FORECASTING REVENUE IN AN UNCERTAIN ECONOMY

TGFOA 2020 Fall Conference

October 8, 2020

pfm.com

All data as of 10-7-2020 unless otherwise noted.

Covid19 Recession

First Services Sector Driven Recession

- COVID-19 has triggered the first recession ever caused by a contraction in the services sector of the economy
- Prior recessions generally stemmed from the goods producing sector. For example, the Great Recession beginning in 2008 was caused by an excess supply of housing stimulated by faulty financing and speculation
- Unlike a goods-based recession, a service sector recession does not generate excess inventory that must be absorbed before recovery can begin
- Instead, a service-based recession causes a very sharp loss of employment and income and devastates restaurants, retail, service, entertainment, tourism and travel
  - Many of these businesses are relatively small and have small capital bases
  - Most services sector workers are relatively lower paid and may lack healthcare and other safety nets and personal savings
- Since a services sector recession is not burdened by excess inventory, the initial rebound occurs very quickly, but full recovery is delayed until a vaccine is in wide use

COVID-19 Recession – Overview and Key Assumptions

1. **Baseline**

   A. Overview – COVID-19 has triggered a severe but short global recession. In the U.S. it is the most severe since the Great Depression

   B. Key Assumptions – Gradual re-openings and periodic roll-backs. Normal economic and social activities are delayed until mid-2021 when a vaccine is widely distributed. In between, as testing and quarantine measures ramp up, social distancing remains necessary, dampening economic activity

2. **Pessimistic**

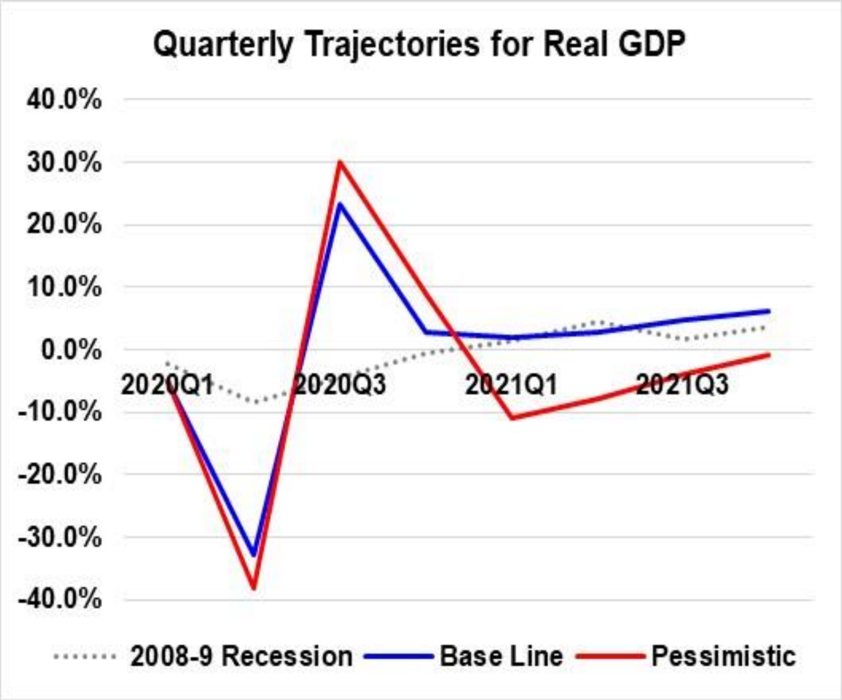
   A. Overview – Infections rebound in the U.S., prompting renewals of lockdown measures preventing a recovery. The result is a prolonged period of below trend economic activity

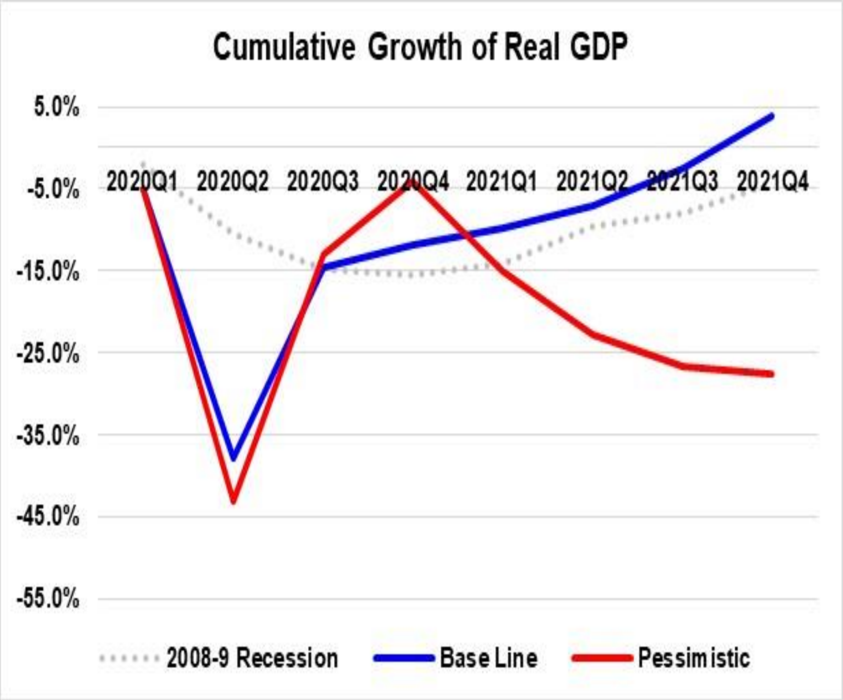
   B. Key Assumptions – Lockdown measures are abandoned too soon and the epidemic re-erupts in major cities. Extensive monetary and fiscal measures result in a quasi nationalization of major sectors of the economy. These measures fail to restore a meaningful recovery, but they do arrest the downward spiral

