

# **Directional Changes in the Economy: Their Impact on State & Local Tax Revenues**

**Presented at:  
The Colorado Government Finance Officers Association  
and  
Colorado Association of Municipal Tax Auditors  
Coalition Meeting**

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# Disclaimer

- **All opinions are mine and do not reflect opinions of the University of Colorado or its employees.**



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# **Objective**

## **Problems Facing Managers**

- **Define the role of government**
- **The economy**
- **Sales tax trends**
- **Gallagher Amendment: 1982**
- **TABOR Amendment: 1992**
- **Economic base**
- **Inflationary expectations**
- **Summary**
- **Questions and Answers**



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# The Role of Government

- **Public Services**
  - Essential services
  - Elective services
- **How do you pay for services**
  - Tax sources (stability issues?)
  - User Fees
  - Grants and other
- **TABOR is an entitlement program**
- **Zero Base Budgets**
  - Capital budget
  - Operating budget



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# The Economy

- **Identifying the onset of a recession**
  - Fed funds rate
  - Unemployment rate

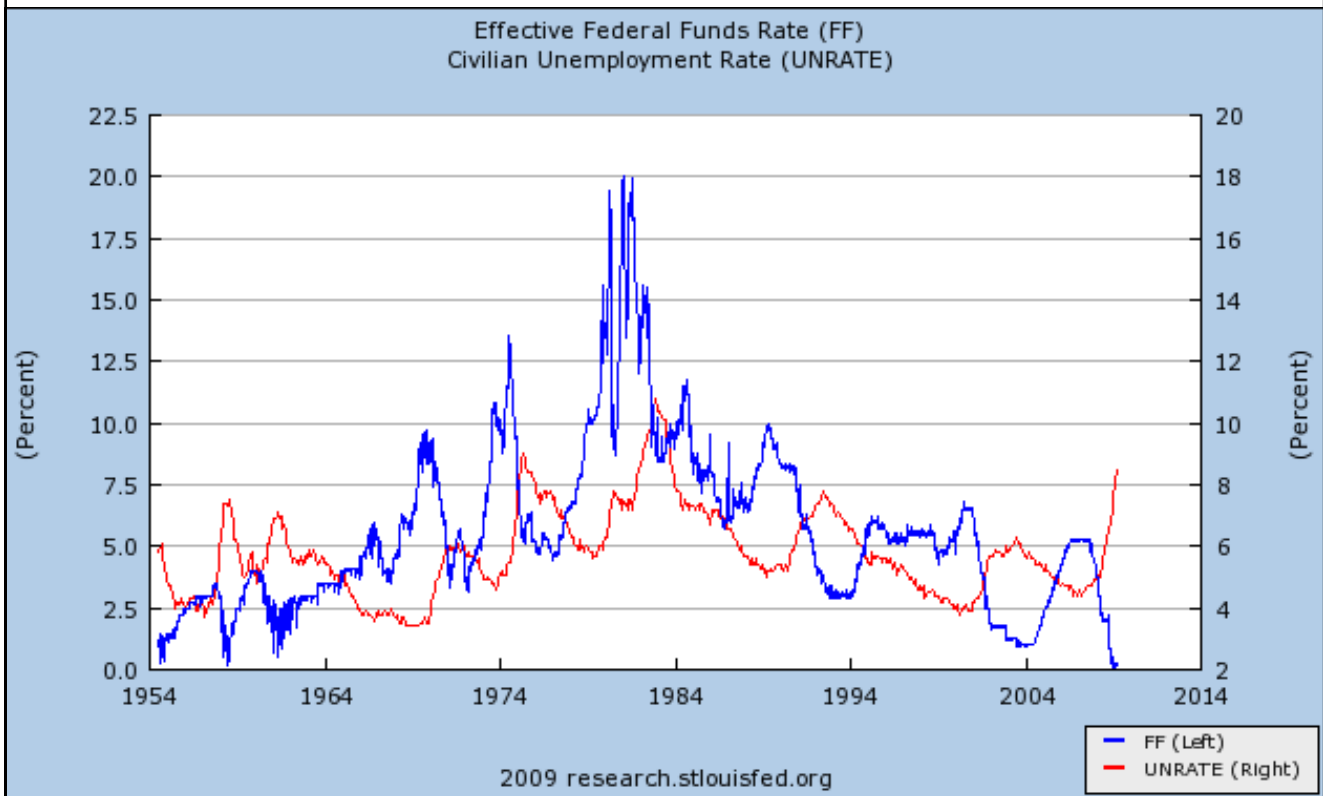


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# Fed Funds Rate and Unemployment Rate as Indicators

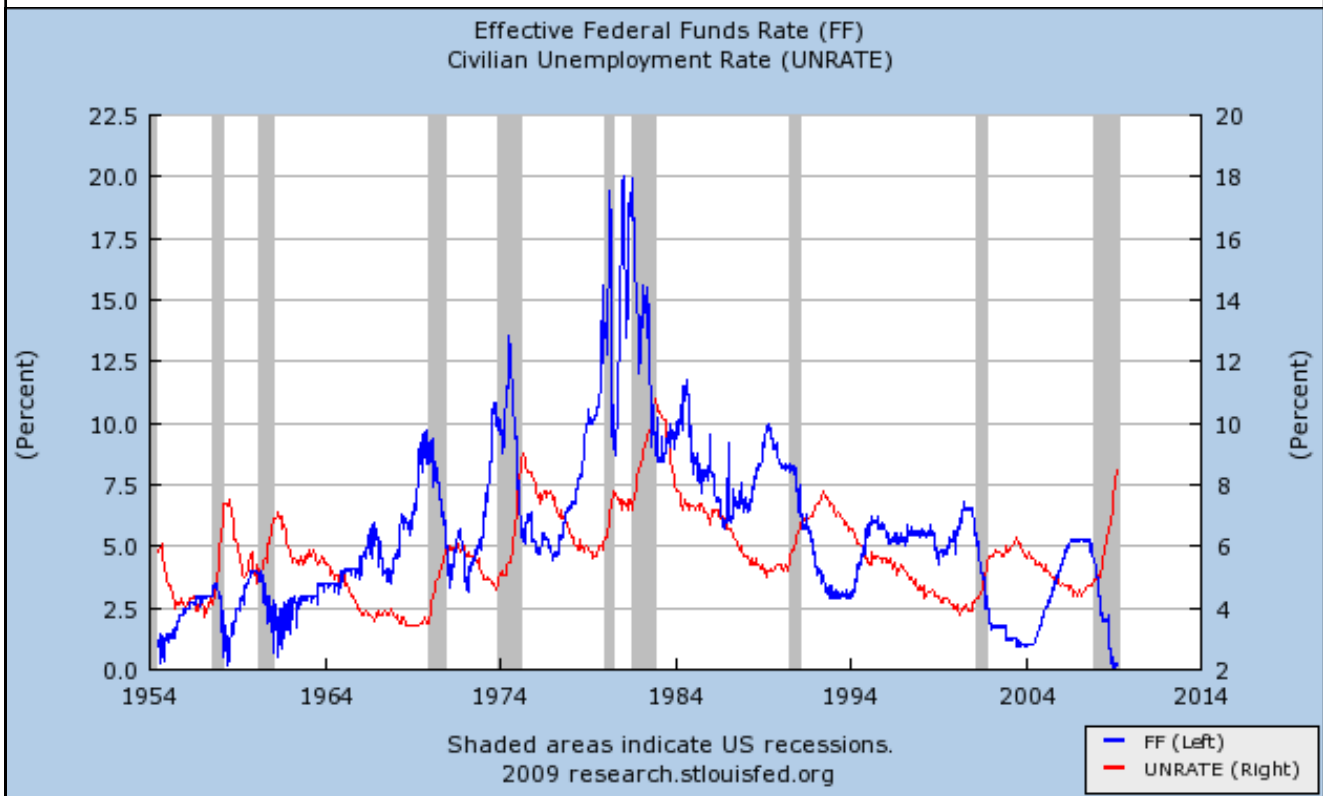


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# Fed Funds Rate and Unemployment Rate as Indicators



