



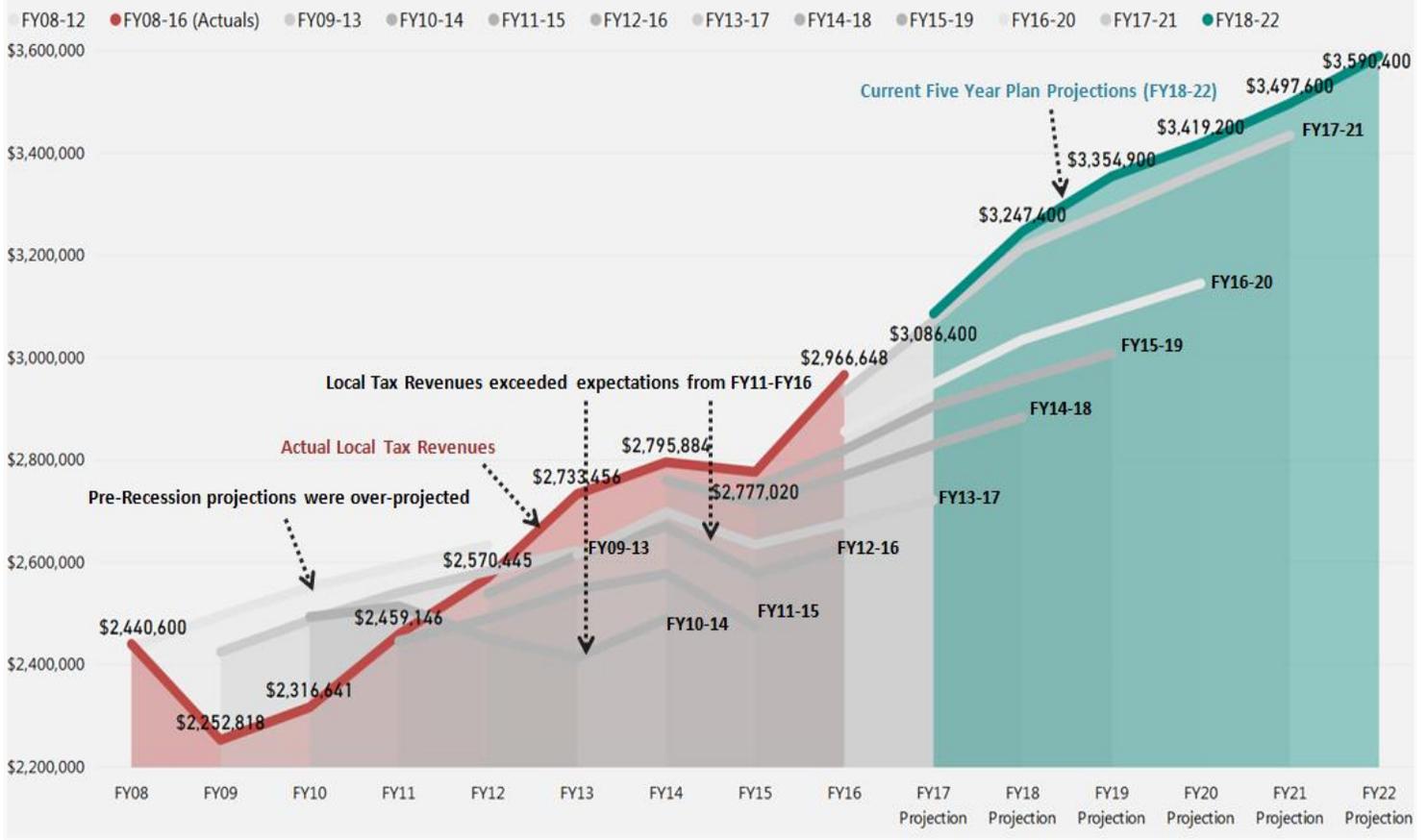
City Council of Philadelphia
Office of the President - Finance and Budget Team
3.23.2017

City Council Analysis: Examining the City’s Financial Projections, Trends, and Economic Indicators using Five Year Plans and Quarterly City Managers Reports

Five Year Plan Trend Analysis

The Five Year Plan has historically *under*-projected the amount of tax revenues collected by the City of Philadelphia, with the exception of the consecutive years following the great Recession of the late 2000s. As evidenced in *Figure 1* below, one can see a **trend of under-projected tax revenues during the Economic recovery when comparing the Adopted Tax Projections to the year-end Actual Tax Revenues amounts**. Each trend line represents the tax projections from the referenced Five Year Plan, with the *thick red line* representing the Actual amounts collected by the City. As seen in the graph, the **Five Year Plan projections are decreasingly accurate in the outer years of the Five Year Plans, while more accurate in the short term**.