Sources: Wells Fargo, BEA, and PFM

Impact of COVID-19 on Real GDP

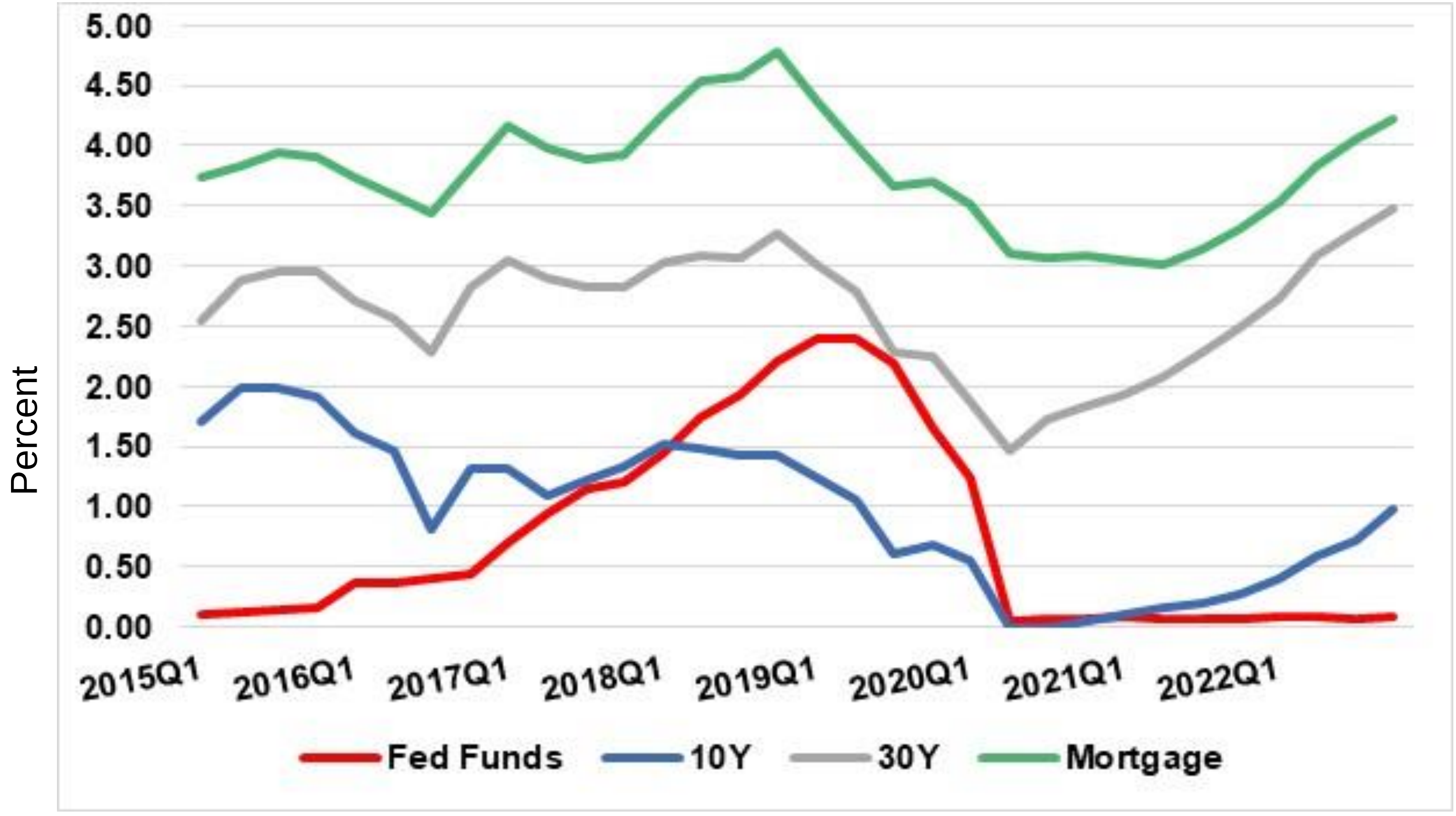
- Baseline – regain prior level of real GDP by 2021Q4
- Pessimistic – do not regain prior level of real GDP until 2023





Sources: Moody's Analytics, and PFM

Key Interest Rates



Source: Moody's Economy.com,

Comparison of COVID-19 Recession to Past Recessions

Recession	Months of Duration	Fall in GDP	Peak Unemployment Rate
Great Depression	43	-30.0%	25%
2008-2009	18	-4.3%	13%
COVID-19	3	-10.5%	15%