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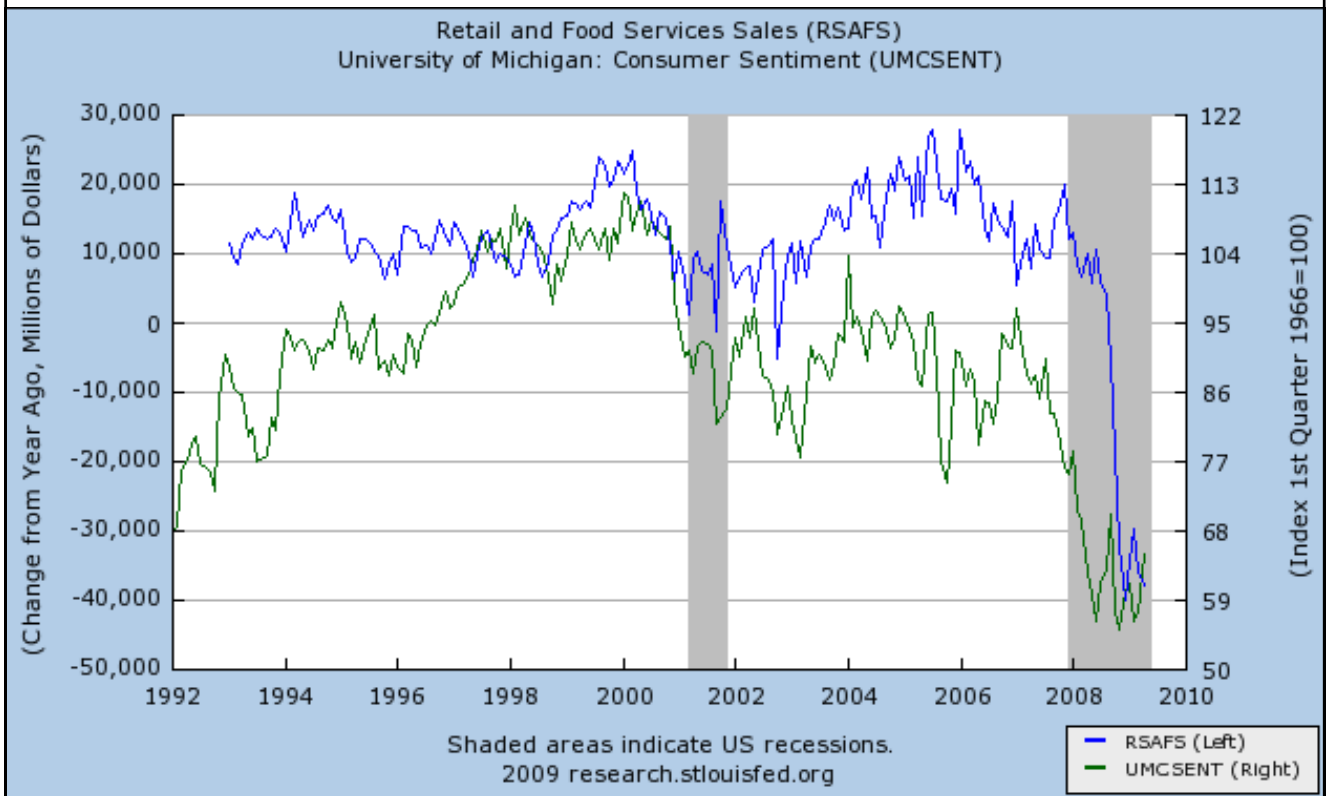
# Sales Tax Trends



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# Consumer Sentiment and Retail & Food Sales

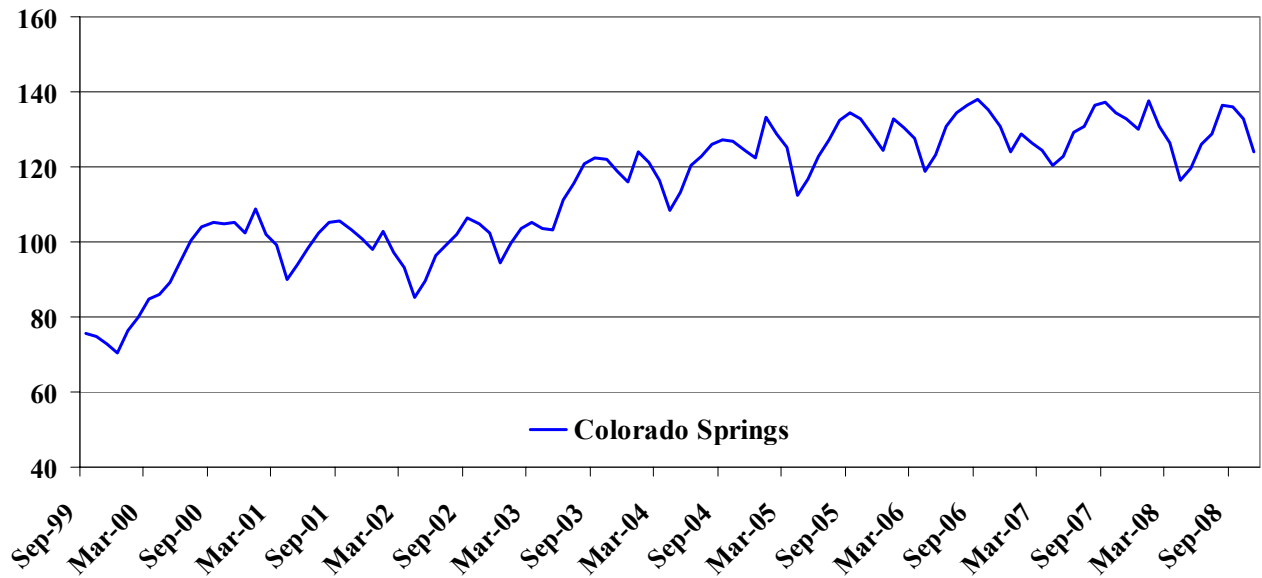


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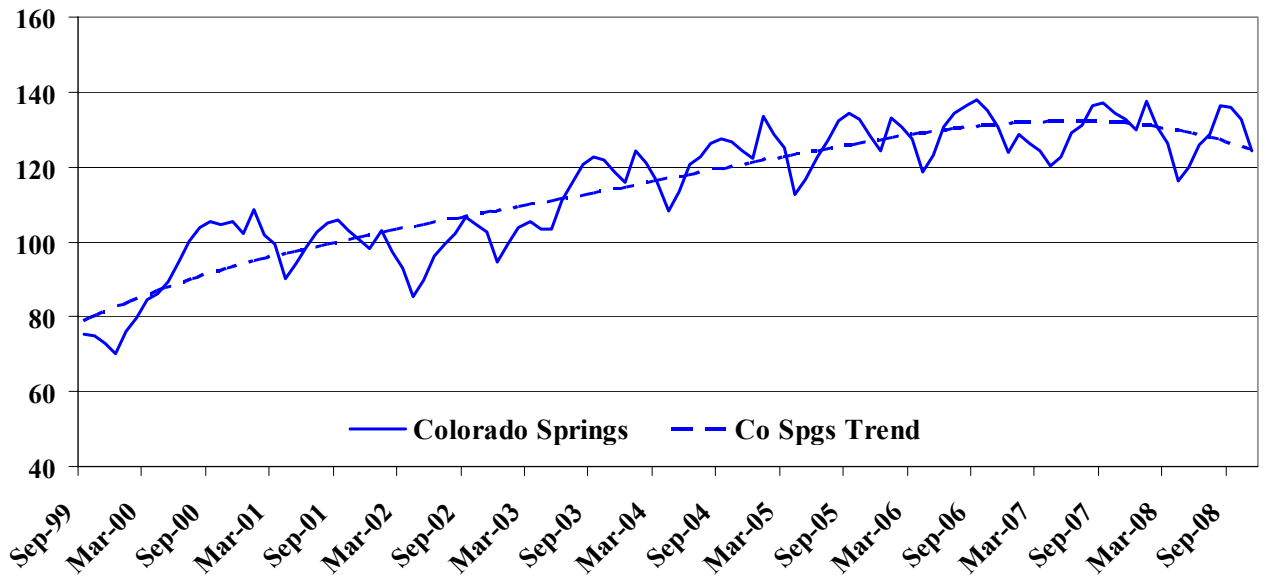
### Colorado Springs Sales Tax Trend (Mar 2001-November 2001 = 100)



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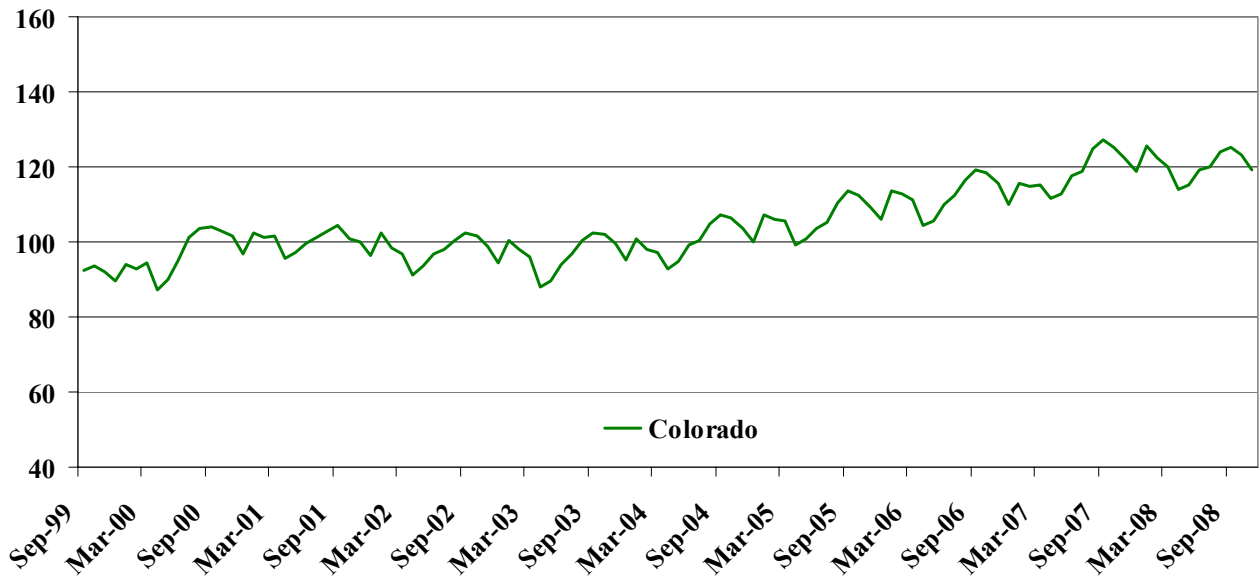
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### Colorado Sales Tax Trend (Mar 2001-November 2001 = 100)

