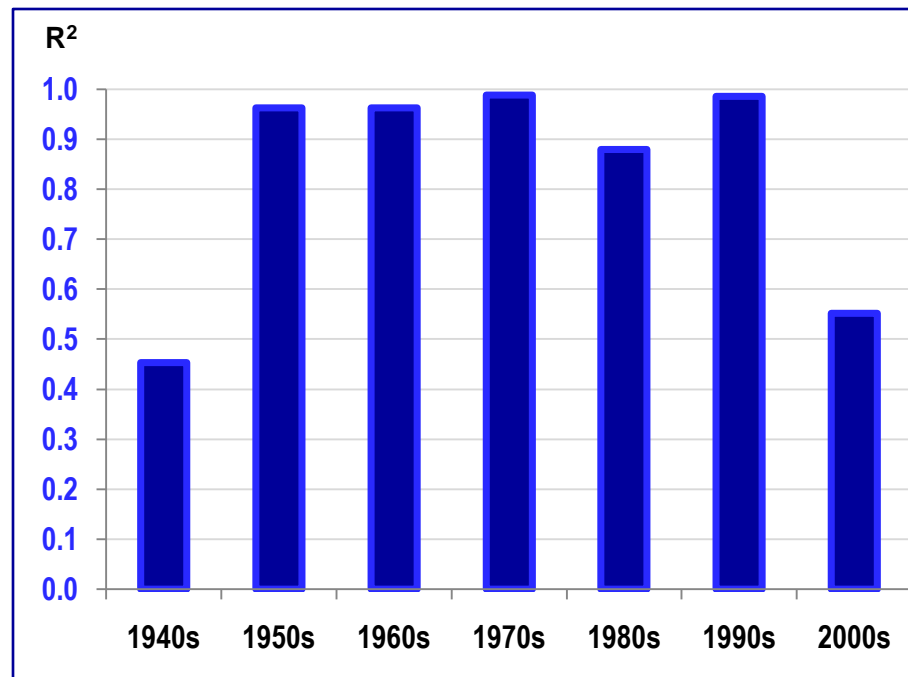


Relationship Between Real GDP and Colorado Employment

Prepared
by
Colorado-based Business and Economic Research
October 15, 2010



Relationship Between Real GDP and Colorado Employment

Purpose of Analysis

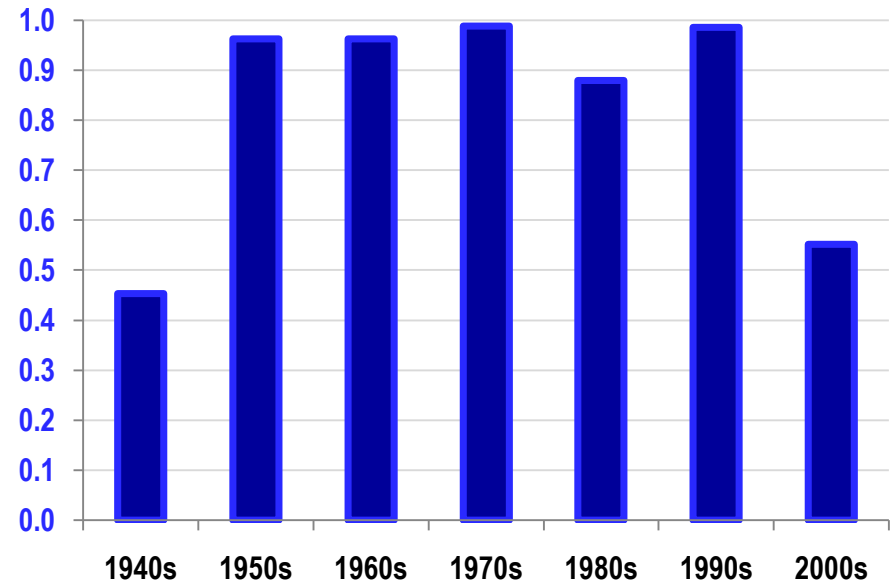
The purpose of this analysis is to evaluate the relationship between Real GDP and Colorado employment.

This analysis will look at the following:

- Relationship between the two variables over 70 years.
- Relationship between the two variables on a decade-by-decade basis.
- Economic events that might cause the relationship to deteriorate.
- Real GDP growth during periods of net job losses in Colorado.

Will this analysis shed any light on whether projected output expansion of 2.5% will translate into positive or negative job growth for Colorado in 2011?