FY08-16: Actual Revenues and Five Year Plan Projections (in thousands)



Tax Revenue: Growth Rates Forecasting

Each year, the Administration projects revenue growth for the upcoming five years, with assistance over the past several years from the City’s consultant – IHS Markit (IHS). The proposed FY18-22 Five Year Plan’s (FYP) revenue growth projections incorporate the majority of IHS’s projections. During the nation’s economic recovery, IHS’s model for forecasting Philadelphia’s economy has been conservative, as portrayed in *Figure 1*. Post-recession FYP *projected* revenues have consistently been below *actual* revenues. **With respect to the current, proposed FYP, however, the tax revenue growth rates for the major taxes are moderately optimistic, notwithstanding the unprecedented, unpredictable political and economic landscape that we now face.** While some risks may be too speculative to monetize in growth rate projections at this time, it is important to note that we need to closely monitor revenues and expenses moving forward in light of the current, constantly evolving political and economic environment. **It is also important to note that these moderately optimistic projections may prove to be more accurate in outer years of the FYP, especially given the historical pattern of conservative forecasting – and management’s pattern of sound, overall control of spending – during prior FYPs (which has lead to higher than anticipated fund balances).**

1. The FY18-22 Five-Year Plan’s growth rates are reasonable, but moderately optimistic

The potential risks to revenues stemming from numerous proposed State or Federal defunding legislation or initiatives, or from potential restructuring of income and property taxes, are not incorporated into current FYP projections. The risks were deemed too speculative to monetize when tax projections were made, mainly due to the limited information available. The proposed FYP notates many of these risks; however it is important to note that these risks are not incorporated into the growth rate calculations.

2. The Five-Year Plan incorporates a \$250B Infrastructure Spending Plan, a Corporate Tax Rate Cut (from 35% to 20%) and stable real midterm growth in revenue growth projections

The FYP looks at the upside of possible federal initiatives, forecasting that consumer spending will rise with wages, net worth, and improving economic outlook. Thus, the FYP approximates that a 10 year, \$250 billion infrastructure plan will be enacted by Congress; and that business investment will be spurred due to a lowering of the corporate tax rate from 35% to 20% and the lowering of the effective personal income tax rate from 21% to 19.5%. These predictions, however, are uncertain.

The current FYP also predicts medium term 1.8% growth in real gross metro product. This rate would properly be characterized as conservative – in the past. Again, under the current environment, shifts in State and Federal policy could negatively impact this rate.

3. Repeal of the Affordable Care Act and restructuring of trade deals are not incorporated

While the FYP acknowledges the potentially devastating impact that a repeal of ACA could produce, it also states that it is too early to speculate on the cost of such a repeal. We know, however, from Council’s recent Fiscal Stability Hearings that an estimated 200,000 Philadelphians will immediately lose their healthcare and 5,000 Philadelphians will lose their jobs with the repeal of ACA. Such losses would negatively impact our revenue

streams, particularly our wage and sales taxes, due largely in part to an estimated \$400 million annual drop in revenue to Philadelphia hospitals.

Restructuring our trade deals to promote American manufacturing could decrease our reliance on imports, as well as potentially decrease the value of the dollar. In contrast, the FYP projects an increase in imports and a steadily increasing dollar value. This is another factor to monitor moving forward.

4. The FYP does not incorporate the potential adverse impact on Local growth from passage of any Federal budget that decreases Domestic spending and increases Defense spending

Any Federal budget – including the President’s proposed 2018 budget – that cuts lower-income and Elderly programs could negatively impact growth rates, even if Defense spending is increased. *(Please bear in mind that the Federal budget process is very fluid and the President’s proposal is likely to change; however, it is important to highlight the potential impacts of any iterations of the budget that mirror the one that is currently proposed.)*

The multiplier effect of government spending – that is, the cumulative economic impact of a particular governmental expenditure – is a contentious topic. However, considerable research has been done, most notably by Barro and Redlick of Harvard University: using U.S historical data, Barro and Redlick found that **Defense spending** had a comparatively low multiplier effect of 0.6-1.0. The precise effect depends heavily on the unemployment rate: the multiplier is lower when employment is higher. This is because, during times of full employment, government spending ‘crowds out’ other economic activity: thus, if the government hires engineers, it will likely be poaching those engineers from the private sector (or from jobs that they already have). The result will drive up wages and the cost of goods (because it is more expensive to do business when competing for labor), and the economic impact of the spending thus decreases.¹ As you know, the US is currently in a period of high employment – suggesting that the military multiplier effect would be on the low end of the range.

In contrast, Domestic – as opposed to Military -- government spending that helps a) lower income citizens, b) elderly citizens, and c) students, has a higher economic impact. These three groups are more likely to *use* their money and thereby introduce it into the economic stream. Similarly, government spending on infrastructure will produce a higher multiplier effect: in fact, the San Francisco Federal Reserve found that, since 1990, every federal dollar spent on infrastructure increased a state’s GDP by \$2 – for a multiplier of 2.0.²

5. Conclusion

Forecasting is both a science and an art, and each forecast must make certain assumptions based on factors deemed to be reasonable at the time that the respective forecast is made. And while we believe the overall projections in the FYP are reasonable at the time the projections were made, we do want to disclose that all current forecasts are subject to more risks than usual, given the current political and economic environment. Thus, more monitoring of the constantly evolving landscape must be undertaken to account for these unpredictable factors.

¹ Harvard University Paper - <file:///ccaddc2/Users/robert%20mcdermott/Downloads/Barro%20Redlick%20paper.pdf>

² San Francisco- <http://www.frbsf.org/economic-research/publications/economic-letter/2012/november/highway-grants/>

Quarterly City Manager Report: Trends in Projections

Each Quarterly City Manager Report (QCMR) provides snapshots the projected revenues throughout the fiscal year, and upward or downward trends in spending. We (City Council’s Finance and Budget Team) digitized the QCMRs from FY08 to FY16, which provided clarity on how the City adjusted its projections throughout the Great Recession and subsequent recovery.