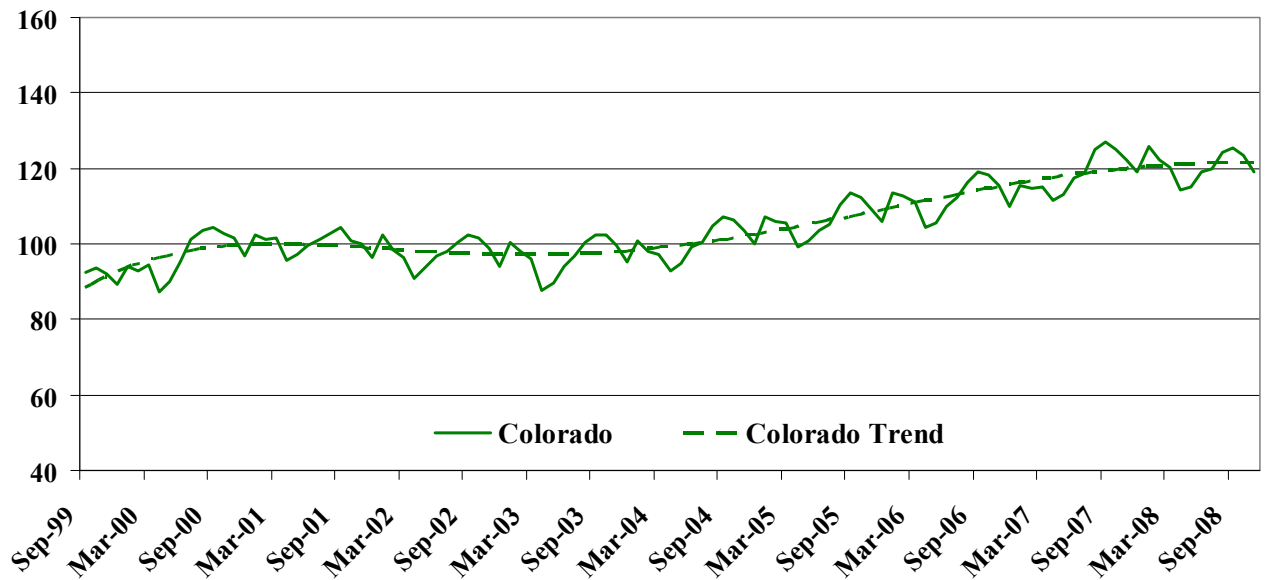


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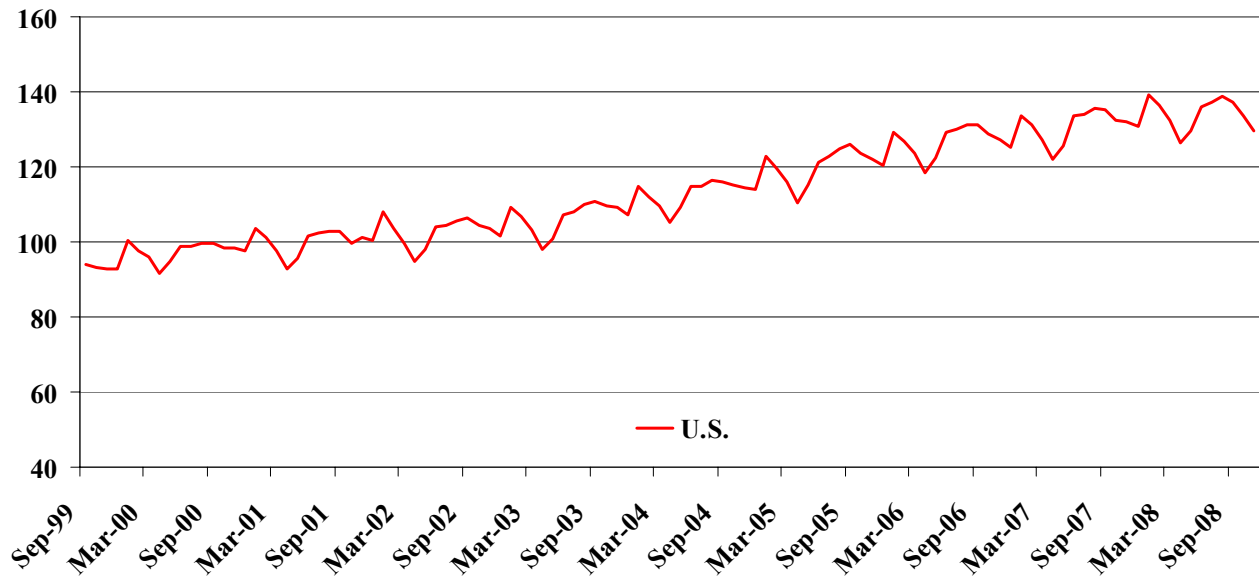
### Colorado Sales Tax Trend (Mar 2001-November 2001 = 100)



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### U.S. Sales Tax Trend (Mar 2001-November 2001 = 100)

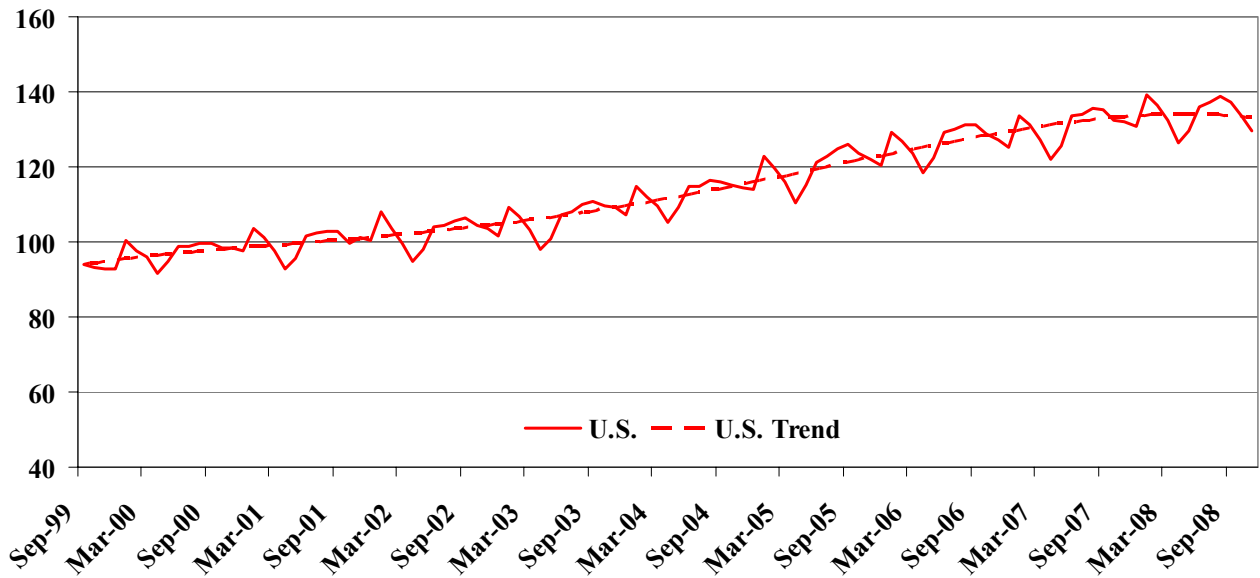


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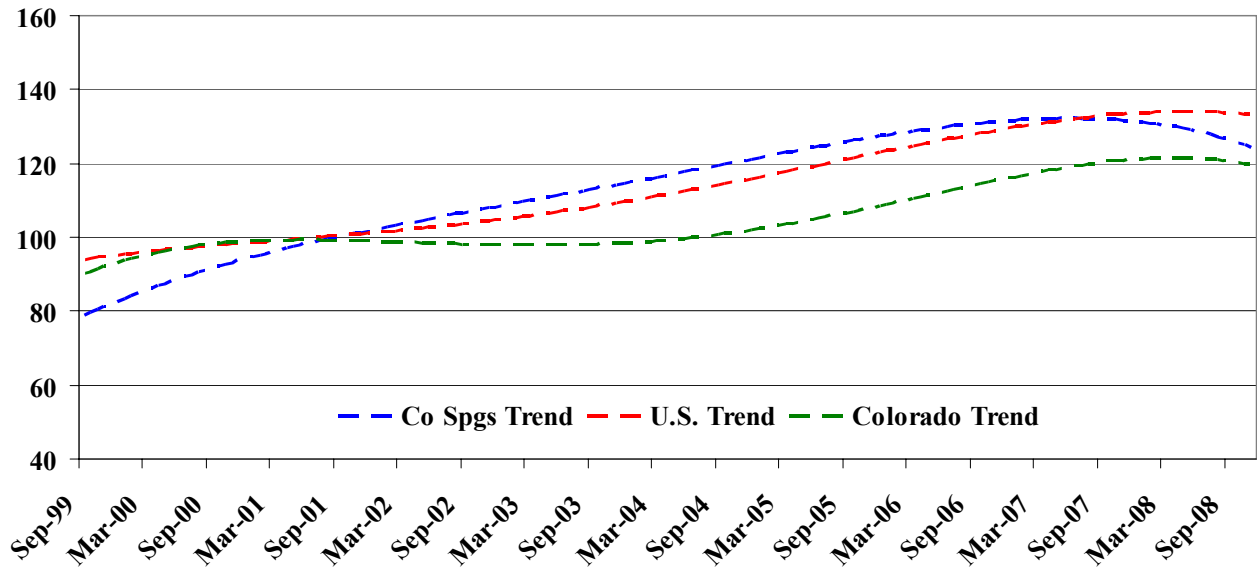
## U.S. Sales Tax Trend (Mar 2001-November 2001 = 100)



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### Colorado Springs, Colorado & U.S. Trend Comparisons (March 2001-November 2001 = 100)

