Finance and Revenue Committee

May 13, 2024 Meeting Minutes

Item 1: Discussion of Predictive Analytics Results

Foil 1: Overview and Historical Background.

On May 4th, 1971, a large group of East Greenwich High School students protesting budget cuts was refused admission to the annual town financial meeting.

With the elimination of the town financial meeting, the Town Council has the final word on the funds appropriated for the School Department in the coming year.

This produces a certain amount of tension between the School Committee, who approves the budget submitted by the School Department and may increase or decrease the appropriation request, and the Town Council, who is entirely responsible for determining the actual appropriation.

Foil 2: The Property Tax and School Appropriation History Tells a Story.

Historical records of the School Local Tax Appropriation and the Property Tax Levy have been telling the same story for several decades at least.

If you think in terms of signal and noise, the signal is clear, strong, and persistent.

However, because it has no simple explanation in terms of year-to-year percentage changes, it has not been recognized.

Foil 3: The Story.

The School Appropriation and Property Tax Levy tend to evolve along straight-line trajectories that persist for years or even decades.

Events can occur that will change the trajectory. The new trajectory will be also be a straight line.

When you look at the long-term history of both quantities, you see a series of connected straight-line trajectories that explain almost all of the variation in the data.

Foil 4: Implications of the Story.

The current trajectories have the following implications:

- In a normal year, we expect the School Appropriation to increase by $815,000 (this is the *signal*).
- In a normal year, we expect the Property Tax Levy to increase by $1.8 million (this is the *signal*).

The noise term for the School Appropriation has an expected value of $0 and a standard deviation of $485,000.

The noise term for the Property Tax Levy has an expected value of $0 and a standard deviation of $580,000.

Foil 5: Implications of the Current Trajectories.

If the School Appropriation and Property Tax Levy continue to evolve on their current trajectories, we can make the following statements:

- The expected percentage increase in the School Appropriation will get smaller over time.
- The percentage of the Property Tax revenue that the School Appropriation comprises will slowly decrease over time.
- Next year the expected $815,000 increase in the School Appropriation will be approximately a 2% increase.

Foil 6: Implications of Straight-Line versus Constant Percentage Trajectories.

The historical record strongly suggests that the School Appropriation evolves along a straight-line trajectory.

- In any multi-year time interval, the straight-line trajectory equivalent to a constant 4% increase over the interval has a percentage change higher than 4% for the first half of the interval.
- For a 13-year interval (the length of time a student may spend in the school system), the maximum straight-line growth possible is 3.3% if no year can exceed 4%.

Foil 7: Long-Term Forecast for School Appropriation.

Because the School Appropriation tends to evolve along a straight-line trajectory, and because the noise component is relatively small, it's possible to make long-term forecasts that assume the status quo.

This is a Bayesian model, so if we have some idea what departures from the stats quo will be (such as increased enrollment), we can easily incorporate them as informative prior information. A Bayesian forecast is a probability distribution (not a single number) so it allows us to determine interval estimates.

Foil 8: Long-Term Forecast for Property Tax Levy.

The Property Tax Levy also tends to evolve along a straight-line trajectory, so we can make long-term forecasts that assume the status quo.

This is also a Bayesian model, so if we have some idea what kind of departures increased debt service for construction bonds will produce, we can easily incorporate them using informative priors.

As was the case with the School Appropriation model, the forecast is a probability distribution so we can produce interval estimates.

Zoom Video Link.

https://drive.google.com/file/d/1o9BmyR-Ji78T7lU4Qf3lPg3V9ZfsMvdM/view?usp=drive_link

Minutes submitted by Gene Quinn, Subcommittee Chair