Figure 2A and 2B below highlights the adjustments in each QCMR’s expenditure projections relative to the Adopted Budget. If the Adopted Budget originally projected \$1 billion in expenditures, and the QCMR adjusted the projection to \$1.01 billion, the graph would show a 1% positive adjustment. As seen in **Figure 2A**, the projections in expenditures over the last 8 fiscal years trend upwards as the fiscal year progresses, only to dip in Q4. Over the same time period, tax revenue projections trend upward throughout the year, both as revenues are collected and as the end of the fiscal year approaches. This conservative approach to forecasting has led to a series of fiscal years where the City ended on better fiscal footing than what was originally projected. *Please keep in mind that the graphs do not include other revenues collected other than taxes, or the Actual amount spent or collected at year-end close. Q4 numbers are updated projections predicting where the City believes they will end the year. However, the Actuals are not known until the first Quarter of the succeeding fiscal year.*

For example, Actual revenues came in higher than projected in FY16, leading to a higher-than-anticipated Fund Balance. **The Adopted FY16 budget projected a year-end Fund Balance of \$69.3 million dollars. That projection increased over the year, ending with an unaudited balance of \$148.3 million, \$79 million higher than originally adopted, and \$78.1 million higher than the projection made available during the budget process (for FY17).** For additional context, the \$78.1 million in additional Fund Balance revenue accounts for 1.95% of the \$3.99 billion the City collected in General Fund Revenues for FY16.

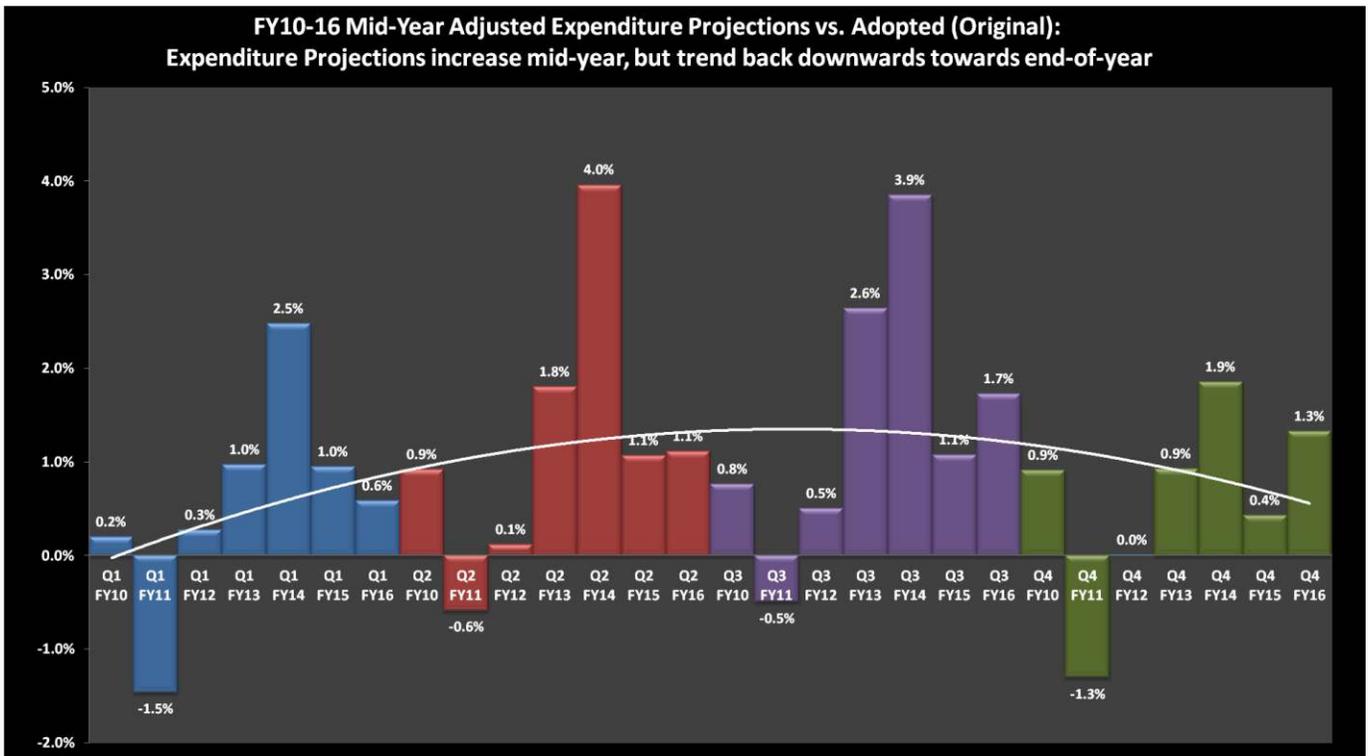
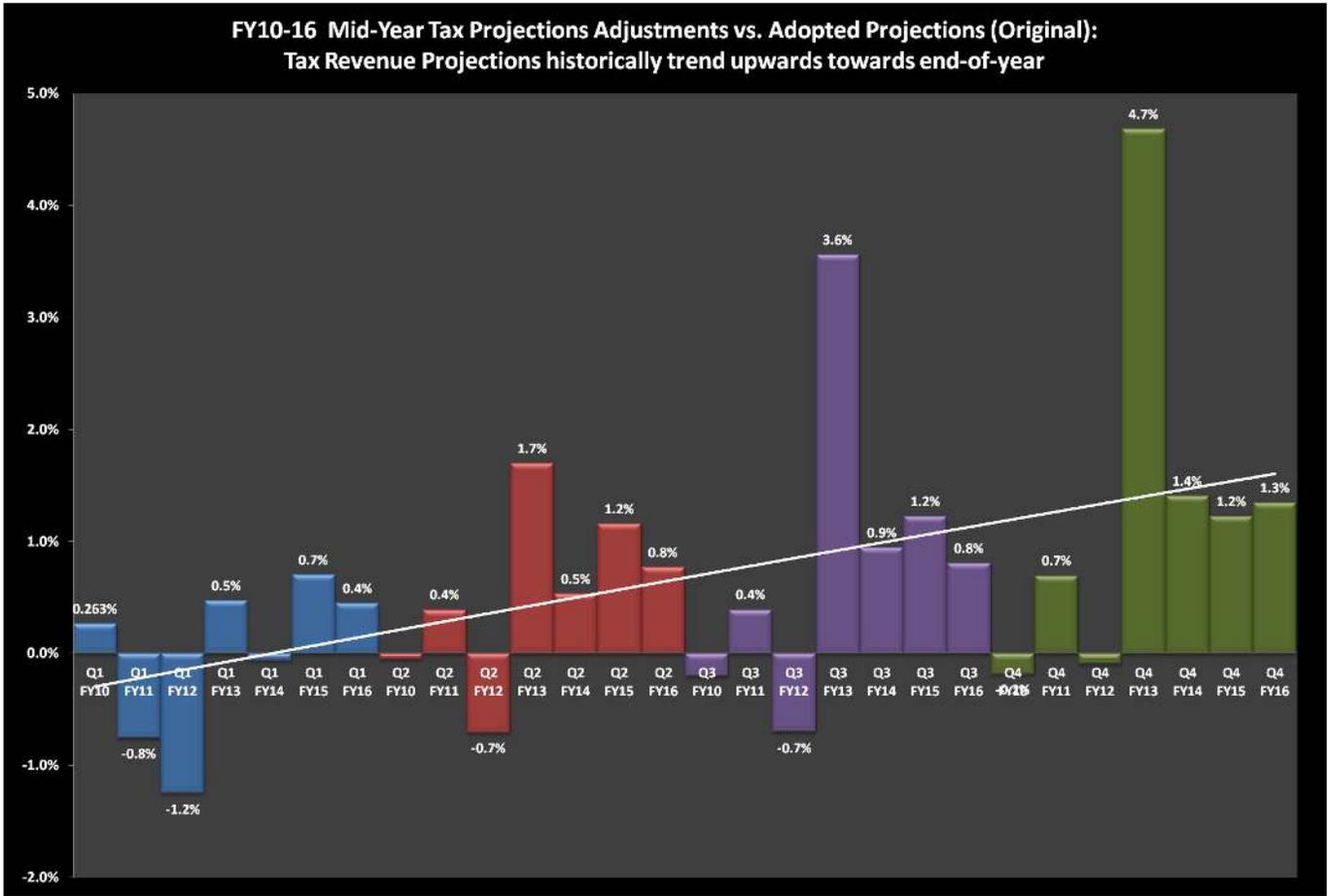