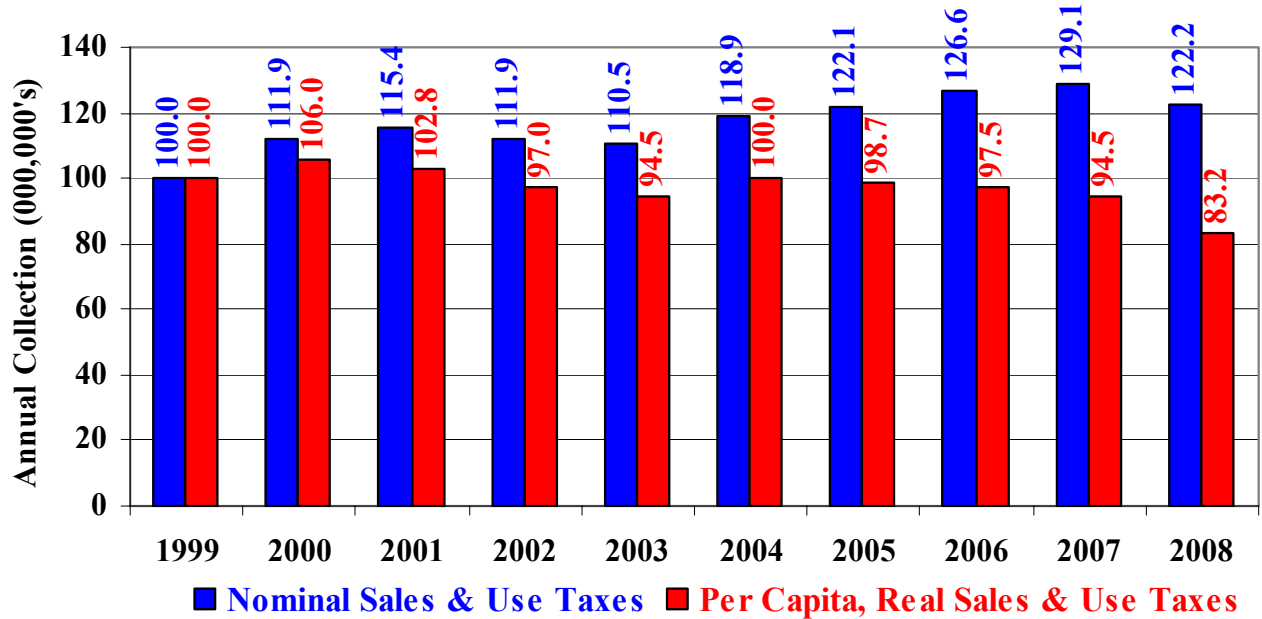


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## City of Colorado Springs: Inflation Adjusted Per Capita Sales Tax Collection (1998=100)



Source: City of Colorado Springs and UCCS Southern Colorado Economic Forum



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## **Variables to Forecast Sales Tax**

- **Income**
  - **Employment/unemployment**
  - **Consumer sentiment**
  - **Seasonal factors**
  - **Federal Reserve policies**
  - **Other**
- 
- **Can be made more reliable with a more stable economic base.**

# **The Gallagher Amendment: 1982**

- **Residential property owners bear 45% of property tax burden**
- **Commercial property owners bear 55% of property tax burden**



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<b>Table 1: Residential and Commercial Property Values in Colorado</b>						
	<b>Property Value (\$Billion)</b>			<b>Share of Values</b>		
<b>Year</b>	<b>Total</b>	<b>Residential</b>	<b>Non Residential</b>	<b>Total</b>	<b>Residential</b>	<b>Non Residential</b>
<b>1983</b>	<b>66.5</b>	<b>35.4</b>	<b>31.1</b>	<b>100%</b>	<b>53.2%</b>	<b>46.8%</b>
<b>1984</b>	<b>69.7</b>	<b>37.7</b>	<b>32.0</b>	<b>100%</b>	<b>54.1%</b>	<b>45.9%</b>
<b>1985</b>	<b>73.0</b>	<b>39.7</b>	<b>33.3</b>	<b>100%</b>	<b>54.4%</b>	<b>45.7%</b>
<b>1986</b>	<b>75.1</b>	<b>41.2</b>	<b>33.9</b>	<b>100%</b>	<b>54.8%</b>	<b>45.2%</b>
<b>1987</b>	<b>146.9</b>	<b>89.3</b>	<b>57.5</b>	<b>100%</b>	<b>60.8%</b>	<b>39.2%</b>
<b>1995</b>	<b>203.7</b>	<b>146.3</b>	<b>57.4</b>	<b>100%</b>	<b>71.8%</b>	<b>28.2%</b>
<b>1996</b>	<b>211.8</b>	<b>152.4</b>	<b>59.4</b>	<b>100%</b>	<b>72.0%</b>	<b>28.0%</b>
<b>2003</b>	<b>478.5</b>	<b>370.9</b>	<b>107.6</b>	<b>100%</b>	<b>77.5%</b>	<b>22.5%</b>
<b>2004</b>	<b>492.6</b>	<b>382.8</b>	<b>109.8</b>	<b>100%</b>	<b>77.7%</b>	<b>22.3%</b>
<b>2005</b>	<b>534.8</b>	<b>416.0</b>	<b>118.9</b>	<b>100%</b>	<b>77.8%</b>	<b>22.2%</b>
<b>2006</b>	<b>554.8</b>	<b>431.5</b>	<b>123.2</b>	<b>100%</b>	<b>77.8%</b>	<b>22.2%</b>

**Table 2: Property Assessment Rates in Colorado**

<b>Years</b>	<b>Residential Assessment Rate</b>	<b>Commercial Assessment Rate</b>
<b>Prior to 1983</b>	<b>30.00%</b>	<b>29.00%</b>
<b>1983-1986</b>	<b>21.00%</b>	<b>29.00%</b>
<b>1987</b>	<b>18.00%</b>	<b>29.00%</b>
<b>1988</b>	<b>16.00%</b>	<b>29.00%</b>
<b>1989-1990</b>	<b>15.00%</b>	<b>29.00%</b>
<b>1991-1992</b>	<b>14.34%</b>	<b>29.00%</b>
<b>1993-1994</b>	<b>12.86%</b>	<b>29.00%</b>
<b>1995-1996</b>	<b>10.36%</b>	<b>29.00%</b>
<b>1997-2000</b>	<b>9.74%</b>	<b>29.00%</b>
<b>2001-2002</b>	<b>9.15%</b>	<b>29.00%</b>
<b>2003-2007</b>	<b>7.96%</b>	<b>29.00%</b>

# The TABOR Amendment: 1992

- **State Cap:**
  - **Rate of inflation + rate of population growth**
- **Well documented issues**
  - **Uses CPI and not GSCI**
  - **Ratchet down effect**
  - **Biased against growth communities**
- **Inherent flaws?**
  - **Applies CPI for Denver to balance of state**
  - **Uses arithmetic and not geometric rate of change**



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**Can the CPIs for individual areas be used to compare living costs among the areas?**

**No, an individual area index measures how much prices have changed over a specific period in that particular area; it does not show whether prices or living costs are higher or lower in that area relative to another. In general, the composition of the market basket and the relative prices of goods and services in the market basket during the expenditure base period vary substantially across areas.**

Source: Bureau of Labor Statistics

[http://www.bls.gov/cpi/cpifaq.htm#Question\\_2](http://www.bls.gov/cpi/cpifaq.htm#Question_2)



## **Arithmetic v Geometric Rates of Change**

- **Assume you had 1,000 in your pension at the beginning of 2007.**
- **Assume your pension program had a good year in 2007. It went up 50%. You now have \$1,500 in the pension.**
- **Assume your pension program went down 50% in 2008. Your pension is now worth \$750.**



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**The arithmetic average process would add the two rates of change and divide by 2 to get an average.**

**+50% in yr 1**

**-50% in yr 2**

**$0\% \div 2 = 0\%$  for an average rate of return. This can't be correct!**



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**Anytime you start with \$1,000 and have \$750 left over at the end of two years, you have lost money.**



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**The geometric process is defined as:**

$$\pi = \sqrt{(1 + \% \text{ change1}) * (1 + \% \text{ change2})} - 1$$

$$\pi = \sqrt{(1 + .5) * (1 - .5)} - 1$$

$\pi = -13.4\%$ , average annual return.

Proof :  $100 * (1 - .134) = 87.60$  at yr 1.

$87.60 * (1 - .134) = 75.00$  at yr 2.



