

## CHAPTER 5: CONCLUSIONS

Since its implementation approximately thirty years ago many of Virginia's public school divisions have experienced volatility in their Local Composite Indices, Virginia's measure of fiscal capacity. The purpose of this study was to develop an explanation for the volatile behavior of the Local Composite Index. Specifically, the study sought to identify the proportion of change or volatility in a school division's LCI value that is *not* due to independent local change in the fiscal capacity indicators. Specifically, the change in the LCI attributable to the subordination of changes in local fiscal capacity that results from its relative relationship with all the other public school divisions in the Commonwealth.

The study was undertaken to accomplish the following primary objective:

To document and analyze the volatile behavior of the mathematical and structural components of the current formula for measuring Virginia public school division fiscal capacity, the Local Composite Index, over the period encompassing the Biennia 1984-86 through 1996-98;

A secondary objective was to quantify the proportion of change or volatility attributable to local and state fiscal capacity changes, usually rates of change.<sup>126</sup> Additionally, the combined effects of the LCI components, particularly the Local and State Standardized Indicators and their Local to State Ratios, were used to explain the differential rates of changes in the LCIs for individual school divisions.

The study documented and analyzed the volatile behavior of the Local Composite Index. The specific proportions of LCI volatility attributable to local and state fiscal capacity changes were quantified. In addition to this report a lengthy Technical Appendix was assembled to reference these findings and analyses. While the Appendix is quite lengthy, for scholars and policymakers, it should be a valuable, if not indispensable, component to the dissertation itself.

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<sup>126</sup> Although, while both the state and local governments generally showed change, occasionally a decline in both wealth and economic activity occurred.

## Overview

This study has found that Virginia public school division LCI values have undergone changes among biennia that cannot be attributed independently to locally derived changes, either growth or decline. Second, these fluctuations are proportionally related to a school division's degree of congruence with the change patterns of the Commonwealth of Virginia as a whole; a phenomenon that is intimately facilitated by the ratio structure of the Local Composite Index formula. Finally, this study has determined that there are different, and sometimes, complex explanations for the various types of volatility. Patterns in the volatility types seem to emerge with respect to a school division's Indicator rate of change relative to the State Mean Indicator rate of change, the absolute size of a school division's Indicator, and the extent to which a school division exhibits Synthetic Change.<sup>127</sup> These three findings are discussed below.

### I. Volatility in the LCI

The ratio structure of the Local Composite Index promulgates changes in a school division's LCI that are not entirely attributable to local growth or decline. At such times this change, particularly when the LCI change is positive and appears to be unpredicted, may be characterized as *volatile* in nature.

The Local Composite Index is a complex algebraic algorithm, which merges six compound ratios that exhibit interactive effects.<sup>128</sup> This feature does not permit a simple analysis without further disaggregation into more functional units of analysis (the Local to State Ratio) directed toward measuring their volatility. The magnitude and direction of the Net Biennial Change Rate for each of the six Local to State Ratios interact to influence the proportion of change in the Local Composite Index.

Each Local to State Ratio has two components: Local and State. The Local components form the numerators, while the State components comprise the denominators of the Local to State Ratios. Additionally, local indicators have variable amounts of influence on the State components, because the State components are aggregates of the Local indicators and their standardization units. Thus, the interactive and combined effects of the Local to State Ratios determine the degree of volatility in the

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<sup>127</sup> Refer to Appendix A: Glossary for the definition of "synthetic change."

<sup>128</sup> Refer to Appendix B: Calculation of the Local Composite Index and State Basic Aid for a summary of the formula.

LCI. This study found there are three interactive effects of the LCI ratio structure that contribute to its volatility.

***Interactive Effects.***

1. **The Ratio structure can enhance the LCI value.** The ratio structure can enhance an LCI value through the combined effects of Local to State Ratio values that have been enhanced in the positive direction. This enhancement is likely to be in a positive direction, increasing either a negative or a positive Local to State Ratio Change Rate. (Volatility types C1 through C4, and D1 through D4 are representative of selected examples.)<sup>129</sup>

This enhancement in a positive direction occurred in Period V for TRS/ADM and TRS/POP. Similarly for Period VI enhancement occurred for TPV/ADM and TPV/POP for each of the five cases studied. Basically, for these Local to State Ratios the Local Net Biennial Change Rates (either decreasing as in the C Series or increasing as in the D Series) was extended in the positive direction beyond the initial Local to State Ratio value. The C Series illustrated the effect of a negative State Net Biennial Change Rate acted in the opposite direction as the Local Net Biennial Change Rate to enhance the Local to State Ratio. The D Series illustrated that the effect of a negative State Biennial Change Rate acted in the same direction as a positive Local Net Biennial Change Rate, and thus, enhanced it.