Figure 2B:



* trend lines based on Excel graphs were added to the graphs for illustrative purposes

Figure 3 and Figure 4 (on the next page) show the comparison of Expenditures reported as incurred in each QCMR as a percentage of total Expenditures incurred by the end of the relevant fiscal year and Revenues reported as collected in each QCMR as a percentage of total Revenue collected by the end of the relevant fiscal year. From FY10-16, on average, the actual tax collections after the first quarter represent 17.1% of the revenues that will be collected during that fiscal year. During the same time period, Expenditures at the end of Q1 represented, on average, 22% of the Expenditures that were actually incurred by the end of the fiscal year. Independent of outside circumstances (budget impasses, recession, etc.), these ratios can be used to roughly project the end-of-year expenditures and revenues, or as a comparison against QCMR projections.

Figure 3:

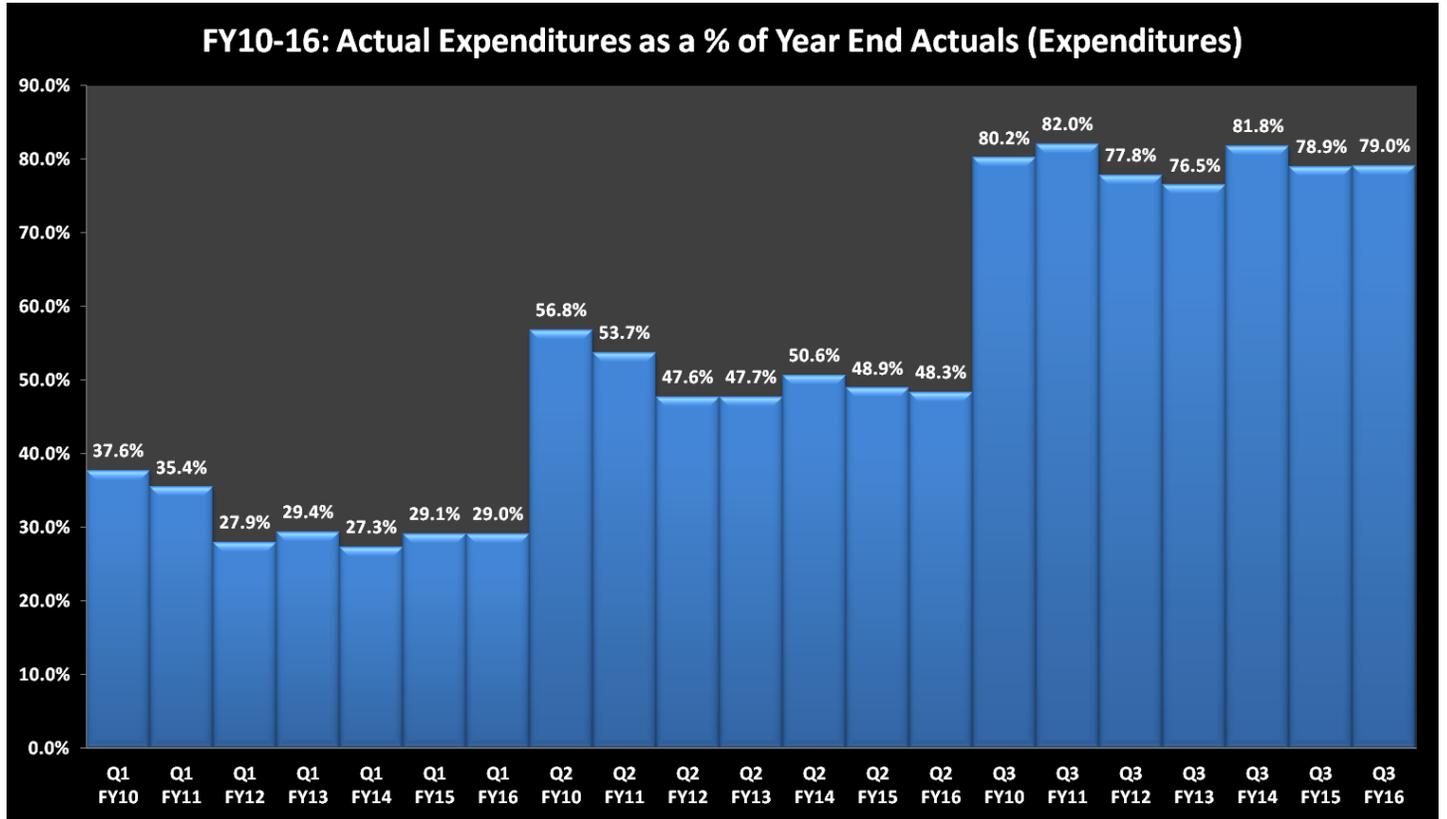
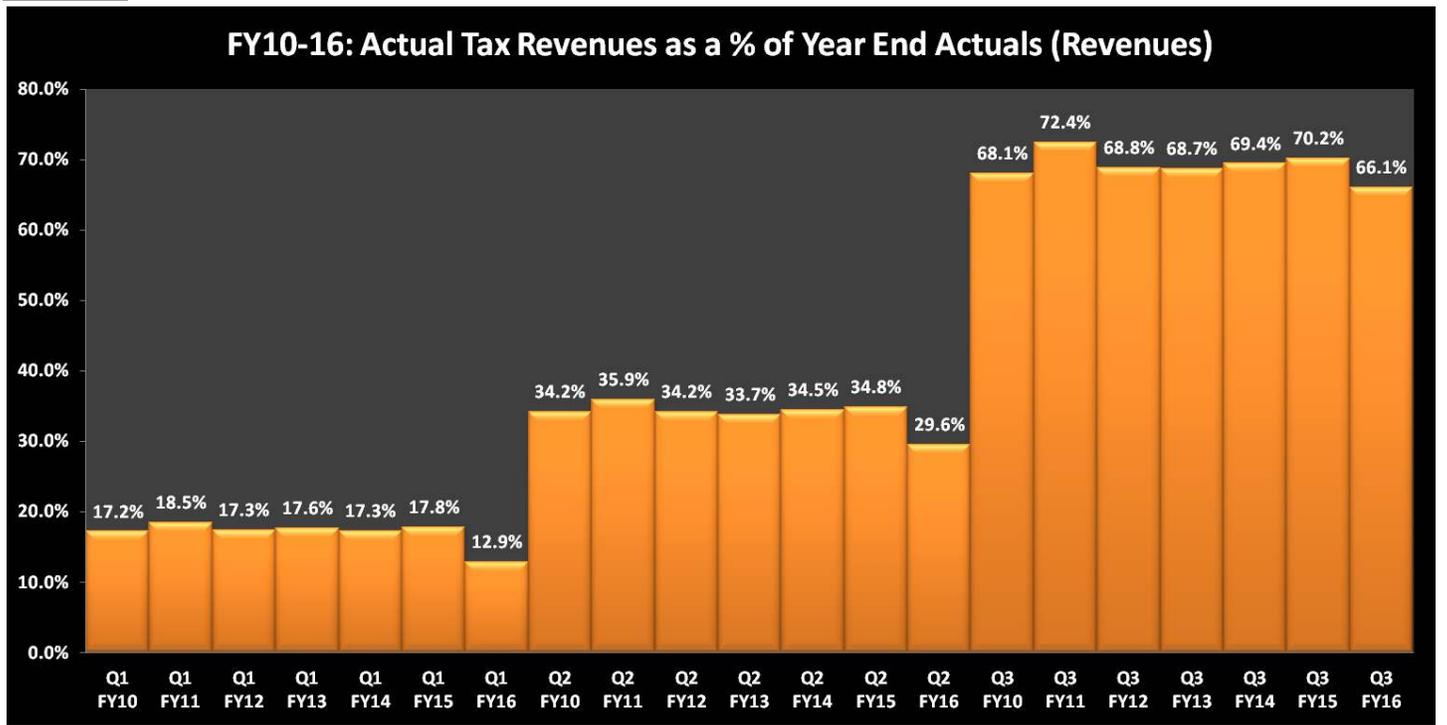


Figure 4:



Regression Analysis – Tax Revenues and Related Economic Indicators

Regression Analysis is a statistical process used to compare the relationships that exist between variables. **The multiple regression analysis below of QCMRs dating back to FY08 found certain economic indicators that are statistically significant and linked to variances in revenue streams.** Identifying statistically significant relationships allows us to anticipate either decreases (risks) or increases to the City’s revenue streams. Listed below are *statistically significant* variables that have trended with our tax revenues over the past 8 fiscal years.