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# **An Example of TABOR Definition Applied to Colorado Inflation + Population Growth**

## **Scenario 1**

<b>Base population</b>	<b>100,000</b>
<b>Base tax revenue</b>	<b>\$10,000,000</b>
<b>Revenue per person</b>	<b>\$100</b>
<b>Inflation</b>	<b>3%</b>
<b>Population growth</b>	<b>0%</b>



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## Next Year's TABOR Effects Arithmetic Process

- **3% inflation + 0% population growth = 3% TABOR CAP**
- **$\$10,000,000 * 1.03 = 10,300,000$**
- **Per capita revenue =  $\$10,300,000 / 100,00$  (Rev/Pop) = **\$103****
- **Inflation adjusted per capita revenue:**
  - **Per Cap Revenue / (1 + inflation rate) =  $\$103 / 1.03 = \$100$**
- **Adjusting for inflation, per capita revenue is the same as last year**



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## **Rate of Change – State Definition Inflation + Population Growth**

### **Scenario 2**

<b>Base population</b>	<b>100,000</b>
<b>Base tax revenue</b>	<b>\$10,000,000</b>
<b>Per capita revenue</b>	<b>\$100</b>
<b>Inflation</b>	<b>0%</b>
<b>Population growth</b>	<b>3%</b>



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## Next Year's TABOR Effects Arithmetic Process

- **0% inflation + 3% population growth = 3% TABOR CAP**
- **$\$10,000,000 * 1.03 = \$10,300,000$**
- **Per capita revenue =  $\$10,300,000 / 103,00$  (Rev/Pop) =  $\$100$**
- **Inflation adjusted per capita revenue:**
  - **Per Cap Revenue / (1 + inflation rate) =  $\$100 / 1.00 = \$100$**
- **Adjusting for population, per capita revenue is the same as last year**



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## **Rate of Change – State Definition Inflation + Population Growth**

### **Scenario 3**

<b>Base population</b>	<b>100,000</b>
<b>Base tax revenue</b>	<b>\$10,000,000</b>
<b>Per capita revenue</b>	<b>\$100</b>
<b>Inflation</b>	<b>3%</b>
<b>Population growth</b>	<b>3%</b>



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# **TABOR Effects**

## **Summarized at This Time**

- **3% inflation + 3% population growth = 6% TABOR CAP**
- **$\$10,000,000 * 1.06 = \$10,600,000$**
- **Per capita revenue =  $\$10,600,000 / 103,00$  (Rev/Pop) =  **$\$102.91$****
- **Inflation adjusted per capita revenue:**
  - **Per Cap Revenue / (1 + inflation rate) =  $\$102.91 / 1.03 = \$99.91$**
- **In “real” terms, per capita revenue declined**



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## **Next Year's TABOR Caps Geometric Process: Multiply Rates of Change**

- **3% inflation; 3% population growth =  $1.03 * 1.03 = 1.0609$ , i.e., 6.09%**
- **$\$10,000,000 * 1.0609 = \$10,609,000$**
- **Per capita revenue = \$103**
- **Inflation adjusted per capita revenue =  $\$103 / 1.03 = \$100$**

**In real terms, per capita revenue remained the same.**



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# Hypothetical TABOR Projections

- **Assume 3% inflation and 2% population growth since 1992.**
- **Arithmetic TABOR would have a cap of about 118.3% higher tax revenues.**
- **Geometric TABOR would have a cap of 120.3%.**
- **This is approximately a 2.0% understatement of revenue caps since 1992.**



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# **Assuming a Statewide Application of the Data, Estimated Incorrect Revenue Caps**

- **State & Local Gvts.**
- **\$416,100,000 error in 2009**
- **School Districts**
- **\$61,000,000 error in 2009**

**Combined error in 2009, \$463,800,000.**

**No allowances were made for ratchet down effects from 1992 through 2009.**



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# **Krupp v Breckenridge Sanitation District<sup>1</sup>**

**“Mathematical exactitude is not required, however, and the particular mode adopted by the governmental entity in assessing the fee is generally a matter of legislative discretion.”**

**“... we will not set aside the methodology chosen by an entity with ratemaking authority unless it is inherently unsound.”**

**<sup>1</sup>Colorado Supreme Court 2001.**



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# Economic Base

- **Diversification basics**
- **El Paso County study (2002)**
- **Colorado study (2008)**



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## Given a Choice of Two Projects, Which One Will You Give An Incentive?

- A
  - Average Tax Revenue = \$125
  - Std Dev of Tax Rev = \$47.87

- B
  - Average Tax Revenue = \$125
  - Std Dev of Tax Rev = \$47.87

It does not seem to matter. Let's look at their trends.

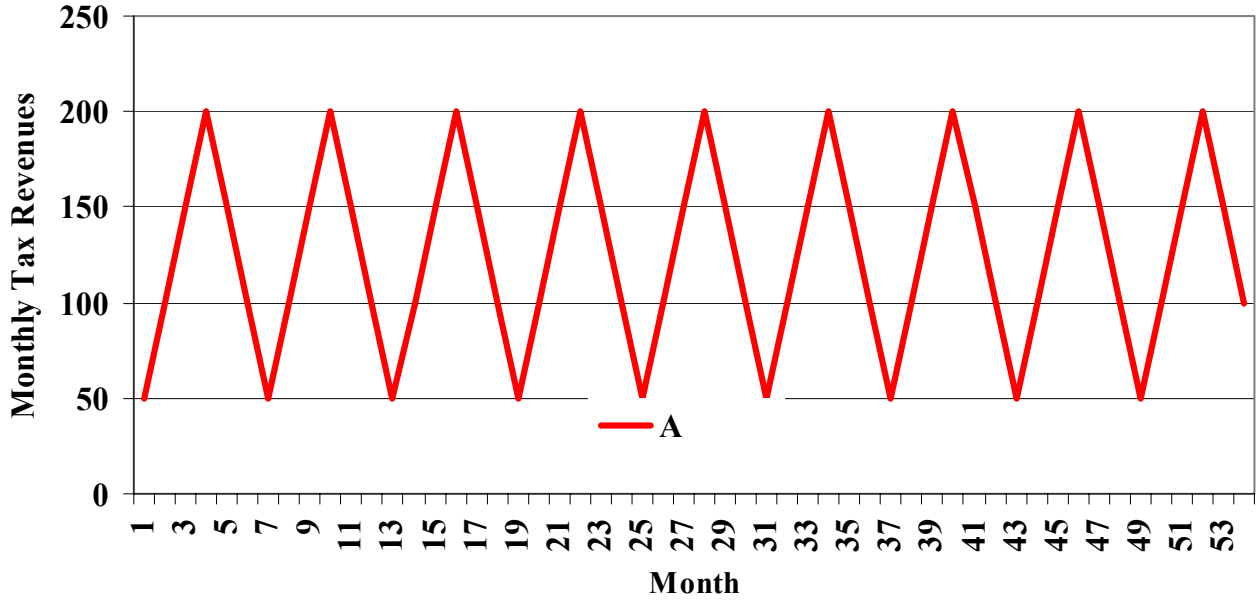
Think of Std Dev (standard deviation) as a plus/minus around the average.



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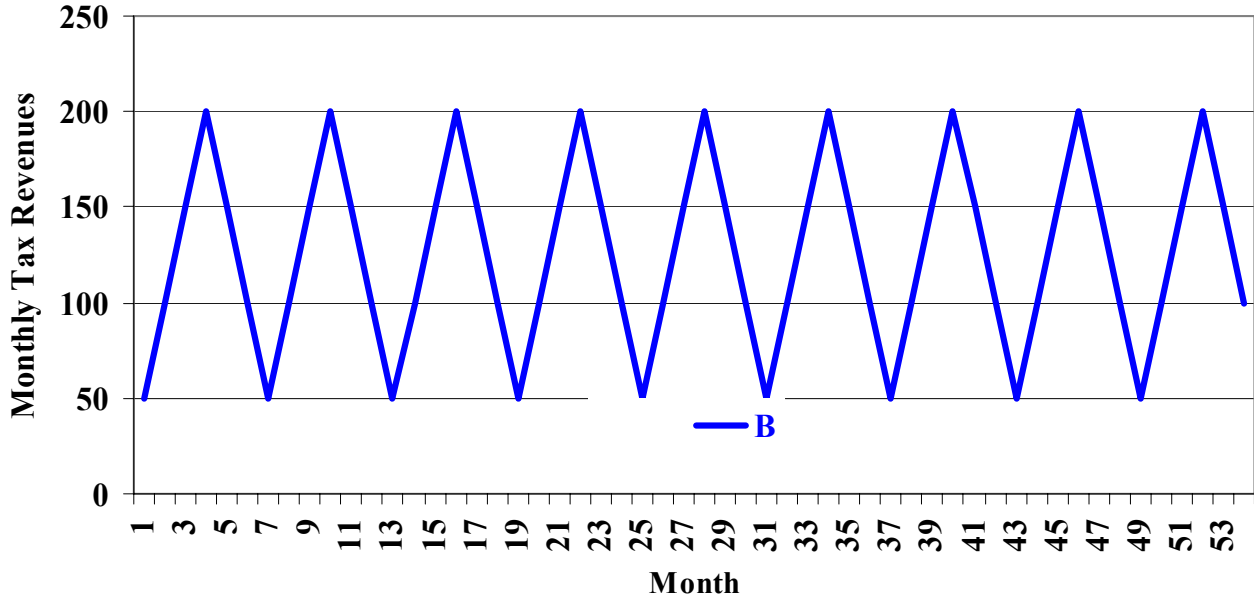
### Comparison of Tax Revenues



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### Comparison of Tax Revenues



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## **Portfolio C: 50% in A and 50% in B. A & B Are Perfectly Correlated**