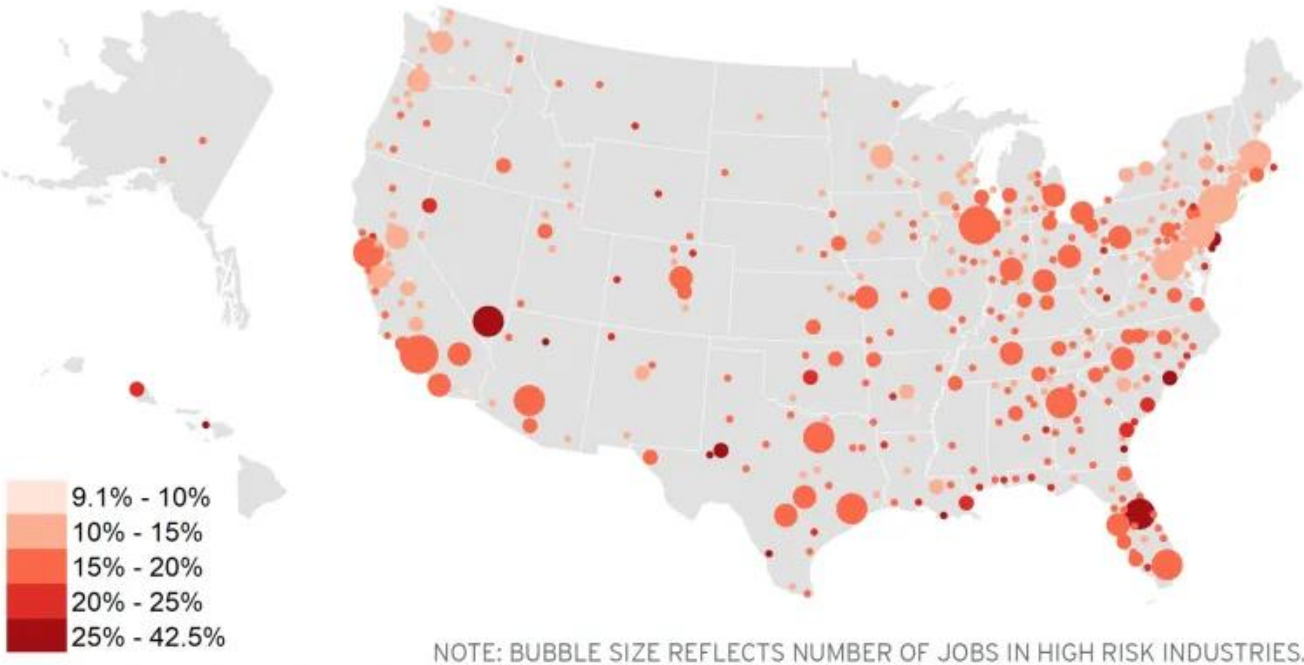
- The COVID-19 recession is unique, because it is primarily a services sector recession caused by an epidemic.
- Although the COVID-19 recession is expected to be short in duration, it will likely cause a spike in the unemployment rate higher than in the Great Recession of 2008-9. Again, this is because this recession strikes at the services sector of the economy.
- Strong actions by the Federal Reserve and the $3T federal stimulus package (equal to 15% of GDP) are likely to prevent cascading sequence of business failures and layoffs from morphing into a financial crises and a depression.

Sources: Moody's Economy.com and NBER

Impact of Geography / Sector Concentration

Sunbelt tourist destinations and energy metros stand to be most affected

Share of metro employment in high risk industries, 2019



Source: Zandi, "COVID-19: A Fiscal Stimulus Plan," (Moody's Analytics, 2020) and Brookings analysis of Emsi data

B | Metropolitan Policy Program at BROOKINGS

In addition to different local and regional economic factors, the level and timing of infections also varies across the country, which may, in turn, impact the timing, pace, and phases of economic recovery

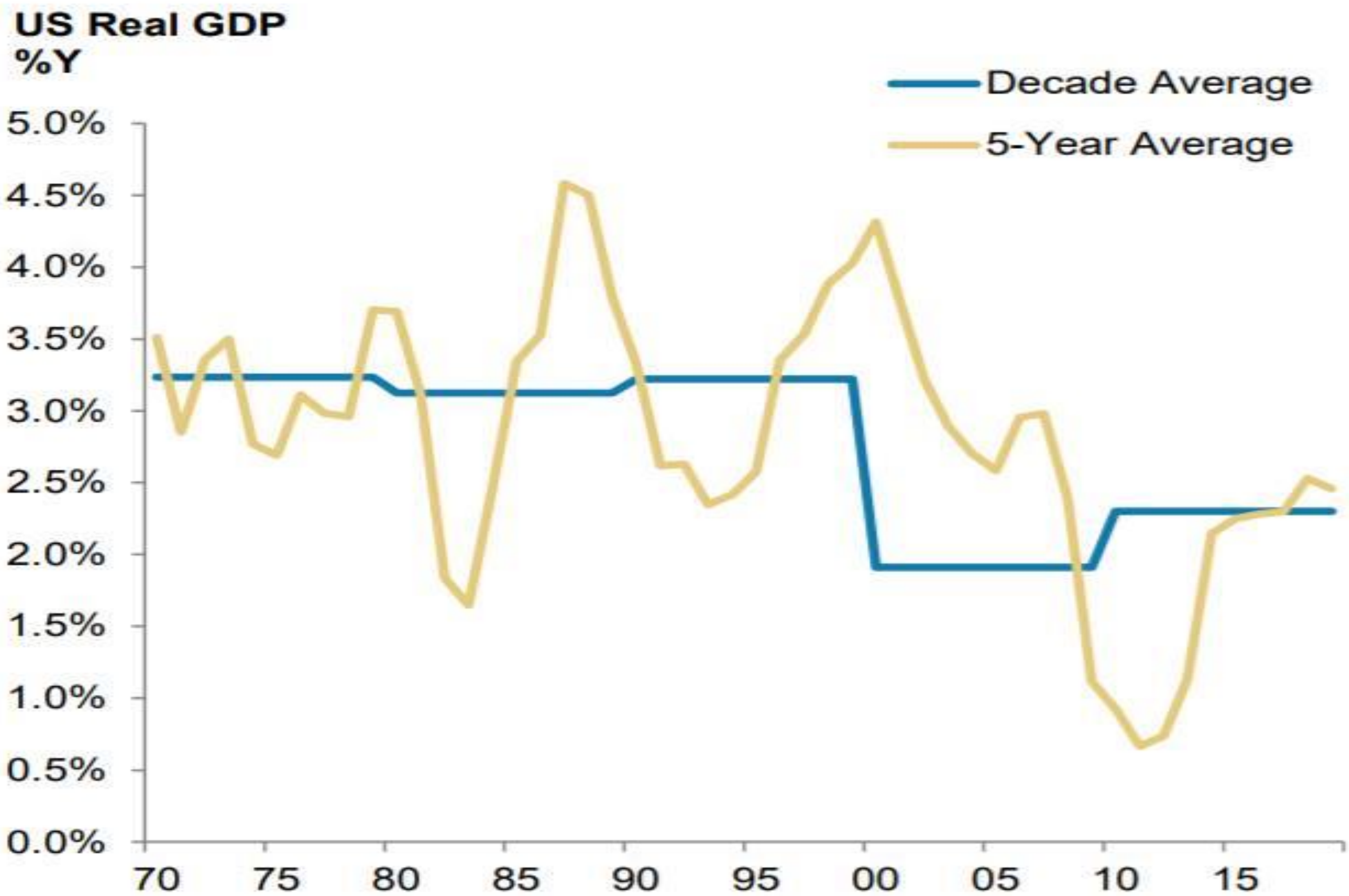
Source: Brookings, "The places a COVID-19 recession will likely hit hardest," Mark Muro, Robert Maxim, and Jacob Whiton, March 17, 2020 https://www.brookings.edu/blog/the-avenue/2020/03/17/the-places-a-covid-19-recession-will-likely-hit-hardest/

