary.

(d) A local board of finance shall be known by the name “The Board of Finance of _____”, inserting the name of the proper political subdivision, and may sue and be sued in the board's name in any action and in any court of competent jurisdiction.

We know how we compare to other districts when it comes to academic success.
What about fiscal health?

- Costs
- Revenue
- Expenses
- Utility Costs
- Pay
- Contracts
- Debt
- Tax rates?

How we got started: Cost to produce a graduate, schools are inefficient.

- HICKS CBER REPORTS
- Indiana Chamber paying for studies pushing school consolidation efforts.

- https://projects.cberdata.org/194/school-corporation-size-and-student-outcomes
- https://projects.cberdata.org/reports/SchoolCorp17-0815.pdf

You know your financial ranking. What is Normal?

Do you know how you rank based on size, location, county, and or taxbase?

Would that data help?

When searching for a job should you know the financial situation?

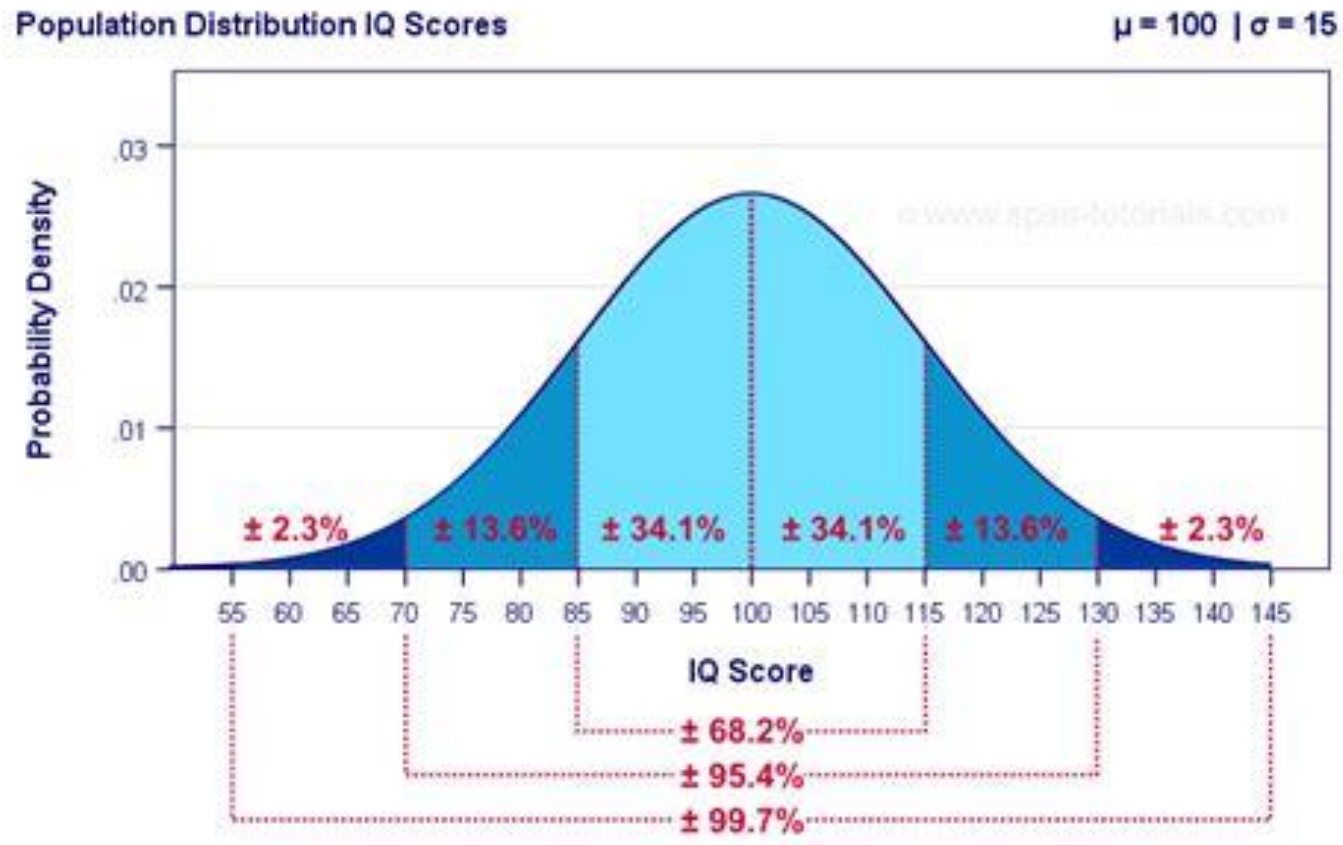
When boards search for a candidate should they find one with strengths related to its need?

How do we make comparisons to know where we are?

What is normal for an expenditure?

What is normal for a cost?

Is our district normal or is it an outlier when it comes to fiscal hearth?



Two examples of the know your quartile ranking approach.

Ex 1: Cost to Produce a Graduate

Ex 2: Debt Analysis Related to HB 1120.

Costs Vary and Graduating Classes Vary

- High Debt Year
- Transportation Costs Vary – larger area more miles.
- Poverty varies
- Contracts
- Facility Age and expenditures are a factor
- Some classes have more capacity than others (honors grads etc.)

Let’s find out who is efficient and why.

Ex 1: **Cost to Product a Graduate**

A Non-Waiver graduate (college and career ready) is our desired outcome.

How much does it Cost to Produce a Non-Waivered Graduate for each school district k-12 in Indiana?

What is the relationship between the Cost to Produce a Non-Waivered Graduate and the following variables?

- Percentage of Free and Reduced Lunch
- Percentage of Special Ed students in the Class
- Federal Special Ed Graduation Rate

Limitations

- Data was collected for K-12 Districts and Charter Schools operating from 2006-2018.
- No K-8 or 9-12 only Charter Schools.
- Data was not collected for any Private Schools.

Data Collection

Data collection utilized Indiana Form 9 data, which is publicly available school financial report.

It collects and documents all expenses for all students in a school district or charter school.

Form 9 data in Indiana comprises of all financial information for a public school and is submitted twice a year.

Data Collection

The data includes debt, transportation, and every single expense incurred by the school district. It also included 3% paid to authorizer by Charter Schools.

We included the student demographic data from the graduating class that was easily accessible from IDoE's enrollment and attendance data and data from the graduation reports published each year.