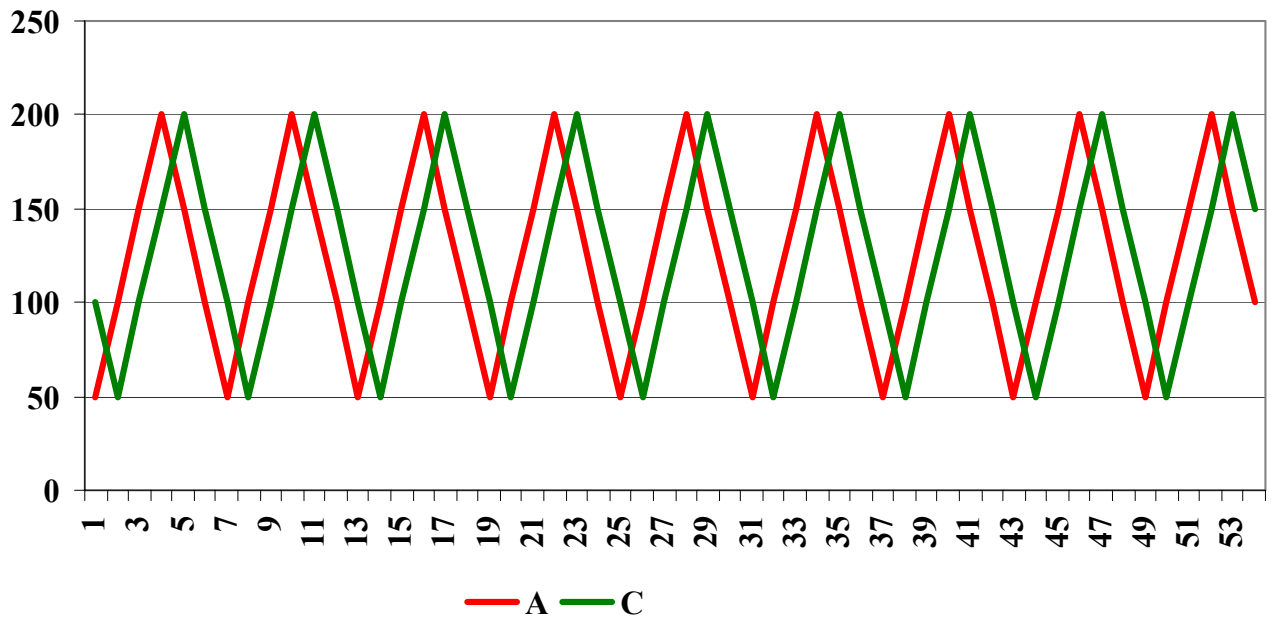
- **A might be your current economic base.**
- **B might be a prospective new firm to your economic base.**
- **If they are perfectly correctly (mirror images), neither your local economy nor local tax revenues will be more stable.**



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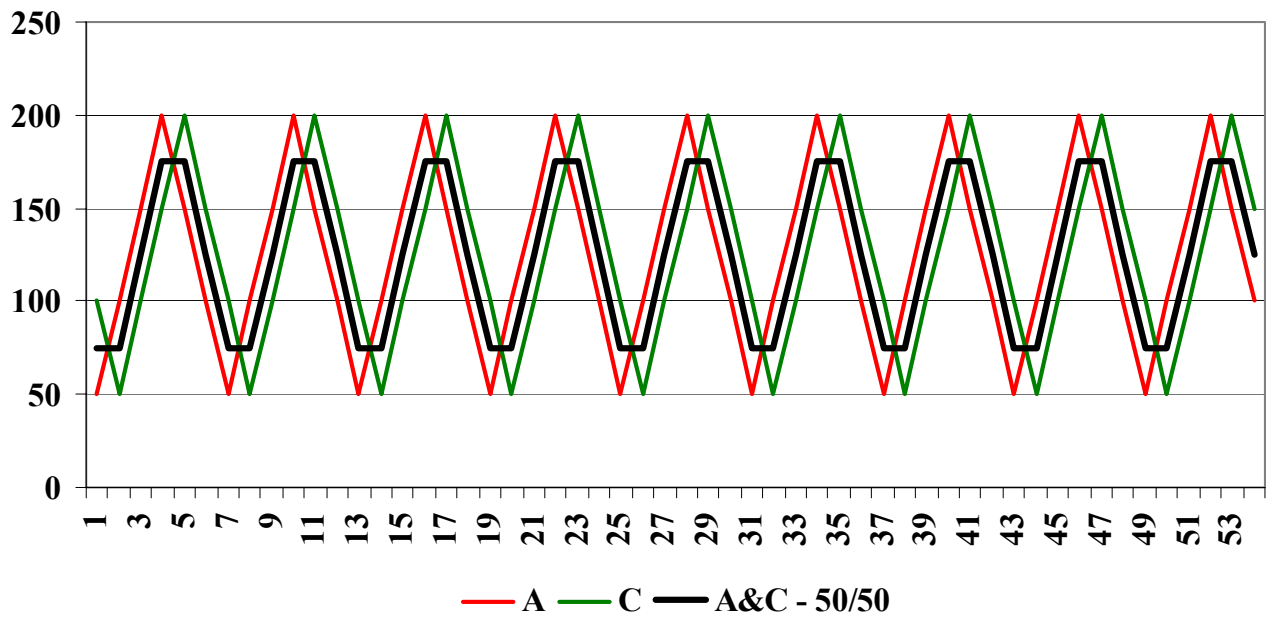
### Economic Base 1 (A&C)



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### Economic Base 1 (A&C)

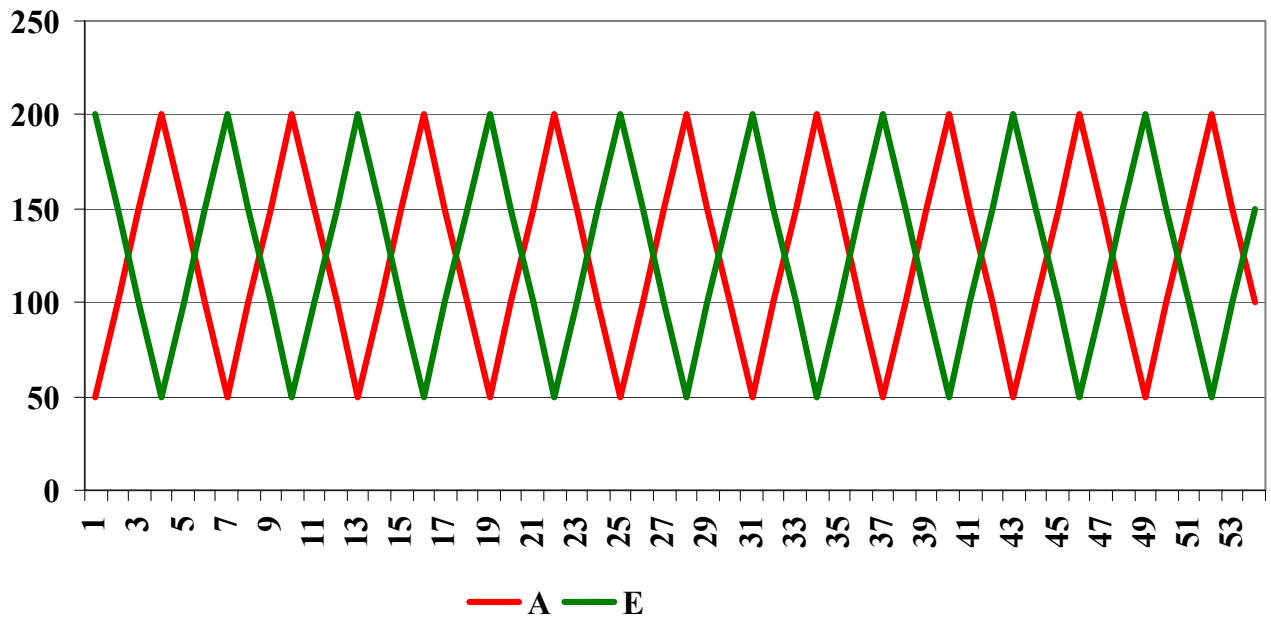


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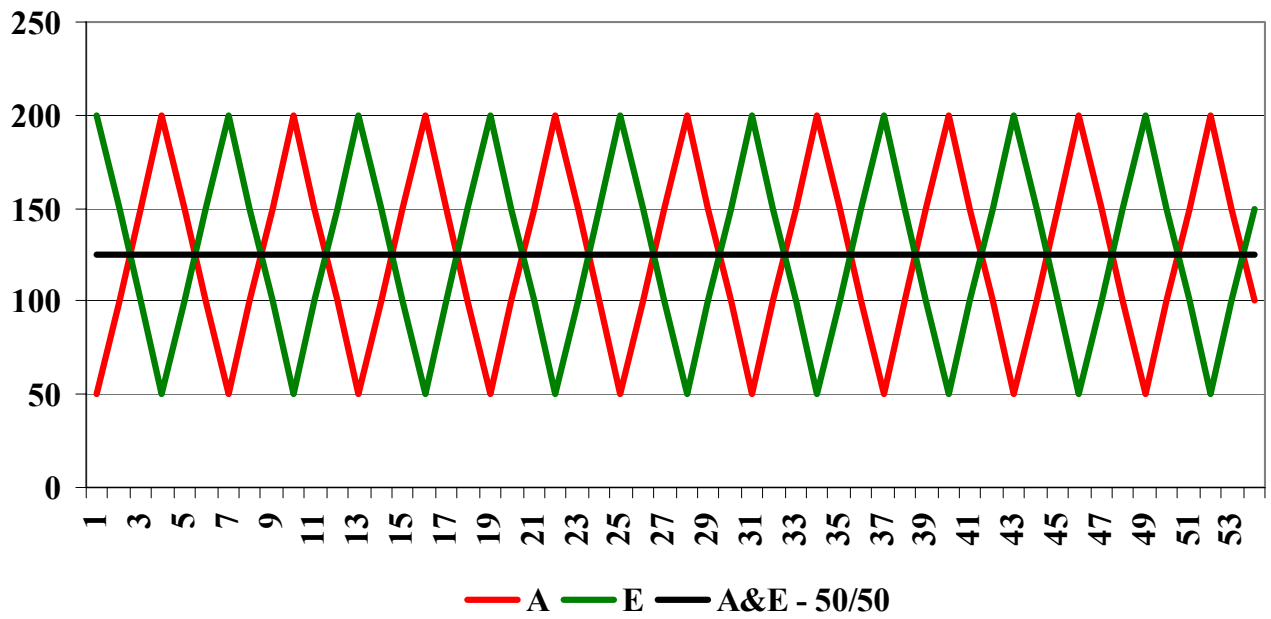