<u>Indicators</u>	<u>Taxes</u>			
	<u>Wage Tax</u>	<u>Total Tax Collections</u>	<u>Real Property Transfer Tax</u>	<u>Real Property Tax</u>
Retail and Food Sales	(+) (Strong) (2)	(+) (Strong) (2)	(+) (Moderate) (2)	(+) (Strong) (2)
National Unemployment Rate		(-) (Strong) (1)	(-) (Strong) (1)	
Consumer Price Index	(+) (Strong) (1)	(+) (Strong) (1)	(+) (Moderate) (1)	(+) (Moderate) (1)
NYC Harbor Gasoline Price	(-) (Strong) (1) (2) (3)	(-) (Moderate) (1)	(-) (Weak) (1) (2)	
New Car Sales	(+) (Strong) (3)	(+) (Weak) (3)	(+) (Weak) (3)	

Chart Description

The **positive and negative sign (+ or -)** portray whether there is a positive or negative correlation between the indicator and the tax. Directly adjacent to the sign (+ or -) are one of **three word options (Strong, Moderate, or Weak)** that notate the strength of the correlation based on a number of statistical factors. The **number (1, 2, or 3)** directly adjacent to the word options refer to the model that the relationship was found to be statistically significant. The indicators included in each model are below.

Positive Correlation (+): *When the value of the indicator increases, the corresponding tax revenues increase (when the value of the indicator decreases, the corresponding tax revenues decrease)*

Negative Correlation (-): *When the value of the indicator increases, the corresponding tax revenues decrease (when the value of the indicator decreases, the corresponding tax revenues increase)*

Model 1: National Unemployment (%), Gasoline Prices (NYC Harbor), Consumer Price Index

Model 2: Retail and Food Sales, Gasoline Prices (NYC Harbor), GDP Growth

Model 3: New Car Sales, Gasoline Prices (NYC Harbor), GDP Growth

The above chart shows the statistically significant relationship that the *indicator* has with the specified tax. For example, the relationship between the National Unemployment Rate and Wage Tax is *negative*. This means that as the National Unemployment rate *rises*, you can expect to see the Total Tax revenues *decrease*. Conversely, Retail

and Food Sales and Total Tax revenues have a *positive* correlation: as Retail and Food spending *increases*, Total Tax revenues should *increase* as well (if Retail and Food spending *decreases*, we can expect to see a *decrease* in Total Tax revenues). All of these indicators are moving independently of one another, so it is important to examine them in tandem, as they all have different implications for the City's revenues.

As previously mentioned, forecasting is not a perfect science. Penner (2001) highlighted how the Congressional Budget Office tends to have periods of over-projecting revenues, followed by periods of under-projecting. Given the relatively short time frame, and limited number of available observations for this model, these variables are merely a guide to better understanding the relationship between local tax revenues and the macro-economy. Following the market crash in FY08, there has been an unprecedented period of local and national growth. This continued economic growth has been coupled with revenues exceeding projections. Given the length of continuous growth, some economists project a recession in the coming years, so it is critical that we continue to observe economic data that might project a change in revenue collections.

New Car Sales is one of the better, more unique indicators of the health of the economy. This indicator, as well as other economically sensitive indicators, offers a somewhat different observation to better understand how the City's revenue streams may fluctuate. Another economically sensitive indicator is *Jewelry Sales*. These two are both sub-categories of the over arching 'Retail and Food Sales' category. As with cars, people tend to reduce jewelry consumption and other non-essential purchases during difficult economic times. When economic growth slows, people may put off these non-essential purchases. These more focused variables additional guidance to revenue tracking.

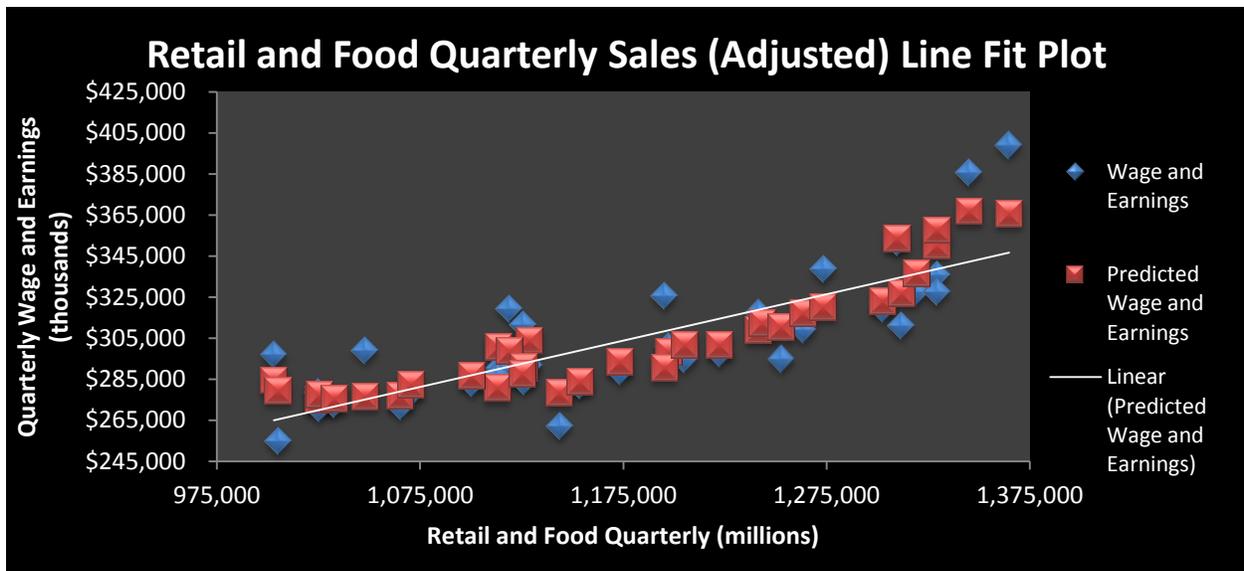
Technical Analysis: Indicator and Model Analysis