Structural Change and Implications for the Economic Outlook

History is a Good Guide to the Future – Until it is Not!

- “History doesn’t repeat itself, but it often rhymes,” ascribed to Mark Twain.
- Typically true and useful.
- Unless there is structural change that no longer makes the history as useful.
- Substantial structural changes to U.S. economy have occurred over the last decade
  - Globalization
  - Expanded international trade
  - Fraking and expanded U.S. energy production
  - Artificial intelligence
  - Concentration of wealth
- Results: slower growth, lower inflation, and lower interest rates

Trend GDP growth has slowed



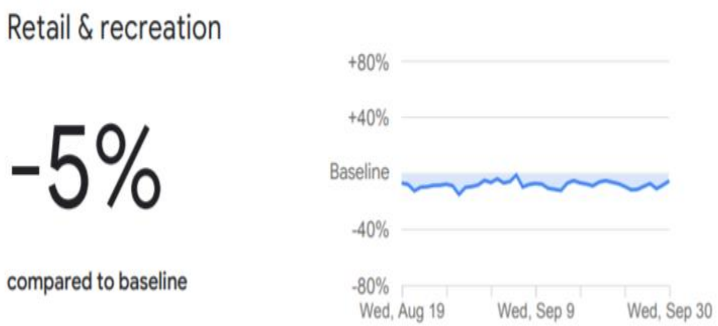
Retail Space Demands Will Continue to Shrink at Accelerating Rate

- Covid19 recession accelerates changes already underway
- Neighborhood centers resist shrinkage for now
- Other retail must adapt and become more of a compelling experience
- Huge excess supply of obsolete space available for re-use
- Need substantial reform of regulations to spur reuse

Average Supportable Space – Florida

Retail	1980-2000	2000-19	Post Covid
Neighborhood	25	25	20
Community	15	7	3
Regional/Mall	10	5	1
	======	======	======
Total	50	37	24

Tennessee mobility data from Google
Tennessee businesses fully reopened now
Even if opened, customers must feel safe

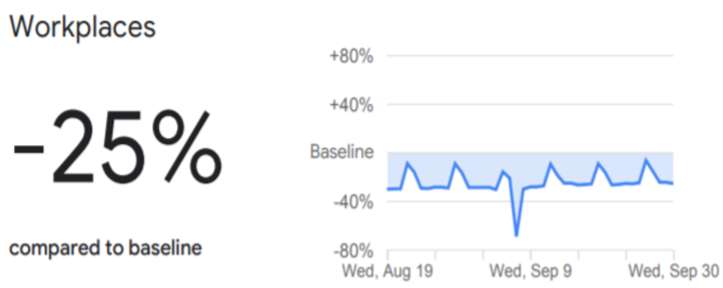


Office Space Demand will Shrink Dramatically

- Office space demand was already shrinking prior to Covid19
- Covid19 recession sharply accelerates this trend – proved work from home can work
- Office space is typically the 3rd largest fixed cost for most businesses – firms will economize
- Only the very best or the very cheapest will compete well
- With more work from home offices located near higher valued homes will be favored
- Opportunities for adaptive reuse