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### Economic Base 3 (A&E)



### Economic Base 2 (A&E)



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## **El Paso County Study – Up to 12/01 Grant from Bureau of Labor Statistics through Pikes Peak Workforce Center**

- **Quarterly Data for El Paso County**
- **16 sectors were selected as desirable for economic development**
- **All other selected were not selected for economic development ( $\approx 60$  sectors)**



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## Results: 12/2001 through 12/2004

- **Selected sectors**

– Jobs	+3,431 (5.2%)
– Income	+\$2,937,268 (7.0%)

- **Unselected sectors**

– Jobs	-6,329 (-4.7%)
– Income	-\$2,502,964 (-2.7%)



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# Colorado Study – Through 9/2007



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**Most Desirable Business Sectors for Economic Development in Colorado**

<b>NAICS Sector</b>	<b>Avg Weight</b>	<b>Tax Multiplier</b>	<b>Times in “Solution”</b>
<b>551 Management of companies &amp; enterprises</b>	<b>15.64%</b>	<b>2.54</b>	<b>8</b>
<b>522 Credit intermediation &amp; related activities</b>	<b>8.76%</b>	<b>1.25</b>	<b>8</b>
<b>441 Motor vehicle and parts dealers</b>	<b>8.42%</b>	<b>1.1</b>	<b>8</b>
<b>624 Social assistance</b>	<b>7.65%</b>	<b>5.94</b>	<b>8</b>
<b>622 Hospitals</b>	<b>6.39%</b>	<b>3.95</b>	<b>7</b>
<b>511 Publishing industries, except Internet</b>	<b>5.40%</b>	<b>2.54</b>	<b>8</b>
<b>322 Paper manufacturing</b>	<b>5.24%</b>	<b>3.58</b>	<b>8</b>
<b>323 Printing &amp; related support activities</b>	<b>3.86%</b>	<b>2.21</b>	<b>8</b>
<b>425 Electronic markets &amp; agents &amp; brokers</b>	<b>3.81%</b>	<b>1.05</b>	<b>8</b>
<b>314 Textile product mills</b>	<b>3.53%</b>	<b>5.12</b>	<b>8</b>
<b>524 Insurance carriers &amp; related activities</b>	<b>3.51%</b>	<b>1.46</b>	<b>8</b>
<b>311 Food manufacturing</b>	<b>3.15%</b>	<b>6.07</b>	<b>8</b>
<b>493 Warehousing and storage</b>	<b>2.99%</b>	<b>3.55</b>	<b>8</b>
<b>447 Gasoline stations</b>	<b>2.16%</b>	<b>1.09</b>	<b>7</b>
<b>486 Pipeline transportation</b>	<b>2.08%</b>	<b>1.27</b>	<b>8</b>
<b>485 Transit &amp; ground passenger transportation</b>	<b>2.04%</b>	<b>1.61</b>	<b>7</b>
<b>333 Machinery manufacturing</b>	<b>1.72%</b>	<b>6.49</b>	<b>7</b>
<b>623 Nursing and residential care facilities</b>	<b>1.28%</b>	<b>2.06</b>	<b>7</b>
<b>452 General merchandise stores</b>	<b>0.78%</b>	<b>1.12</b>	<b>8</b>

**Left to itself, Colorado's Department of Labor employment projections would generate an employment base that would provide a **Tax Multiplier of 2.49 in the year 2015****

**The portfolio solution is expected to provide a tax multiplier of 2.875.**

**This is approximately 15.5 percent more expected tax revenues for Colorado than if employment were to grow as projected by the Colorado Department of Labor.**



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## **A well diversified economic base can:**

- **Provide job growth**
- **Provide income growth**
- **Provide stable employment**
- **Provide tax revenues to support economic growth**
- **Minimize chance of ratchet down effect**
- **Accomplish to above without violating TABOR**



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# **Inflationary Expectations**

## Equation of Exchange

$$\text{Gross Domestic Product} = P * Q$$

$$P * Q = M * V$$

- **P = Price of goods and services**
- **Q = Quantity of goods and services**
- **M = Money Supply**
- **V = Velocity of Money**



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## **Are any of you consciously spending**

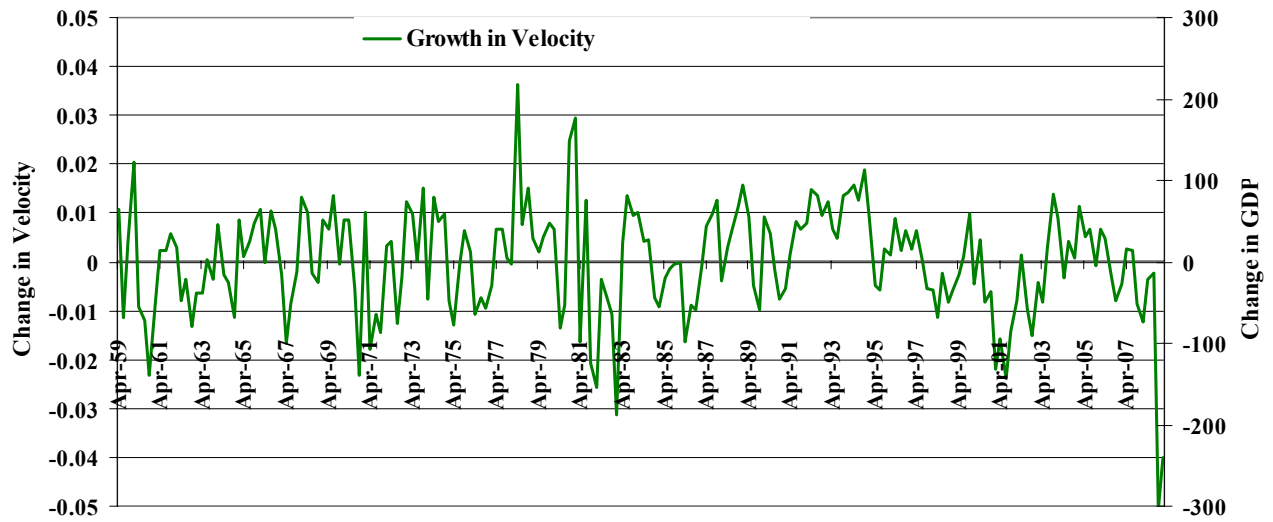
- **more than 12-18 months ago?**
- **about the same as 12-18 months ago?**
- **less than 12-18 months ago?**



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## Change in Velocity



Source: Federal Reserve, UCCS Forum

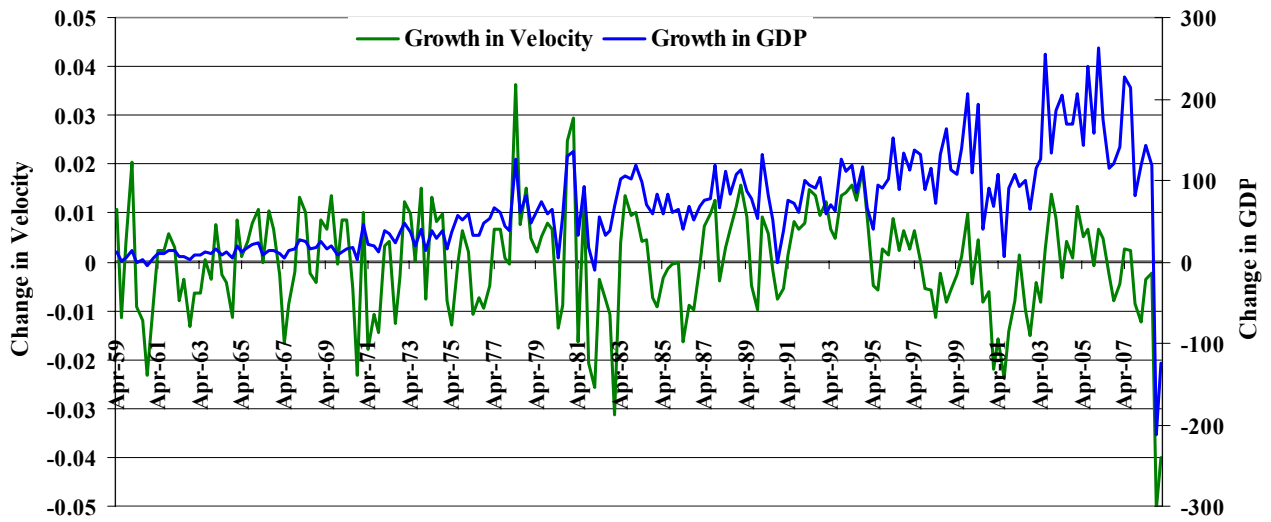


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SOUTHERN  
COLORADO  
ECONOMIC  
FORUM

## Change in Velocity and GDP



Source: Federal Reserve, UCCS Forum



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## Equation of Exchange

**Gross Domestic Product = P\*Q**

$$P(\downarrow)*Q(\leftrightarrow) = M(\leftrightarrow)*V(\downarrow)$$

- **P = Price of goods and services**
- **Q = Quantity of goods and services**
- **M = Money Supply**
- **V = Velocity of Money**



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**Q is stable in the short run**