How much does it Cost to Produce a Non-Waivered Graduate for each school district k-12 in Indiana?

We calculated the **Cost to Produce a Non-Waivered Graduate** by

- Summing the expenses for each district, representing the total cost for the entire graduating class of 2018.
- Dividing the result by 13 to control for the cost of one grade level.
- Dividing by the number of graduates and non-waiver graduates, representing a cost per student.

We also collected data for the following variables for each school district k-12 in Indiana:

- **Percentage of Free and Reduced Lunch (SocioEconomic Status)**
- **Percentage of Special Ed students in the Graduating Class**
- **Federal Special Ed Graduation Rate**

Corporation Name	Number of 2018 Grads Non-Waiver	Number of 2018 Grads including Waivers	Cost to produce a 2018 non waiver graduate	Cost to produce all 2018 grads including waivers	Percent Free and Reduced Lunch 2018 (SES)	Special Ed Percent Class of 2018	Special Education Federal Graduation Rate 2018
Adams Central Community Schools	73	81	$ 185,599.40	$ 167,268.60	0.2506	0.0941	0.5000
North Adams Community Schools	123	136	$ 196,020.39	$ 177,283.15	0.5173	0.0845	0.7500
South Adams Schools	77	87	$ 192,200.71	$ 170,108.68	0.4237	0.1368	0.6154
M S D Southwest Allen County Schls	519	532	$ 151,268.05	$ 147,571.65	0.1425	0.0812	0.6889
Northwest Allen County Schools	536	543	$ 128,370.95	$ 126,716.07	0.1898	0.1046	0.8305
Fort Wayne Community Schools	1547	1723	$ 244,549.20	$ 219,569.13	0.6678	0.1764	0.6254
East Allen County Schools	637	727	$ 164,441.40	$ 144,084.14	0.5262	0.1293	0.4167
Bartholomew Con School Corp	699	777	$ 206,184.15	$ 185,486.13	0.4535	0.1290	0.6518
Flat Rock-Hawcreek School Corp	63	69	$ 157,082.58	$ 143,423.23	0.4524	0.1370	0.9000
Benton Community School Corp	125	130	$ 178,128.99	$ 171,277.87	0.4918	0.2370	0.8750
Blackford County Schools	111	120	$ 180,453.86	$ 166,919.82	0.5848	0.1221	0.6875

Descriptive Statistics

Variable	*n*	*M*	*SD*
1. Cost Non-Waiver Graduate [a]	296	190,530.71	69,487.45
2. Cost Graduate (Waiver & Non-Waiver) [a]	296	173,592.40	62,314.61
3. Percentage Free & Reduced Lunch (SES) [a]	296	0.4781	0.16
4. Percentage Special Ed students Class of 2018	296	0.1427	0.05
5. Federal Special Ed Grad Rate [a]	296	0.7242	0.15

[a] Values reflect the average for 2018.
[b] Values reflect the average from 2005 to 2018.

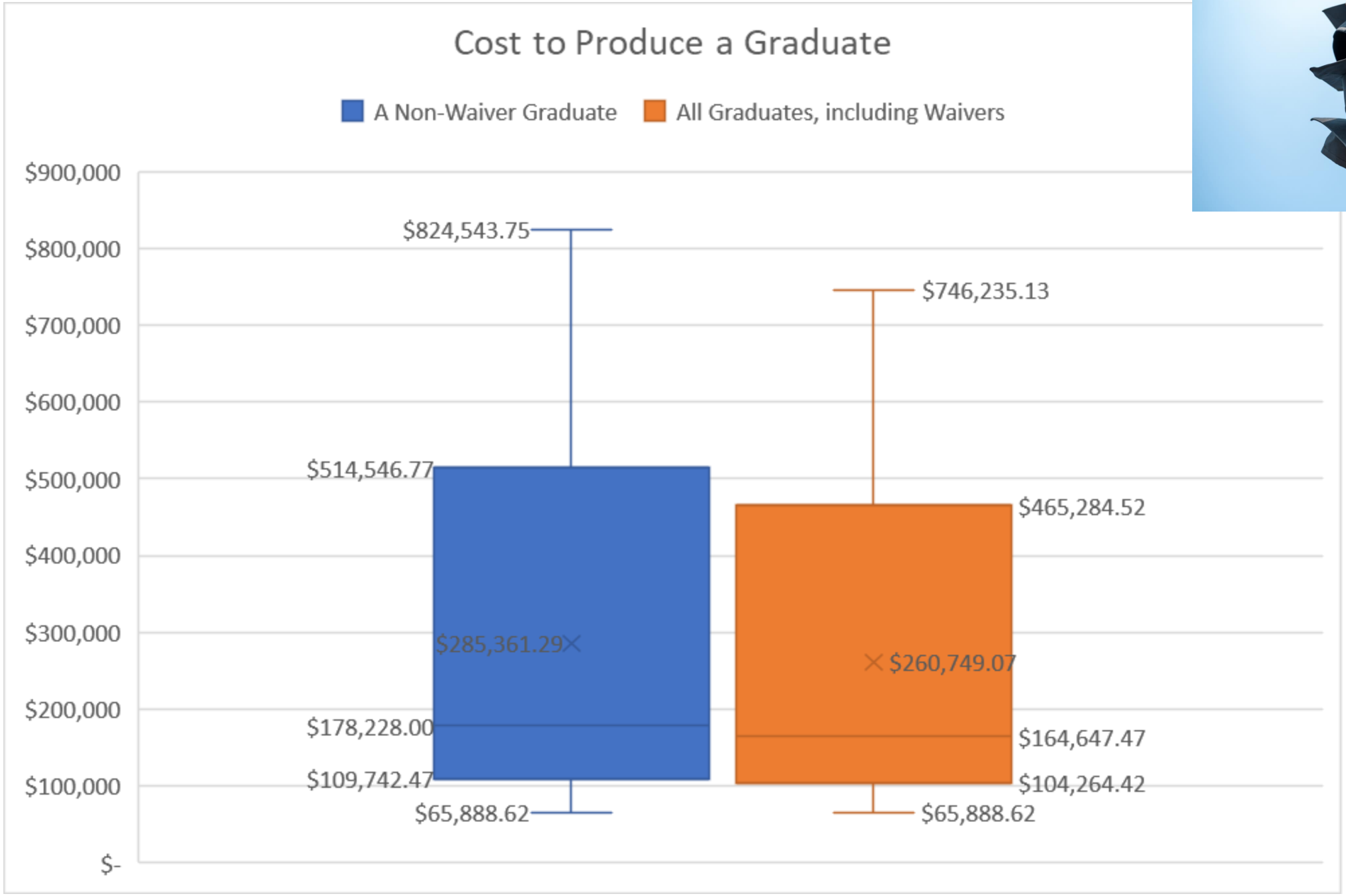
A new type of analysis

- Doesn’t look at high achievers…doesn’t look at SAT. Just Graduates as the product based on dollars spent as an input.