Office	SqFt
1980-2000	250
2000-19	150
Post Covid	50-to-75

Tennessee Mobility from Google
Many still working from home

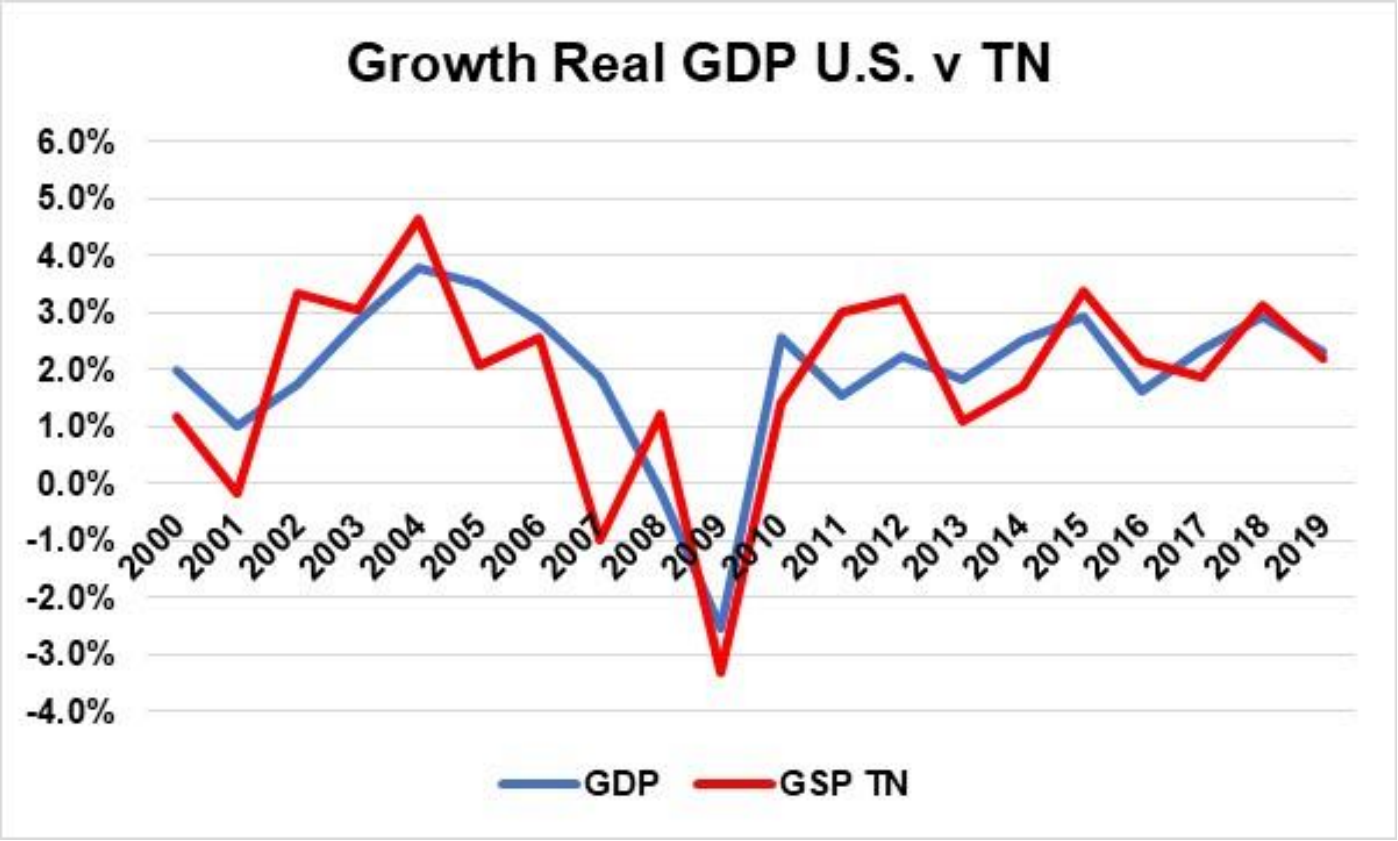


Consequences for Property Tax Revenues

- Values for retail, restaurant, office and hotels will decline on average
  - Impacts on many retail and office properties will be permanent
  - Impacts on hotels will be substantial, but over time the sector will recover
- Values for warehouses will increase significantly
  - Driven by Ecommerce
- Values for residential properties will increase
  - Driven by work from home / school from home
- Impacts will be felt mostly in FY2022-23

IMPACT ON TENNESSEE

Why Care About GDP? Where GDP Goes, so Goes Tennessee’s Gross State Product to a Large Extent