Each graph below includes ‘predicted’ variables that represent the predicted outcome when all of the values in the model are taken into account. The impact that the variable has on a tax represents the impact of that variable alone. The upward ‘push’ of one positive variable in a model can be dampened by the downward ‘pull’ of another negative variable within a model. For instance, let’s say that retail sales (positive) increase at the same time that gas prices (negative) increase. These positive and negative influences on our tax revenues may cancel one another out. Under a linear regression, which includes one independent variable and one dependent variable, would not take into the impact of other variables and is less accurate. Although the linear regression model more accurately reflects the individual impact of retail sales on revenues, the lack of other variables makes each predicted value less accurate. Because of this, continuous monitoring of all relevant economic indicators in order to anticipate trends in our revenue streams.

Indicator 1 (Model 2): **Retail Sales (National)**

- Definition:** The total value of national retail sales, by month.
- What it impacts:** Wage Tax, Total Taxes, Real Property Transfer Tax, Real Property Tax
- Released:** Monthly Retail Trade Report by the [Census Bureau](#)

As seen in the graph below, increases in Retail spending correlate with increases in Wage and Earnings collections. **Model #2** controlled for Wage Tax Rate (when applicable), Price of Gasoline (NYC Harbor), Retail Sales and GDP Growth. *This impact of Retail sales on Wage Tax revenues is independent of the other variables in the model.*



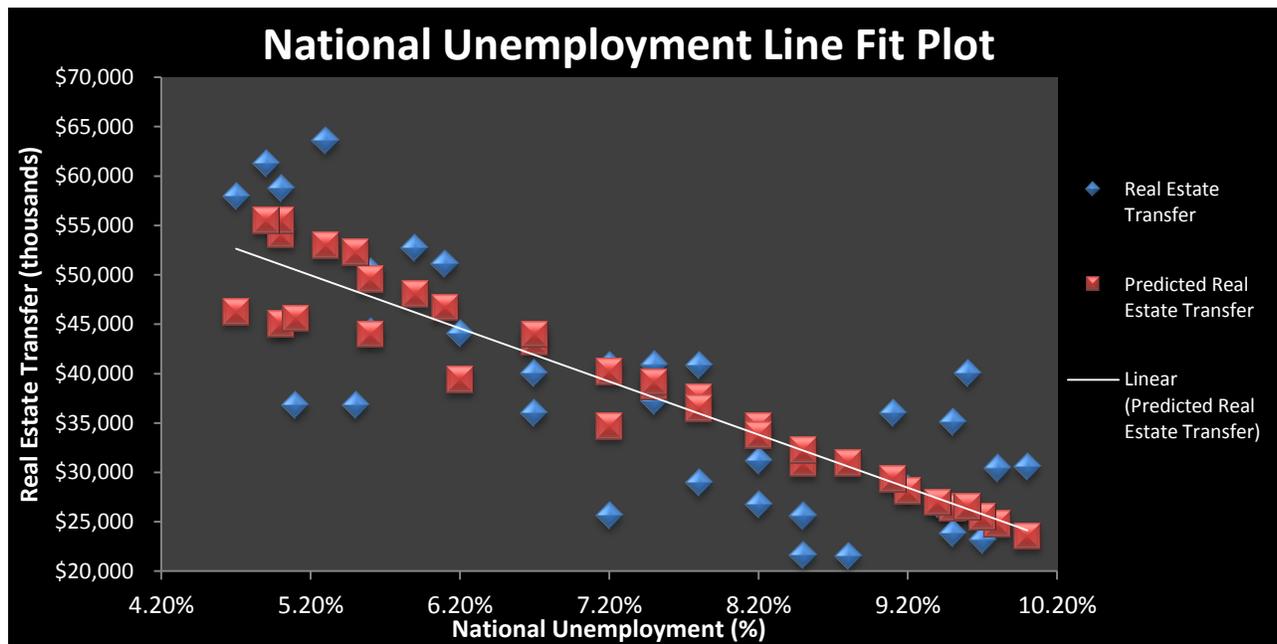
When examining the relationship of Retail and Food Sales to the Total Taxes, we can expect, based on our observations, that an increase in *Retail and Food spending correlates positively with an increase in the Total Tax*

collections per quarter. Several of our taxes are collected in varying amounts depending on the quarter. Thus, the average increase is the true average of the total collection over the year. For example, the bulk of Property Taxes are collected in Q4, which inflates total collections. In order to account for the seasonality of tax collection, these models include ‘Dummy Variables’ when appropriate.