- Charter schools
  - Advantage: They do not have transportation or debt services to account for.
  - Disadvantage: They typically serve very high poverty populations.

Cost to Produce a Graduate - Quartiles

Cost to Produce a Non-Waiver Graduate	Cost to Produce All Graduates, including Waivers	
$ 190,530.71	$ 173,592.40	**Mean, Average**
$ 69,487.45	$ 62,314.61	**Standard Deviation**
$ 65,888.62	$ 65,888.62	**MINNIMUM**
$ 153,596.31	$ 142,640.21	**1st QUARTILE**
$ 178,228.00	$ 164,647.47	**Median, 2nd QUARTILE**
$ 204,549.78	$ 184,333.92	**3rd QUARTILE**
$ 824,543.75	$ 746,235.13	**Maximum**


Cost to Produce a Graduate
A Non-Waiver Graduate
All Graduates, including Waivers
$900,000
$800,000
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$-
$824,543.75
$514,546.77
$285,361.29
$178,228.00
$109,742.47
$65,888.62
$746,235.13
$465,284.52
$260,749.07
$164,647.47
$104,264.42
$65,888.62

Top 10 1st Quartile Highest SES

Corporation Name	Number of 2018 Grads Non-Waiver	Number of 2018 Grads including Waivers	Cost to produce a 2018 non waiver graduate	Cost to produce all 2018 grads including waivers	Percent Free and Reduced Lunch 2018 (SES)	Special Ed Percent Class of 2018	Special Education Federal Graduation Rate 2018
Burris Laboratory School	46	46	$ 65,888.62	$ 65,888.62	0.2403	0.0652	1.0000
Noblesville Schools	600	657	$ 173,240.83	$ 158,210.81	0.2404	0.1272	0.8046
Brownsburg Community School Corp	566	587	$ 152,746.19	$ 147,281.68	0.2480	0.1133	0.7971
Adams Central Community Schools	73	81	$ 185,599.40	$ 167,268.60	0.2506	0.0941	0.5000
Northwestern School Corp	119	119	$ 151,711.95	$ 151,711.95	0.2534	0.0992	0.9167
South Gibson School Corporation	132	140	$ 163,606.01	$ 154,257.09	0.2540	0.1164	0.9412
Southeast Dubois Co Sch Corp	88	92	$ 157,923.54	$ 151,057.29	0.2541	0.1237	0.8333
Penn-Harris-Madison School Corp	780	841	$ 146,188.95	$ 135,585.47	0.2617	0.1104	0.7835
Plainfield Community School Corp	358	367	$ 153,307.42	$ 149,547.84	0.2720	0.1156	0.8043
Westview School Corporation	102	108	$ 270,141.69	$ 255,133.81	0.2802	0.1429	0.8750

What is the relationship between the Cost to Produce a Non-Waivered Graduate and the following variables?

Correlation with the Cost to Produce a Non-Waivered Graduate

Variable	r
Percentage Free & Reduced Lunch (SES)	.442**
Percentage Special Ed students Class of 2018	.317**
Federal Special Ed Grad Rate	-.307**

**$p < .01$.

A significant multiple linear regression equation was found (F (3,292) = 37.695, p < .001), with an R^2 of .279.

Cost to Produce a Non-Waiver Graduate = 139,265.35 + 148,195.59(FR Lunch/SES) + 320,129.79(Percent of SpEd in class) – 90,104.88(Fed SpEd Rate)

Policy Implications for Small and Rural Districts/Schools

-We realize that results vary slightly year to year based on each class.

-However, what is causing us to have a higher cost output?

-Document our efficiency.

-Contrary to beliefs.

-Large land mass affects transportation costs.

-Keep measuring this each year.

Ex 2: **Debt Analysis Related to HB 1120**

- Schools vary in the amount of debt they have relative to their size, enrollment, number of buildings, and assessed value.
- Schools that have really high debt many times have really high assessed value compared to other units.
- Creating variables based on debt per student and assessed value per student equalizes the analysis across schools.
- Debt required to educate a student should not vary dramatically.
- Age of buildings and rates for bonding were not considered but important.
- This focuses on total debt not debt paid in a calendar year.

Indiana School Property Tax Supported Funds (See Tax Caps Handouts)

Operations Fund

- Bus Replacement
- Transporation Costs
- Utilities
- Superintendent Salary
- Custodial Salaries
- Non-Instructional "Stuff"