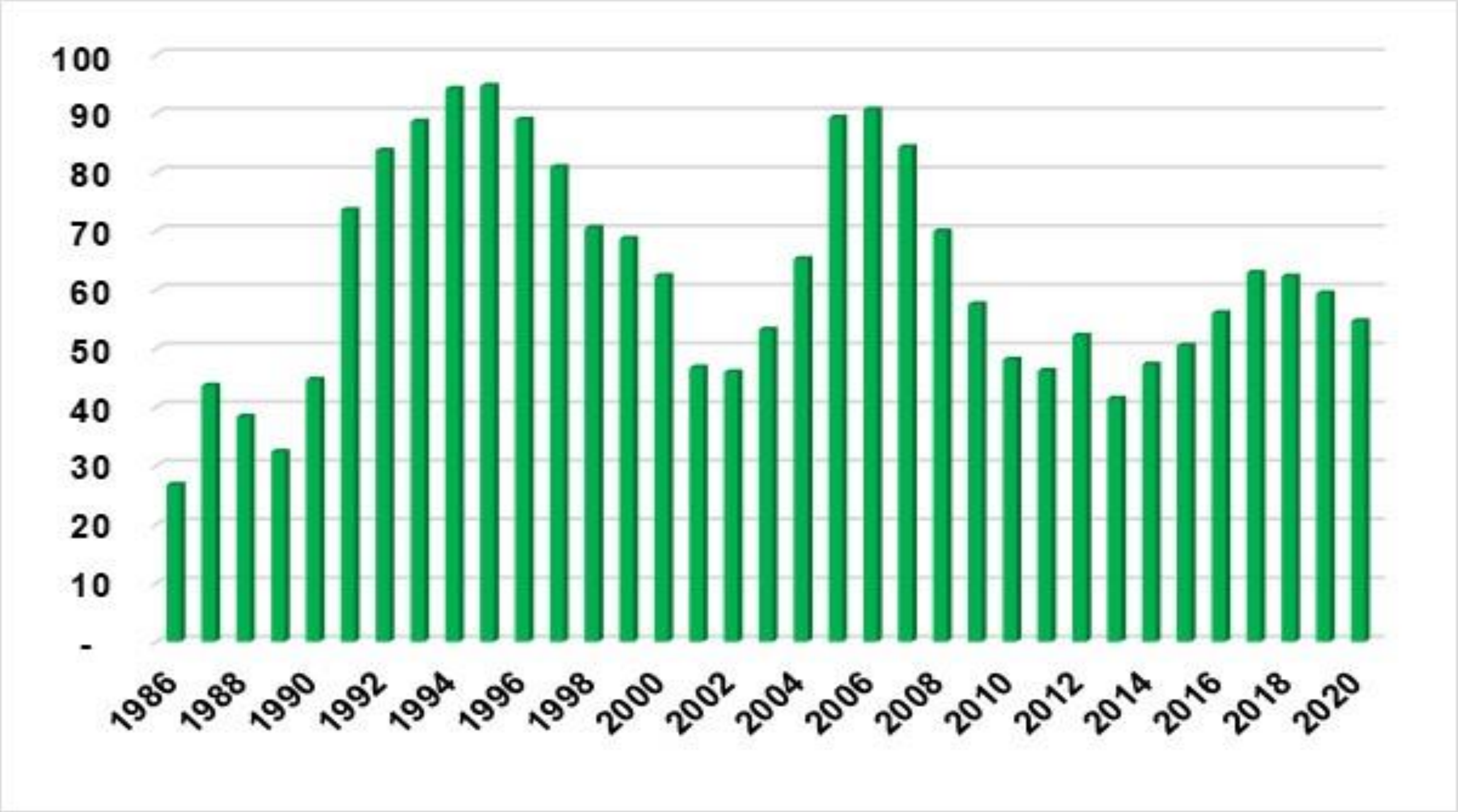


Correlation = 0.77

Source: U.S. Bureau of Economic Analysis and PFM

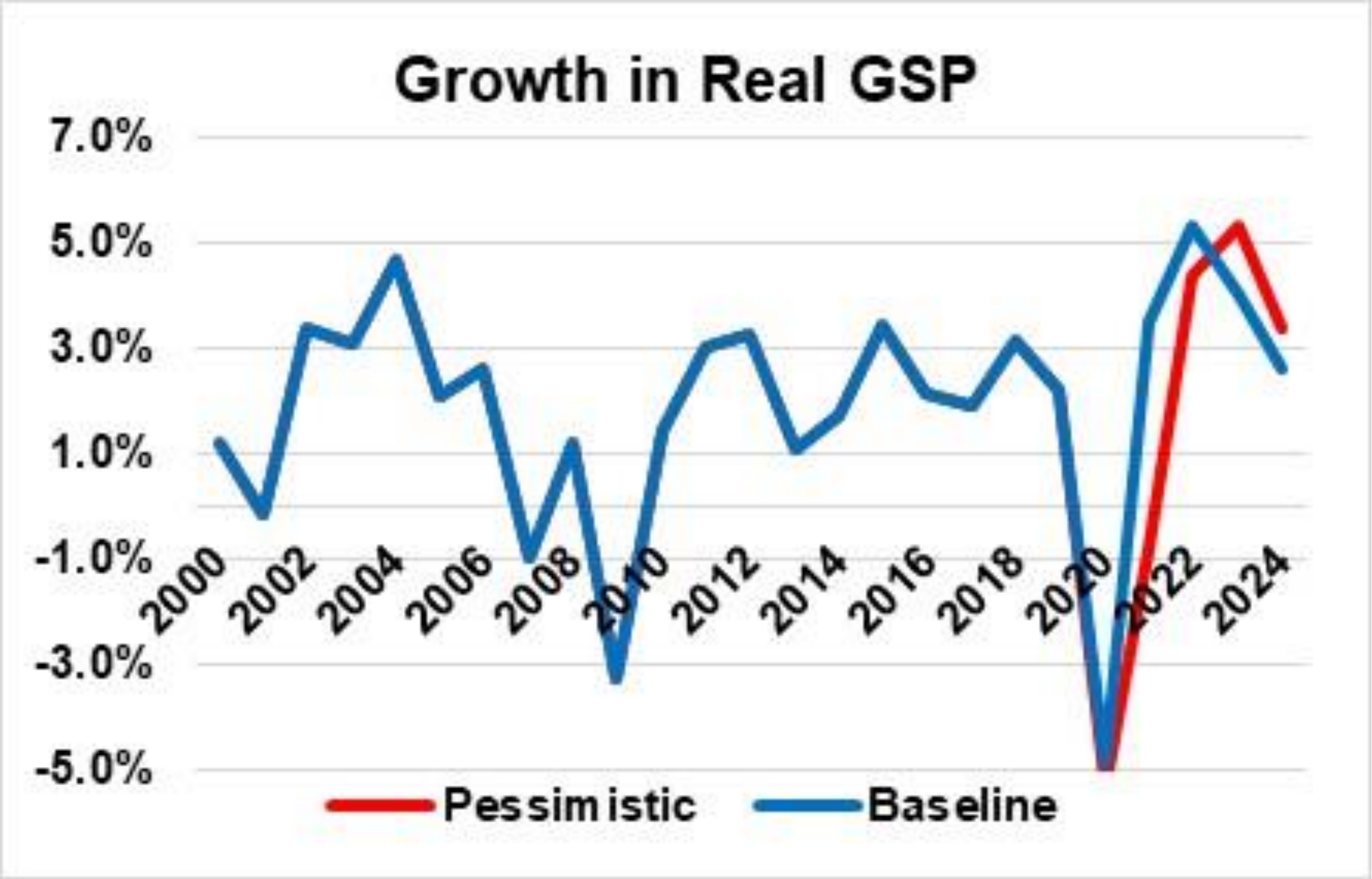
Tennessee's Population Growth Peaked in 2017 Well Before the COVID-19 Recession

- Domestic migration has slowed significantly over the last 2-years
- International migration has also dropped off