Each school division case exhibited these four examples of Local to State Ratio enhancement volatility. Depending upon the enhancement magnitude relative to the local indicator base size, its Local Net Biennial Change Rate, and the various weights by the LCI formula, the LCI may or may not have been increased. For example, the Carroll County LCI for Period VI could attribute approximately 10% of its increase could be attributed to the enhanced effects of both the TPV/ADM and TPV/POP Local to State Ratios.

2. **The Ratio structure can dampen the Local to State Ratio value.** The ratio structure can dampen the Local to State Ratio value. This dampening can be *complete* in which the Local to State Ratio decreases or *incomplete* in which the Local to State Ratio value increases. Selected volatility types in Series A, B, E, F, G, H, and I illustrate the dampening volatility.
3. **The Ratio structure allows for Synthetic Change within the Local or State Standardized Indicators, which stimulates unpredictable patterns of volatility.** When the standardization

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<sup>129</sup> Refer to Appendix C: Analysis of Selected Local to State Ratio Volatility Types.

unit (average daily membership or population) increases faster than its respective indicator, Synthetic Change occurs within the Standardized Indicator. The Local to State Ratio is dampened. Synthetic Change may be exhibited by the Local, State, or both indicators. Synthetic Change is likely to be a concern in localities in which the average daily membership or population is increasing at a higher rate than the indicator. Thus, the Standardized Indicator is depressed, when no actual loss in the indicator has occurred.

## **II. Congruence with Change Patterns of the Commonwealth**

This study identified that dampening and enhancement volatility patterns in the Local to State Ratio are minimized, when the Local Net Biennial Change Rate mirrors the State Net Biennial Change Rate for each of a school division's Local to State Ratios. Thus, in so far as a locality exhibits change *rates* that approximate (or parallel) with the mean change *rates* of the Commonwealth, the school division LCI will remain the same. The direction and magnitude of change in the State (Mean) Net Biennial Change Rate is the evaluative basis for the degree of change in a school division's Local to State Ratio, and subsequently, in the LCI. If school division exhibits overall higher Net Biennial Change Rates in its Local to State Ratios than the State, then its LCI will increase at a faster rate than the State Mean value configuration for the LCI. This phenomenon is especially noticeable in the case of a school division with smaller base values for its Indicators, because smaller dollar amounts of change will trigger larger amounts of percentage change than for a larger school division. Small "net worth" school divisions may exhibit greater percentage variation from initial LCI values to final LCI values. Conversely, if a school division exhibits overall lower Net Biennial Change Rates in its Local to State Ratios than the State, then its LCI will increase at a slower rate than the State Mean value configuration for the LCI.

## **III. Volatility Patterns**

This study identified specific volatility patterns in the Local to State Ratio that seemed to be prevalent with respect to the characteristics of a school division. These characteristics included the magnitude and direction of a locality's Local Standardized Indicator Net Biennial Change Rate relative to the State Mean, the absolute size of a locality's Indicator base, and the extent to which the locality exhibits Synthetic Change.

There appear to be some volatility patterns that can be differentiated with respect to school division fiscal capacity as determined by the LCI. Low fiscal capacity localities tend to exhibit complete dampening patterns and incomplete dampening opposite from the higher fiscal capacity localities during the same Period. For example, in Periods II, III, and IV, which was Divergent Change for the LCI, Carroll County, a low fiscal capacity locality, exhibited a Type B (Complete Dampening) volatility pattern for TPV and AGI. Considered as moderate to high fiscal capacity localities, Fairfax and Loudoun Counties exhibited a Type A (Incomplete Dampening) volatility pattern for the same Periods. Hampton exhibited a predominately Type B volatility pattern, however,

Period II exhibited a Type A pattern in TPV/POP. Buena Vista, low fiscal capacity city, exhibited multiple volatility patterns, A, B, and others indicative of Synthetic Change.