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## Equation of Exchange

**Gross Domestic Product = P\*Q**

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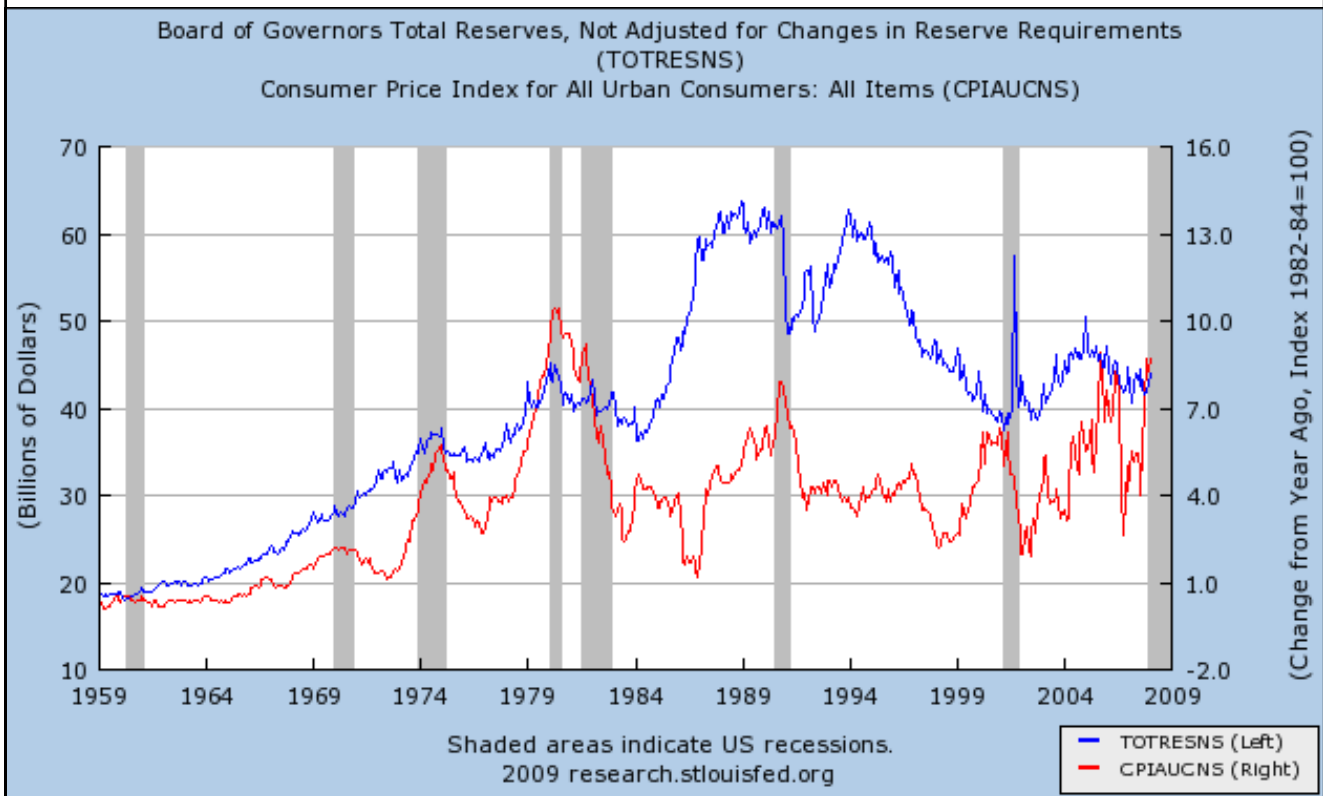
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## Total Bank Reserves Through Early 2008

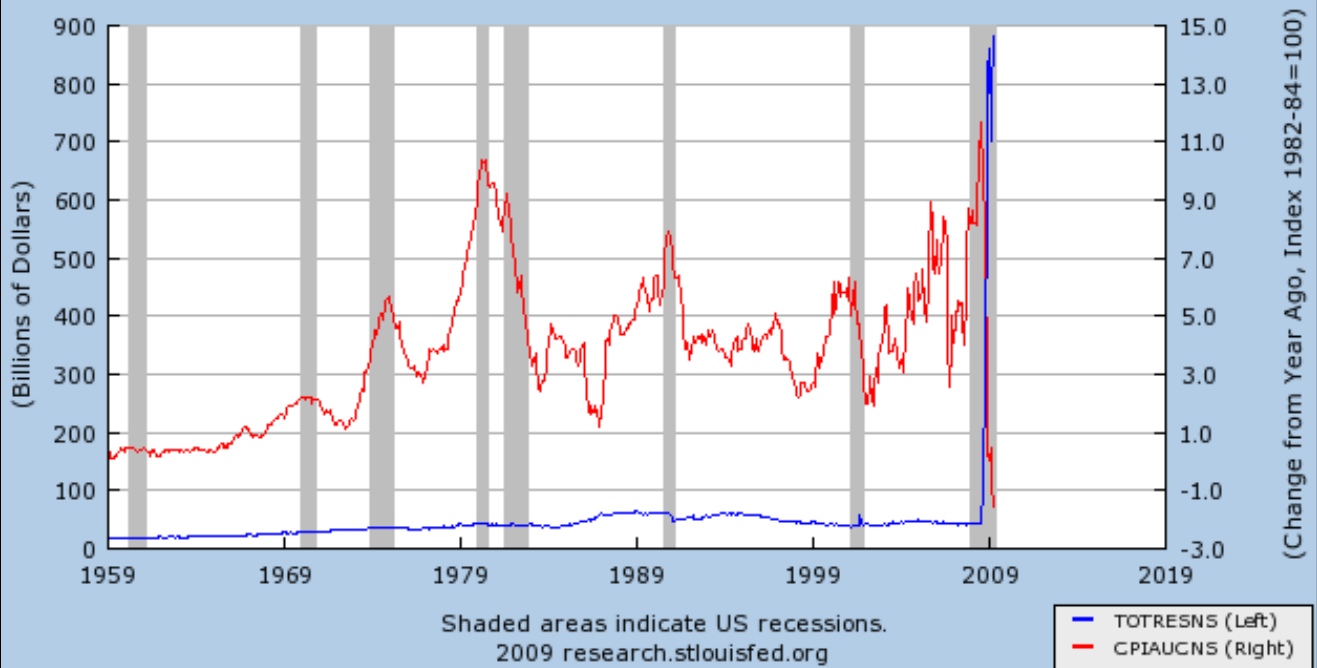


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## Total Bank Reserves Through April 2009

Board of Governors Total Reserves, Not Adjusted for Changes in Reserve Requirements (TOTRESNS)  
 Consumer Price Index for All Urban Consumers: All Items (CPIAUCNS)

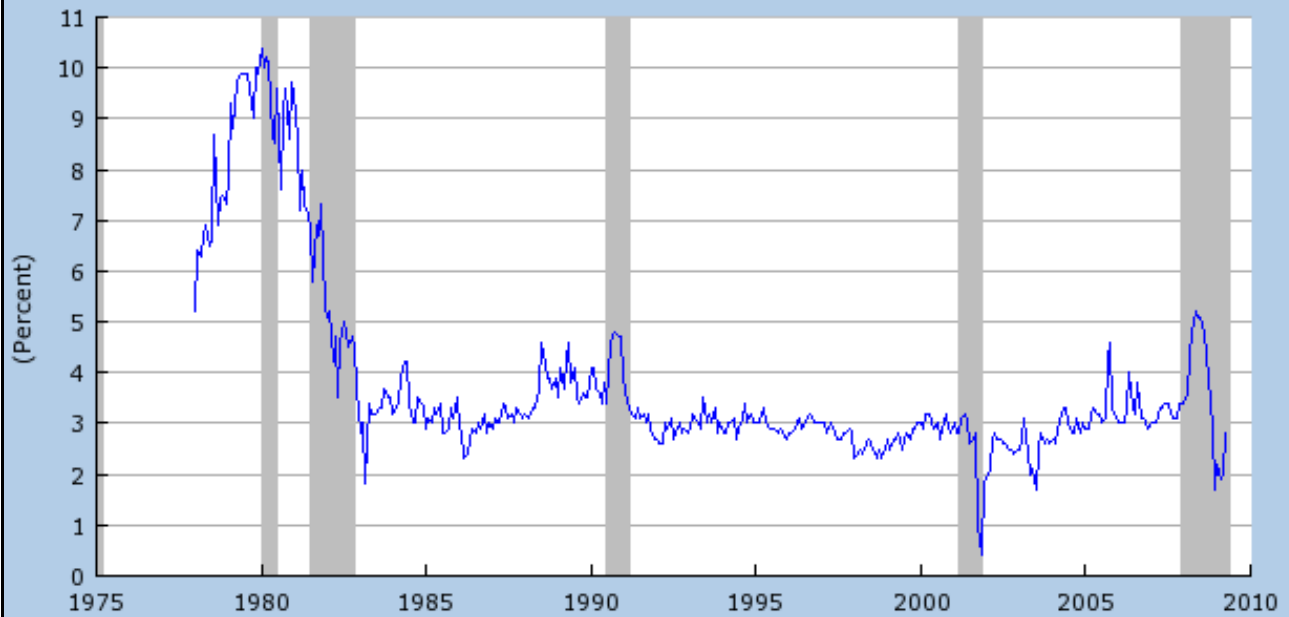


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## Consumer Expectations of Inflation

University of Michigan Inflation Expectation (MICH)  
Source: Survey Research Center: University of Michigan



Shaded areas indicate US recessions.  
2009 [research.stlouisfed.org](http://research.stlouisfed.org)



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## Summary

- **It's all about the economy**
- **Controllable v non-controllable**
- **Identify directional changes in the economy**
- **Shift resource funding and allocations**
- **Changing TABOR is not the sole solution**
- **Develop a diversified employment base**
- **Develop a diversified tax base**
- **Regional trends will continue to radiate out of the City**



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**Lets stretch our legs for 5-7 minutes  
before starting in on Questions?**



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