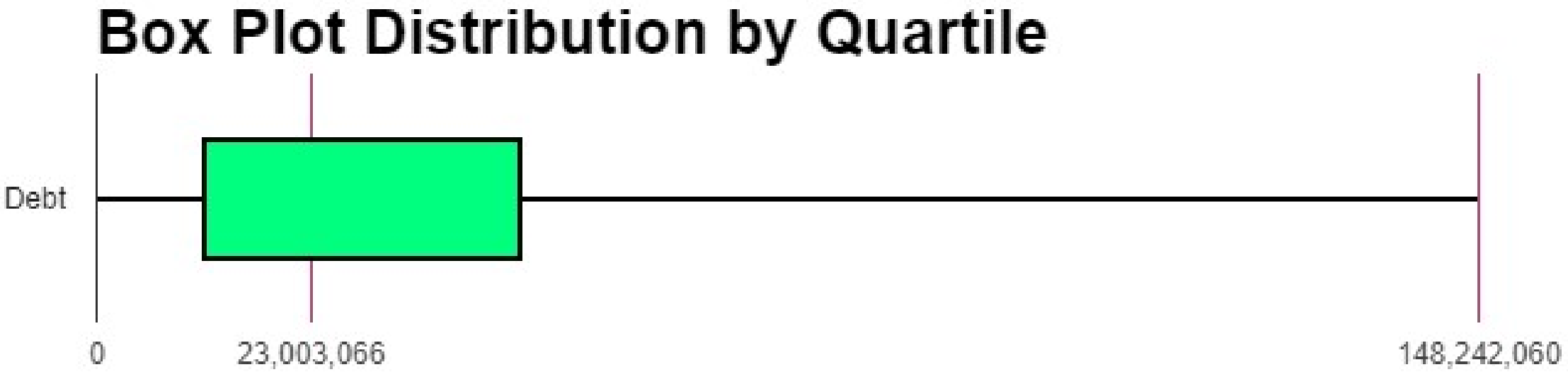
Debt Service Fund

- Payment of Debt on Bonds
- Lease Rental Payments
- Leases on Technology

Variables

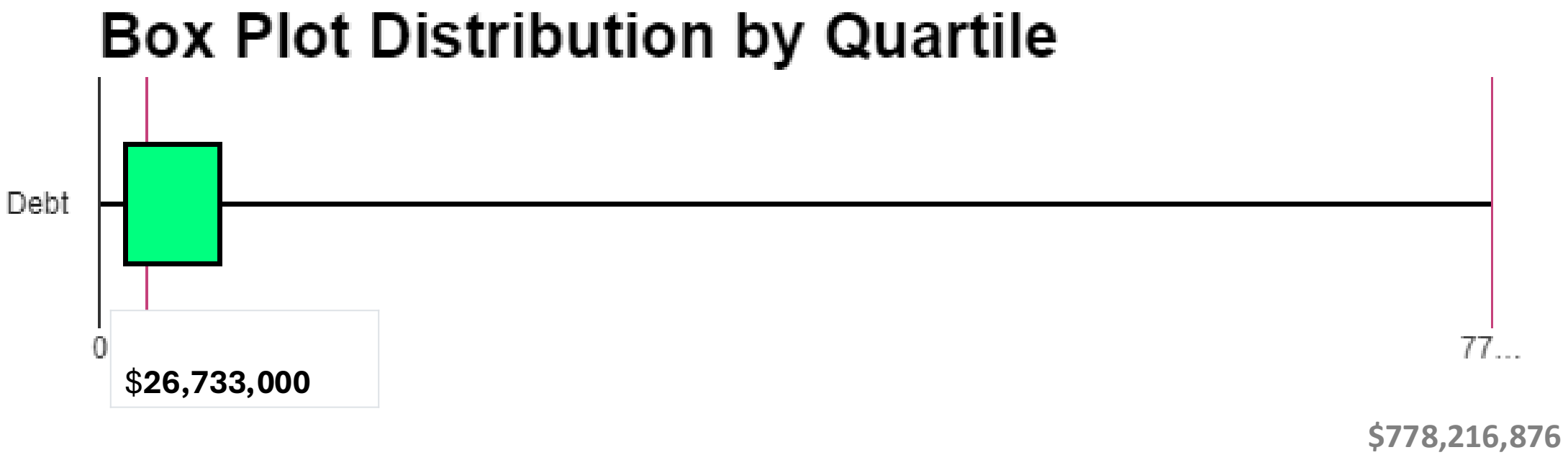
2013–2019	2021–2023	2023	2023	2023	2023	2024
ADM Data 2013-2019 Pre Covid	ADM Data 2021-2023 Post Covid	Total Debt as of 2023	Total Debt per student based on 2023 ADM	Assessed Value 2023	Assessed Value per student based on 2023 ADM	Debt Tax Rate 2024

What is the Norm for total Debt?



Based on Tukey's and Ignores Outliers (31)