It appears that the dampening patterns were opposite, because during the Divergent Change trend high fiscal capacity localities tended to exhibit higher Local Net Biennial Change Rates and low fiscal capacity entities exhibited lower Local Net Biennial Change Rates.<sup>130</sup> In the case of Buena Vista during Period IV which exhibited a TPV/ADM Local Net Biennial Change Rate higher than the State Net Biennial Change Rate the volatility exhibited was Type A and the Local to State Ratio increased.

As mentioned before locality's with smaller base values for their Indicators, or Standardized Indicators will tend to express larger percentage changes in their Net Biennial Change Rates than school divisions with larger bases. Additionally, extremely large localities, such as Fairfax County will tend to influence changes in the State Mean to a greater extent than can localities who compose smaller proportions of the aggregate State base. Finally, school divisions that are growing in average daily membership or population more rapidly than they are increasing in their Indicator base risk creating Synthetic decreases in their Local Net Biennial Change Rates. In turn, if these decreases are severe enough relative to the behavior of the State Standardized Indicator, the Local to State Ratio value could exhibit a negative Net Biennial Change Rate. A increase in the Local to State Ratio could ensue in localities that are losing average daily membership or population faster than they are declining in their Indicator base. Synthetic Change seems to create a secondary level of volatility (occurring within the Standardized Indicator) to the primary volatility of relativity to the State Mean of the Local to State Ratio. Thus, some school divisions experience both causes of volatility.

#### **IV. Implications of this Study**

This study raises several important concerns regarding the appropriateness of the Local Composite Index for measuring the fiscal capacity of Virginia's public schools. First, the degree of dampening volatility appears to create differential treatment among high and low change rate localities during periods of extreme high and low change rate in the Commonwealth. This differentiation by the LCI on the basis of comparability to the State Mean change rate indirectly affects localities according to their geographic location, fiscal capacity size (as defined by the LCI), and their degree of correspondence with the three Indicators employed in the LCI. School divisions

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<sup>130</sup> The reference point that higher and lower refer to greater than the State (Mean) Net Biennial Change Rate.

whose economic structures are based upon other indicators will have fiscal capacity that will go undetected and unassessed.

Second, it appears that the ability to develop budget plans to account for sharp changes in the LCI due to either enhanced growth or decline is limited at best. While local change in the indicators can be projected, the change in the State Mean depends on the individual behavior of many more inputs well outside the control of an individual school division. Further, the wisdom of expecting the General Assembly to react in a "blanket" fashion each time the LCI exhibits enhancement volatility simply is not consistent with the criteria for an adequate and reliable (stable) fiscal capacity measure. Further, because not all localities will exhibit enhancement volatility, when the State Mean decreases, this compensation may be inherently inequitable.

Finally, this study illustrates the need for the criterion of reliability for fiscal capacity measurement - the extent to which fiscal capacity measures should encompass stability for predictable and informed budget development. This study indicates that the Local Composite Index formula engenders instability or volatility as an inherent or internal characteristic of its rationalized formula structure. While in many instances the LCI dampens local change, at other times it enhances local change in an unpredictable manner.

A second criterion that is necessary for fiscal capacity measurement is validity - the extent to which it actually measures local indigenous capacity instead of a *relationship* that a locality has with a composite jurisdictional entity, such as the State. Should the fiscal capacity measurement of a specific school division be dependent upon the change in Indicators or standardization units of one or more other school divisions in the Commonwealth? The rationalized structure of the LCI appears to be more indicative of local school division's relationship to the *mean* economic behavior and its changes of the State than assessing its independent local school division fiscal capacity.

In conclusion, it must be remembered that schools educate, and an effective educational system depends upon the development of a budget based upon reliable and stable sources of revenue. The query posed in Chapter 1 as to how a well-intentioned prescription, such as The Local Composite Index, could produce such unanticipated consequences reverberates here. This study has shown that individual school division LCI values increase and decrease according to factors as much outside their jurisdictions as within the localities in which these divisions reside. The question fundamentally becomes - How much volatility or instability is acceptable? The answer - The Local Composite Index was at one time "state of the art" with its utilization of multiple weighted indicators and standardization units. Further, over its twenty-five year tenure the General Assembly has shown its sensitivity to correct on a biennial basis for fluctuations in LCI values that appear erroneous or

inequitable. However, at the present time there appears to be no moratorium on economic downturns and upturns, so there is little encouragement to assume that the behavior (and trends) of the last seven biennia will not persist into the future with continued implementation of the Local Composite Index as it is currently constructed. Perhaps, further study into an alternative, more reliable and valid measure of local public school division is warranted.