Indicator 2 (Model 1): Unemployment Rate (National)

Definition: The percentage of the labor force that is actively seeking work.
What it impacts: Real Property Transfer, Total Tax Revenues
Released: Monthly by the [Bureau of Labor Statistics](#)

As seen in the figure below, the *National Unemployment Rate correlates negatively with quarterly revenues of the Real Estate Transfer Tax.* This makes sense intuitively; people will not purchase homes if they are unemployed. However, the sheer size of the relationship indicates that the unemployment rate itself likely influences the purchases for employed individuals. **Model #1**, which also controlled for gas prices and CPI, indicates that for *every 0.1% increase in unemployment, we could expect to see a reduction in Real Estate Transfer revenue, up to \$0.5 million per quarter.* This model controls for the Price of Gasoline, Retail Sales, and GDP Growth. This relationship is easier to visualize than other relationships due to the fact that Real Estate taxes are not seasonal; people purchase homes all year.



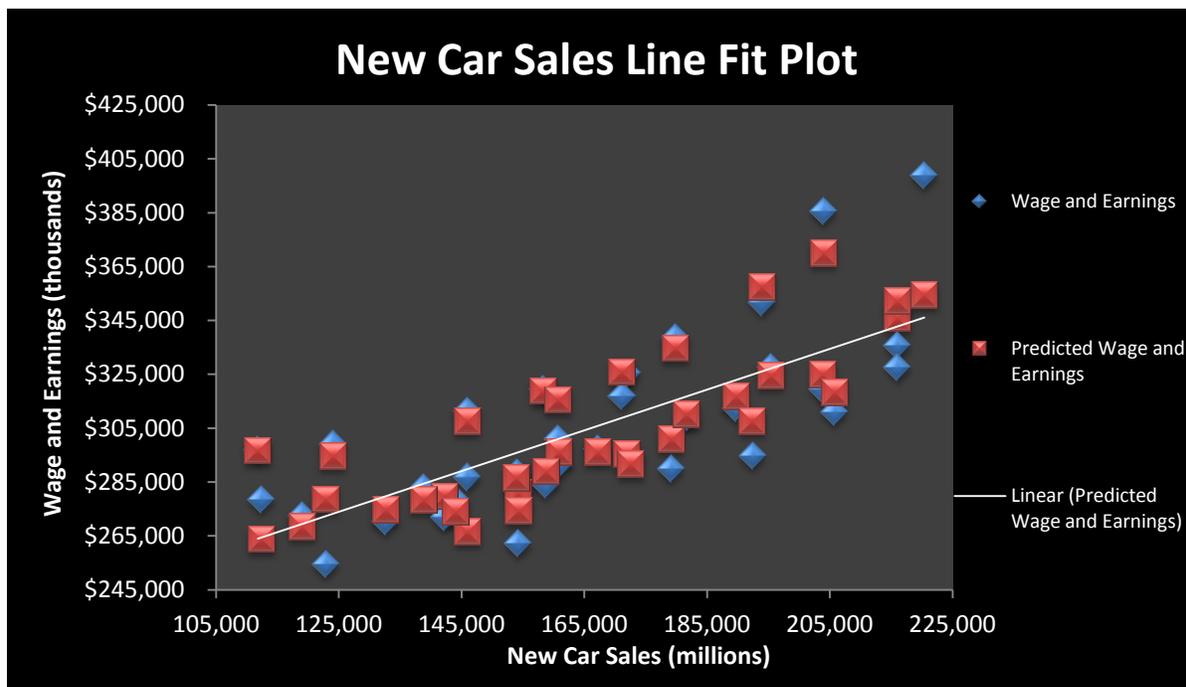
Indicator 3 (Model 1): Philadelphia MSA Consumer Price Index

- Definition:** The measure of the average change in prices over time in a fixed market basket of goods and services. This indicator smoothes the changes in prices over the entire Philadelphia region.
- What it impacts:** Total Tax Revenues
- Released:** Quarterly by the [Bureau of Labor Statistics](#)

Although it may sound counterintuitive, a *rising Consumer Price Index (CPI) is often indicative of Total Tax Revenue growth*. The rising price of goods (inflation) can be attributed to a strong economy when it is driven by market demand. A rise in the CPI would indicate a weaker economy when rising prices are driven by non-market forces. The most common example would be oil prices: oil prices are often a reflection of geopolitical forces rather than market forces. A rise in oil prices translates to an increase in the price of goods, independent of economic growth. To account for this, we controlled for the price of a gallon of gasoline.

Indicator 4 (Model 3): New Car Sales (National)

- Definition:** The total value of new car sales nationwide, by month.
- What it impacts:** Wage Tax, Total Taxes, Real Property Transfer Tax
- Released:** Monthly Retail Trade Report by the [Census Bureau](#)



As mentioned previously, Sales of New Automobiles are one of the better indicators. **Model #3**, which controls for GDP Growth, Price of Gasoline (NYC Harbor) and the Wage Tax Rate, found that *increases in Sales of New Cars*

has a statistically significant positive relationship with Wage, Real Estate Transfer, and Total Tax Revenues.

New Car Sales can be considered a non-essential purchase, which consumers tend to delay making during economic downturns. This variable offers a unique indicator to monitor in anticipation of any changes to City revenue projections.

Sources:

https://www.bls.gov/regions/mid-atlantic/news-release/areaemployment_philadelphia.htm

<http://www.urban.org/sites/default/files/publication/61106/310086-Errors-in-Budget-Forecasting.PDF>

<https://beta.phila.gov/media/20170301200611/FY18-22-Five-Year-Plan.pdf>

<http://www.stat.yale.edu/Courses/1997-98/101/linmult.htm>