Total Debt Including Outliers

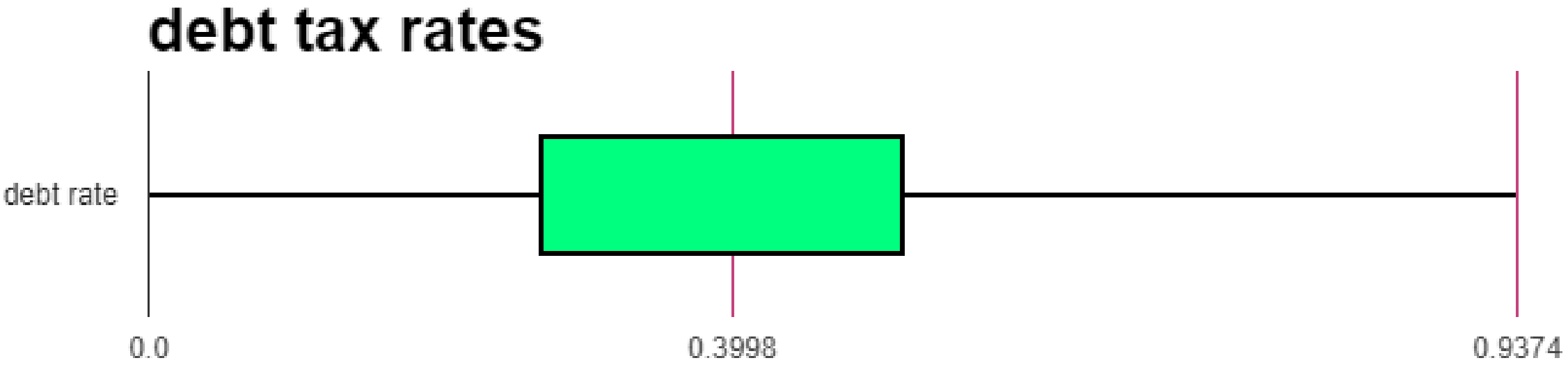


Descriptive Statistics

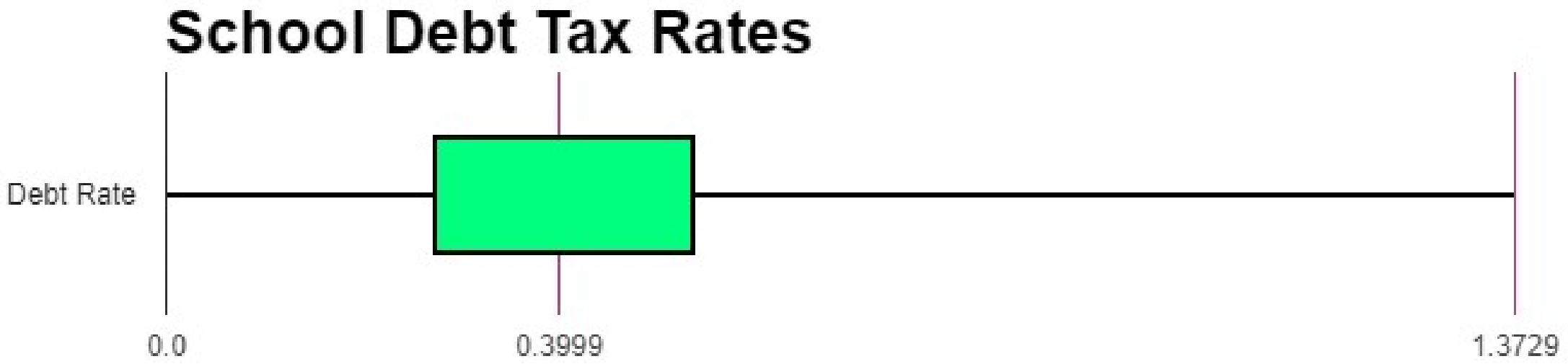
	Debt
Sample size (n)	293
Minimum	0
Q1	12,492,285.5
Median	26,733,000.00
Q3	68,800,847.5
Maximum	778,216,876
Mean ($\bar{x}$)	64,777,010.63
Skewness	3.362645

What about the actual debt rates?

- Tukey's with 10 Outliers Excluded.



School Debt Rates with Outliers Included



Descriptive Statistics

	Debt Rate
Sample size (n)	280
Minimum	0
Q1	0.26645
Median	0.3998
Q3	0.5183
Maximum	0.9374
Mean ($\bar{x}$)	0.399102
Skewness	0.2806
Skewness Shape	Potentially **Symmetrical** (pval=0.054)
Excess kurtosis	-0.394771

Descriptive Statistics

Descriptive Statistics for Study Variables

Variable	*n*	*Median*	*Mean*	*Standard Deviation*
1. Debt Tax Rate	289	0.40	0.4241	0.232
2. Growing Post Covid	290	0.0018	0.0077	0.067
3. Growing Pre Covid	288	-0.0179	-0.0270	0.130
4. Debt Per Student	290	14,058.18	17494.48	12,882.41
5. Assessed Value	290	743,616,519.00	1,475,993,748.50	1,996,583,657.20
6. Assessed Value Per Student	290	412,338.81	448,078.14	211,090.60

Size of the N Changes Based on School District Changes, North Central Parke & West Clark

Pearson's Correlation-Moderate Correlation for Two Variables.