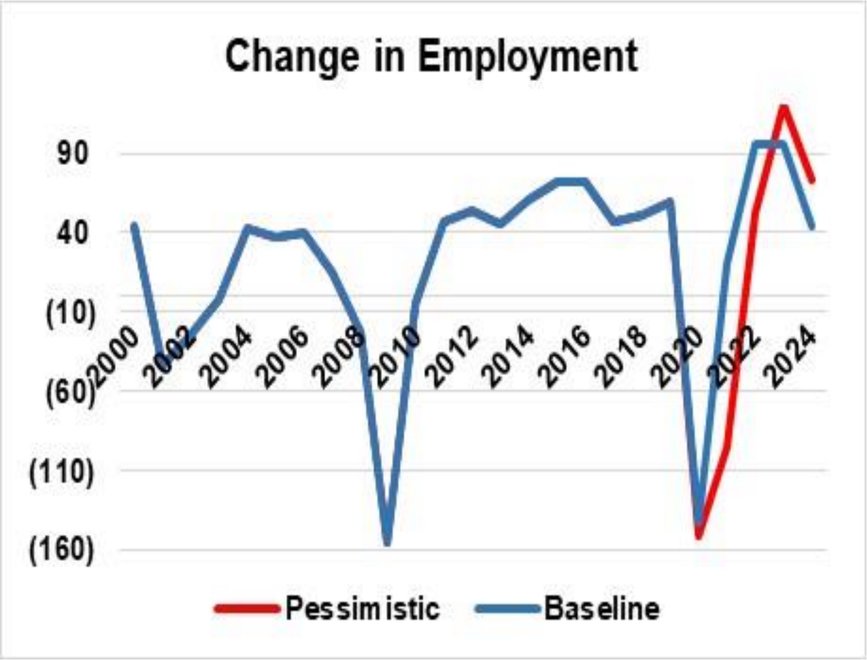


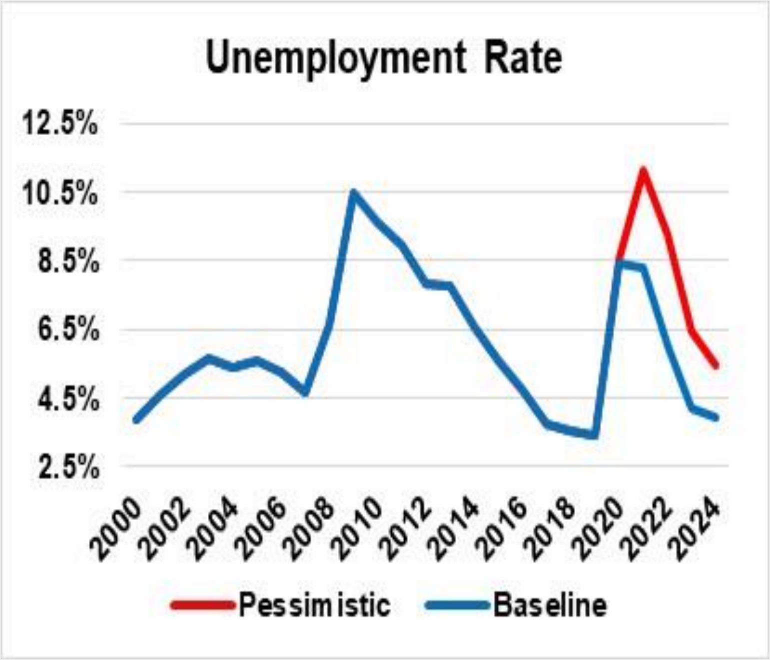
Source: U.S. Census Bureau

Impact of COVID-19 Recession on Tennessee



Impact of COVID-19 Recession on Tennessee





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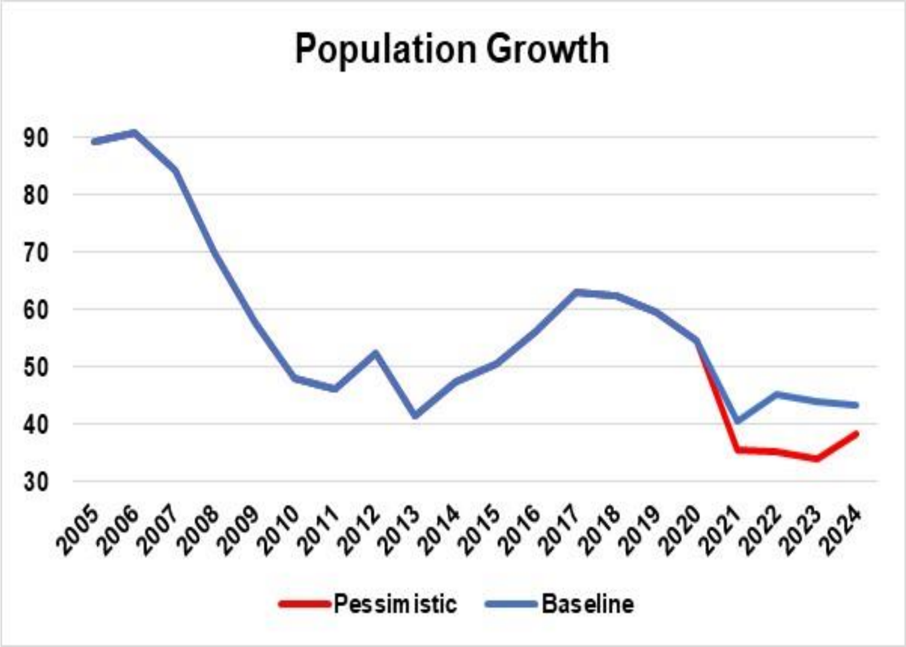
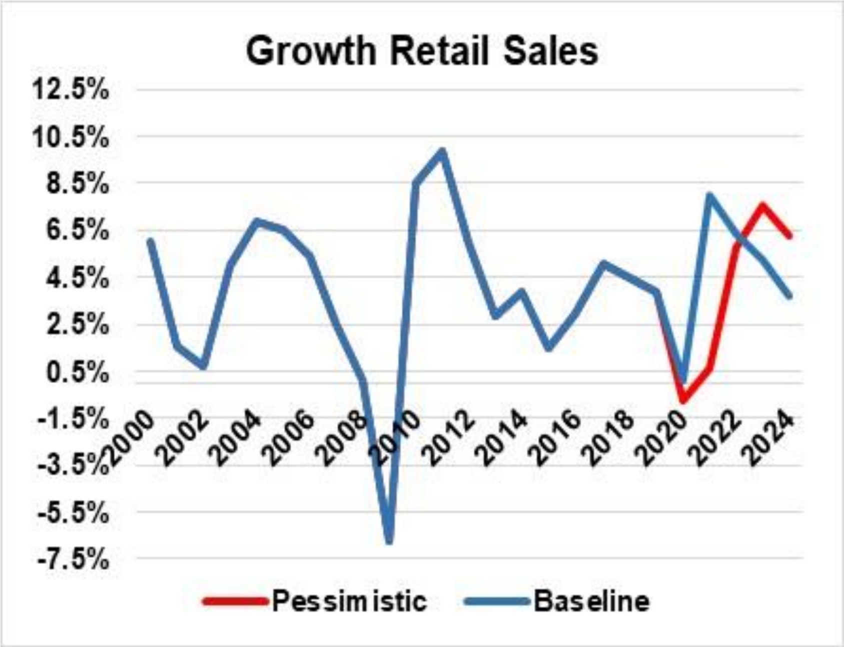




FORECASTING KEY REVENUES

Forecasting Key Revenues – Econometric Approach

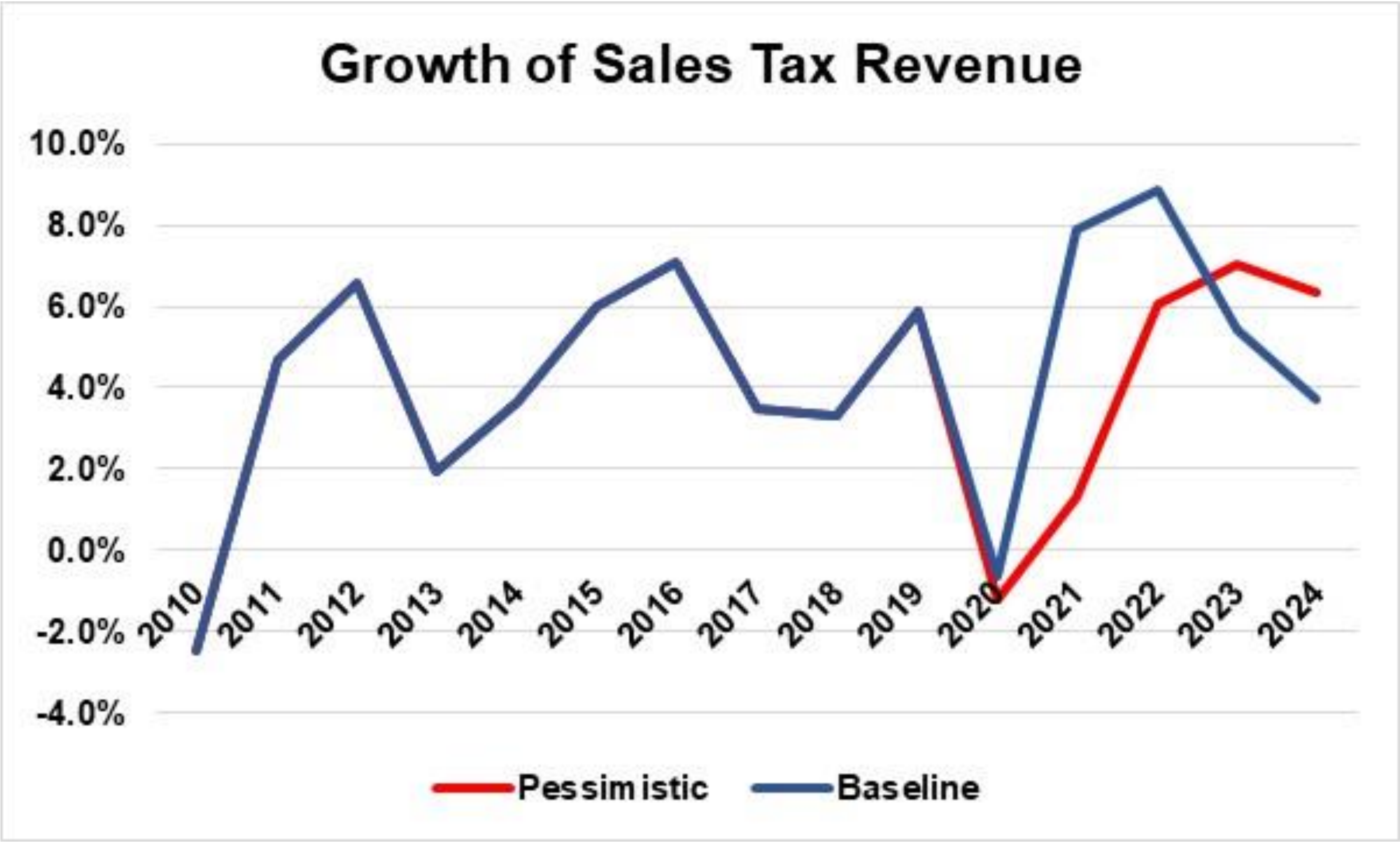
1. Obtain forecast for independent variables – the drivers
   - Gross national product
   - Gross state/metro product
2. Develop model/equation to explain revenue source of interest as a function of independent variables from #1
3. Estimate relationship with regression analysis
   - Excel has a suitable regression capability
4. Apply judgment – the interocular impact test

Example – forecast for Tennessee Sales Tax Revenue

- Growth in sales tax revenues estimated as a function of:
  - Growth in gross state product
  - Growth in population
  - Dummy to reflect sales taxation on ecommerce

SUMMARY OUTPUT				
Regression Statistics				
Multiple R	0.82			
R Square	0.67			
Adjusted R Square	0.50			
Standard Error	0.02			
Observations	10.00			
ANOVA				
	df	*SS*	*MS*	*F*
Regression	3	0.005	0.002	4.014
Residual	6	0.002	0.000	
Total	9	0.007		
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.006	0.021	0.281	0.788
Growth GSP	1.286	0.889	1.446	0.198
Growth Pop	0.123	0.059	2.065	0.084
Dummy	0.060	0.042	1.429	0.203

Resulting Forecast



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Thank You!

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