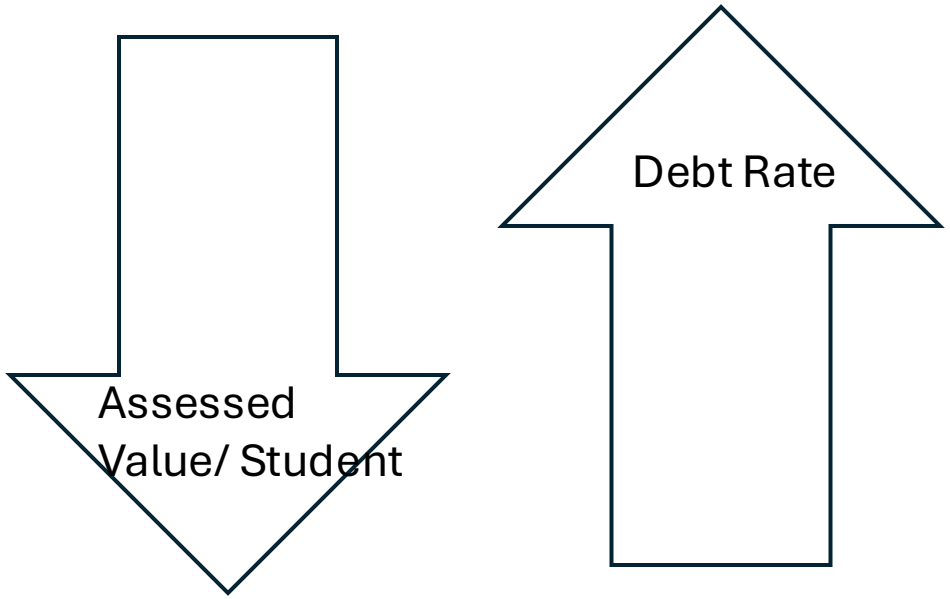
Correlation

Correlations for Study Variables

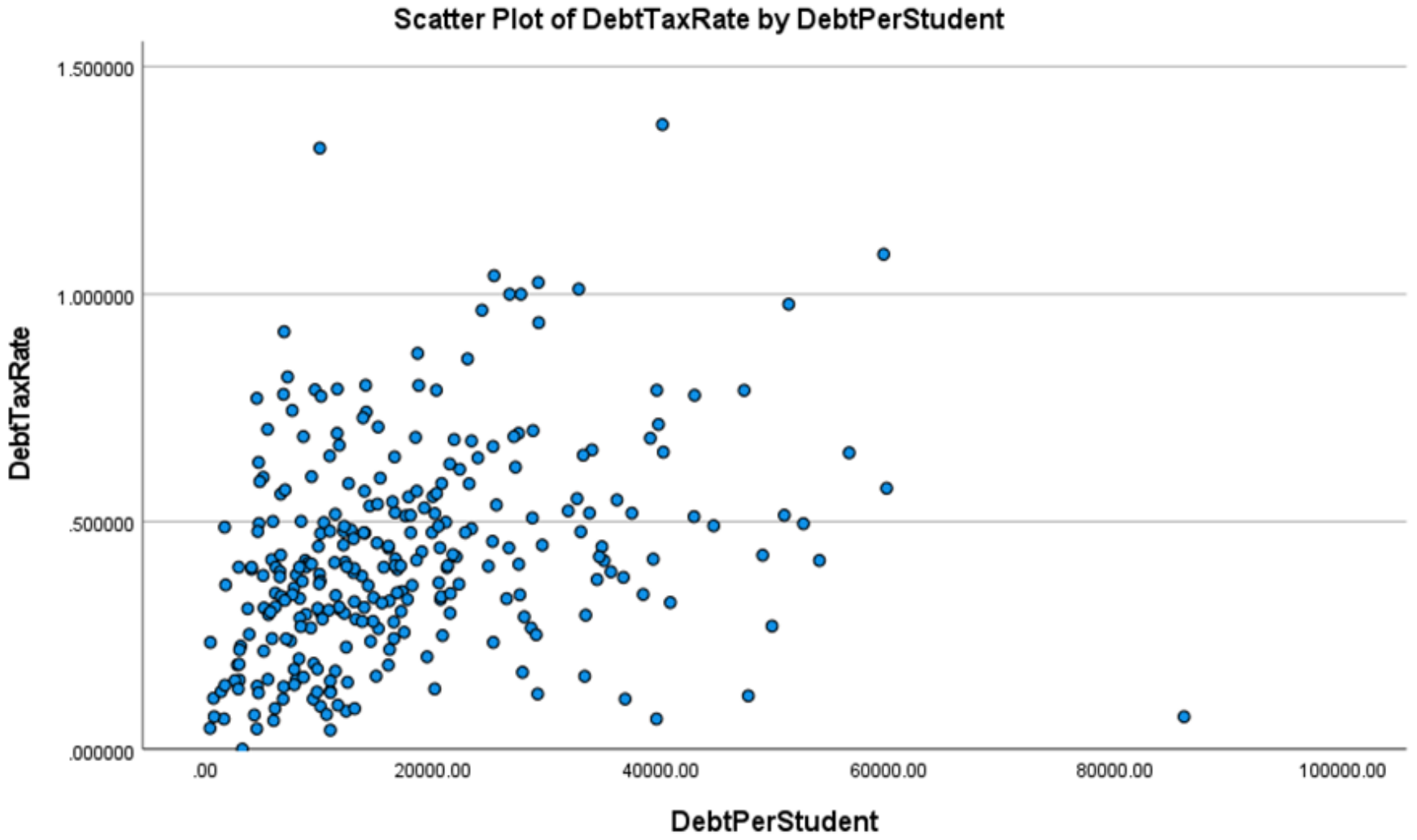
Variable	1	2	3	4	5	6
1. Debt Tax Rate	—					
2. Growing Post Covid	-.016	—				
3. Growing Pre Covid	.125*	.092	—			
4. Debt Per Student	.306**	.041	.075	—		
5. Assessed Value	-.084	-.082	.101	.166**	—	
6. Assessed Value Per Student	-.374**	-.101	-.288**	.136*	.199**	—

Negative Correlation with Assessed Value Per Student

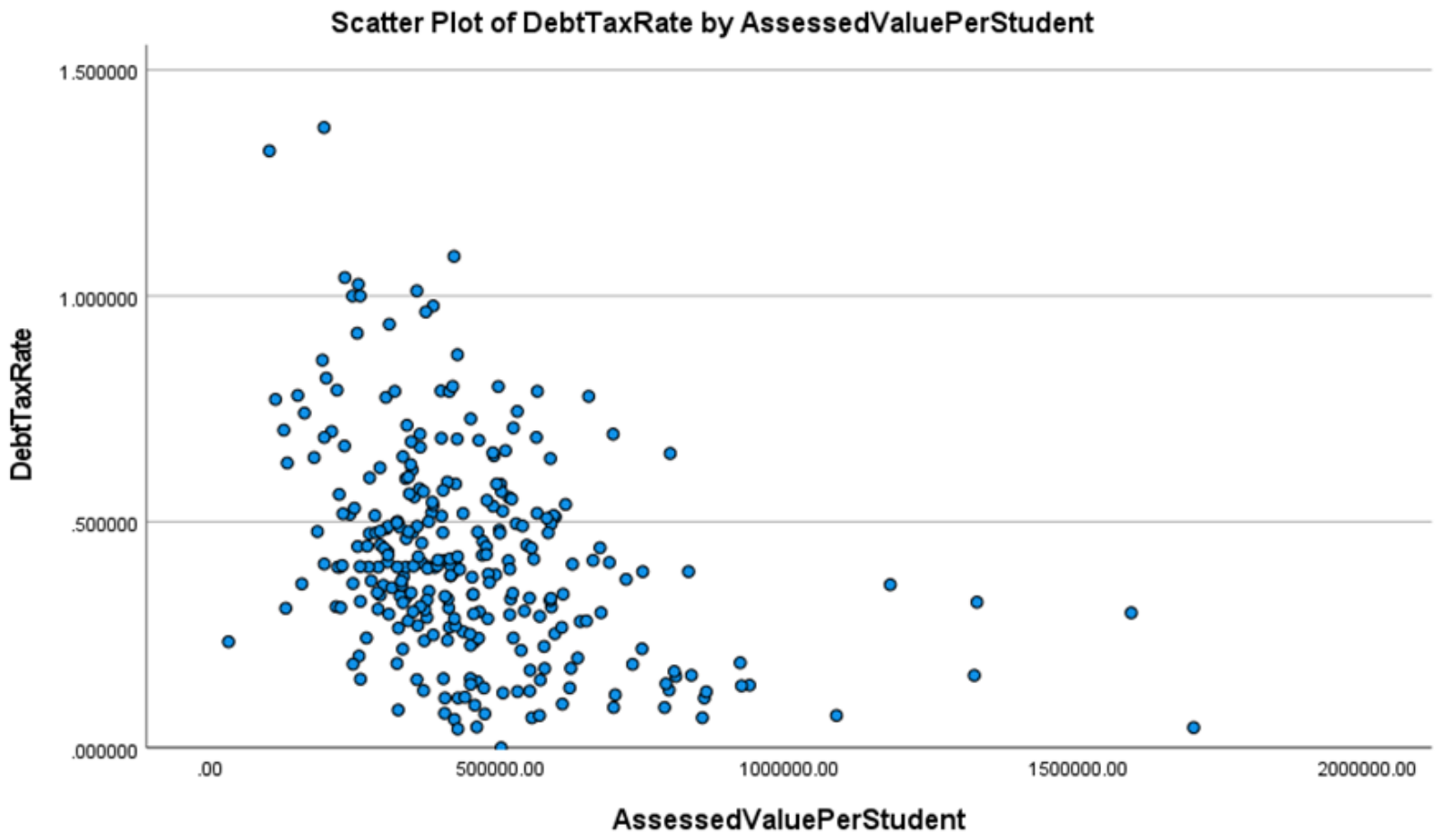
- As the assessed value per student goes up, there is a moderate correlation with debt rate going down.
- As assessed value per student goes down, there is a moderate correlation with debt rate going up.



Scatterplot of Debt Rate by Debt Per Student



Scatter Plot of Debt Tax Rate by Assessed Value Per Student



Correlation Coefficients

Correlation

Correlations for Study Variables

Variable	1	2	3	4	5	6
1. Debt Tax Rate	—					
2. Growing Post Covid	-.016	—				
3. Growing Pre Covid	.125*	.092	—			
4. Debt Per Student	.306**	.041	.075	—		
5. Assessed Value	-.084	-.082	.101	.166**	—	
6. Assessed Value Per Student	-.374**	-.101	-.288**	.136*	.199**	—

Regression Analysis

Dependent Variable:

- Debt Tax Rate

Independent Variables:

- Growing Pre Covid
- Growing Post Covid
- Debt Per Student
- Assessed Value
- Assessed Value Per Student

Results

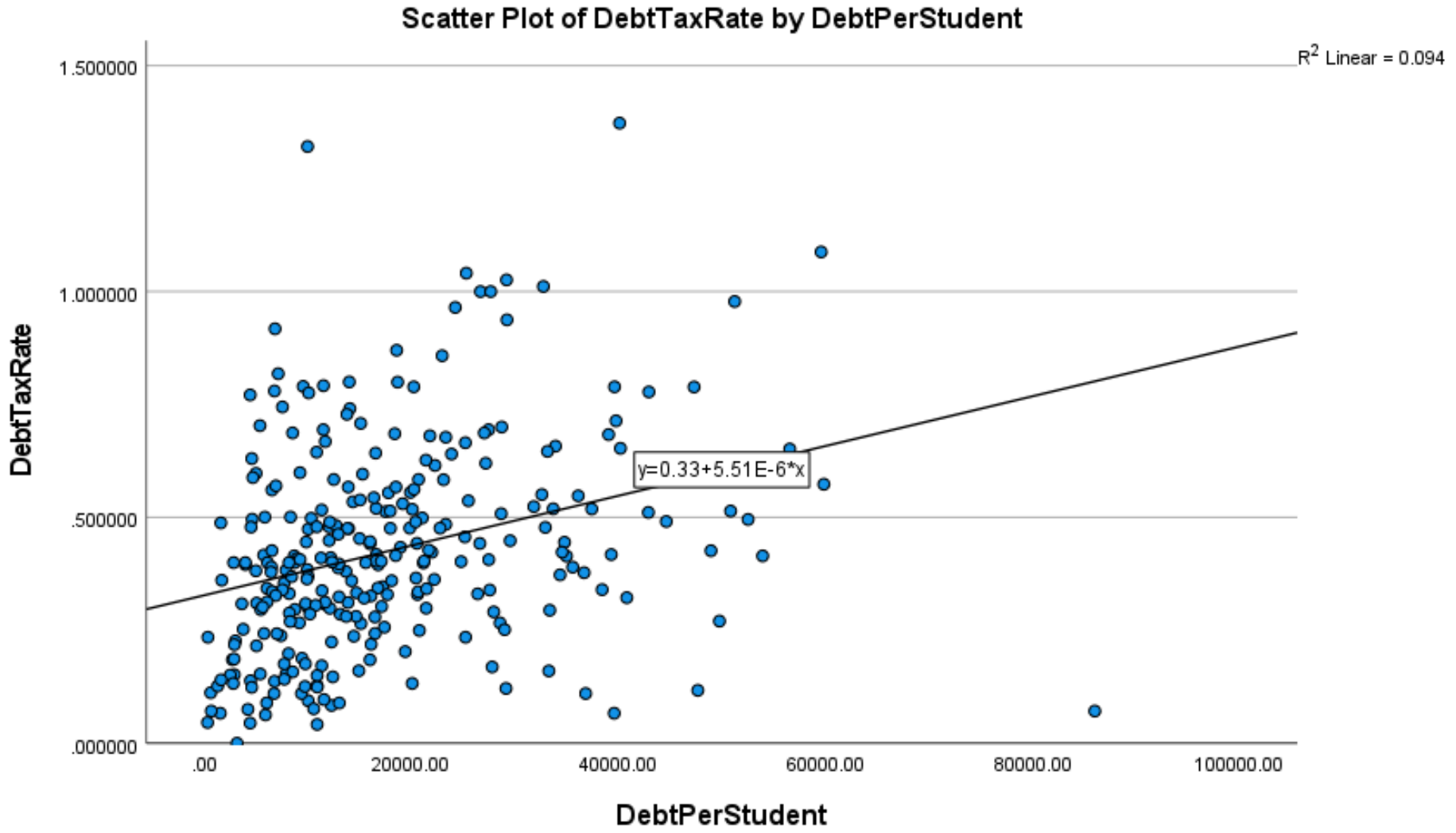
A multiple linear regression was calculated to predict the debt tax rate based on the school corporation's pre-covid growth, post-covid growth, debt per student, assessed value, and assessed value per student.

A significant regression equation was found ($F(2,286) = 52.828$, $p < .001$), with an R^2 of .270.

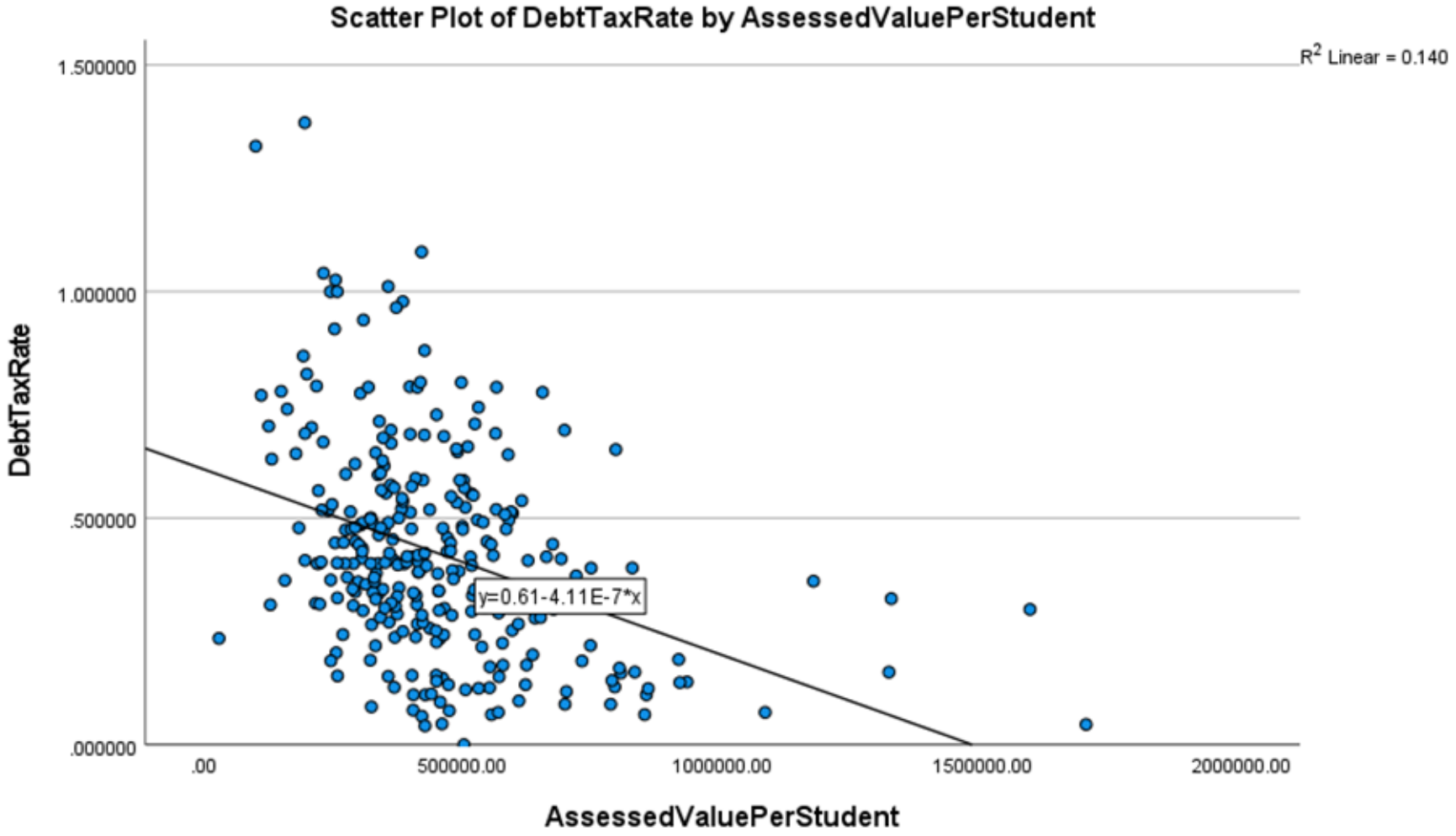
- The significant predictors include school corporation's debt per student and assessed value per student.
- Pre-covid growth, post-covid growth, and assessed value were not significant predictors.
  - Regardless of whether the school corporation was growing, pre or post-covid, does not affect the debt tax rate.
  - Additionally, the total assessed value does not appear to affect the debt tax rate.

The predicted debt tax rate in this model is equal to 0.518 + 0.000006538(Debt Per Student) – 0.0000004646(Assessed Value Per Student).

Scatterplot of Debt Tax Rate by Debt Per Student with least squares regression line.



Scatterplot of Debt Tax Rate by Assessed Value Per Student with least squares regression line



What does this mean?

- The debt tax rate increased by 0.000006538 for each one dollar increase of Debt Per Student, holding Assessed Value Per Student statistically constant (controlling for all other variables in the model).

- The debt tax rate decreased by 0.0000004646 for each one dollar increase of Assessed Value Per Student, holding Debt Per Student statistically constant (controlling for all other variables in the model).

- R2 (coefficient of determination) = .270 means that 27% of the variance in the DV (debt tax rate) can be explained by variation in the IVs (Debt Per Student and Assessed Value Per Student).

Policy Implications

- Schools can not control their assessed value.
- Schools can not totally control their enrollment. Even if they have quality there is a geographic and population density aspect that is beyond their control.
- Schools should understand where they are in total debt, debt per student, and assessed value per student.
- Schools with low assessed value are forced to use debt to assist operations. Repairs, fixes, and maintenance are delayed

List of schools with 80 Cent Threshold.

Cannelton City Schools	$101,169.99	x
Elwood Community School Corp	$192,873.43	x
Lake Ridge New Tech Schools	$195,684.29	x
Frankton-Lapel Community Schools	$199,484.56	x
Beech Grove City Schools	$231,683.56	x
Eastern Howard School Corporation	$244,962.65	x
Medora Community School Corp	$253,005.57	x
School City of Hobart	$254,881.98	x
MSD Wayne Township	$258,210.83	x
Blue River Valley Schools	$308,549.33	x
Brownsburg Community School Corp	$357,812.97	x
Clark-Pleasant Community Sch Corp	$371,652.87	x
Avon Community School Corp	$384,413.76	x
Mt Vernon Community School Corp	$420,487.14	x
Danville Community School Corp	$426,351.22	x

Lowest Quartile for Assessed Value Per Student 0- $384,477.45

Red shading reflects 1st Quartile (Lowest) in assessed value per student.

Policy Questions

- Assessed value is not controlled by the district.
- Enrollment can be influenced by quality, but there is a geographic and population density limit to how much a district can affect enrollment.
- Should schools in the absolute lowest quartile in assessed value per student receive some sort of help/waiver process in relation to recent legislation?

Policy Implications of this research

- If 2 schools would like to consolidate, we now can model and predict what the debt tax rate benefits would be based on variables new assessed value per student and total debt per student. If there is little growth in assessed value per student, the benefits may not be there. New debt in consolidation paired with little change in assessed value per student does mean tax rate would increase.
- The predicted debt tax rate is equal to 0.518 + 0.000006538(Debt Per Student) – 0.0000004646(Assessed Value Per Student).

Quartile Ranking Applications

- Board Retreats and Long-Term Planning
- Referendum Information for Taxpayers
- Advocacy work with lawmakers.
- Budget planning
- ?????????

- Other topics for quartile rankings: Pay, Staff Size, Admin overhead, age of buildings, all informative data not currently collected.
- Taxbase Mix 1%, 2%, or 3%.