R² for Real GDP and Colorado Employment



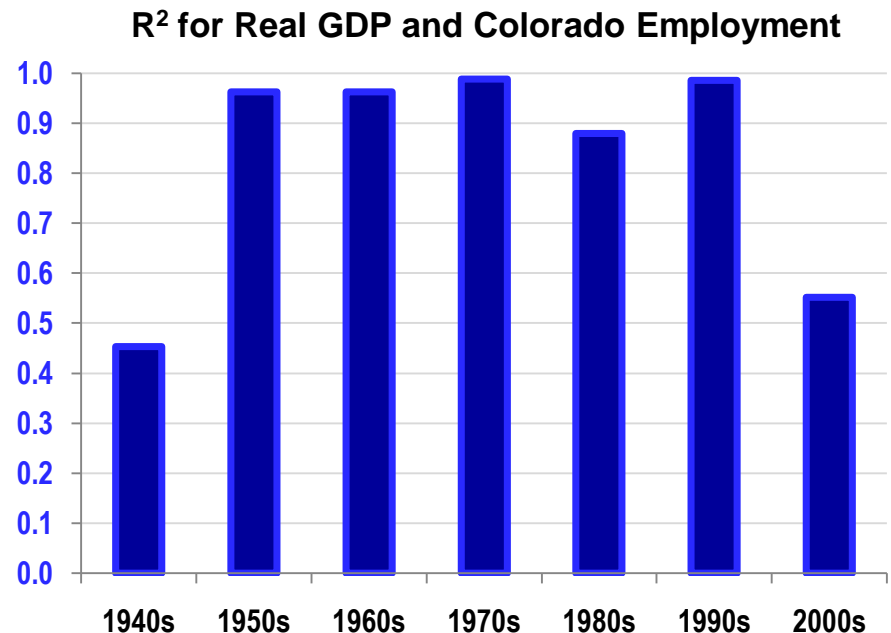
Relationship Between Real GDP and Colorado Employment

For the period 1939 to 2010 there is a strong relationship between Real GDP and Colorado employment.

- $R^2 = .983$, for Real GDP and CO employment.
- $R^2 = .970$ for Real GDP and US employment.

An evaluation of the Real GDP and Colorado employment on a decade-by-decade basis shows that there is a strong correlation in most decades. This relationship is weaker in 3 of the 7 decades, i.e. the R^2 value declines:

- 1940s - World War II.
- 1980s - Economic issues endemic to Colorado.
- 2000s – Two significant recessions.



Comparison on Real GDP v Colorado Employment (1940s)

US Real GDP

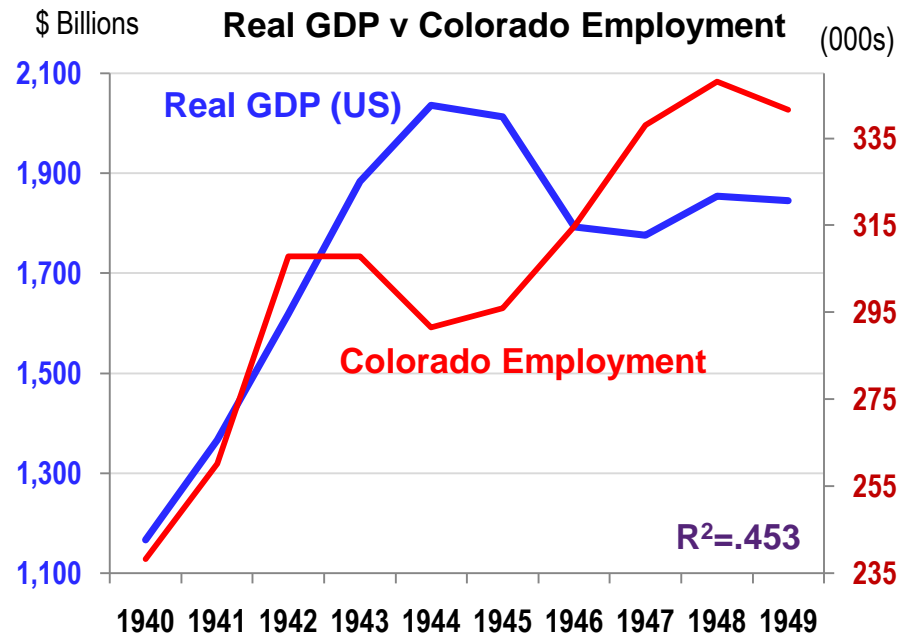
1939	1,072.8
1949	1,844.7
Difference	771.9
Annualized %	5.6%

Colorado Employment

1939	233.5
1949	341.5
Difference	108.0
Annualized %	3.9%

R Squared = .453

There is a comparatively weak correlation between the growth of Real GDP and Colorado employment. This was caused by World War II and the post-war effects on the economy. During this period there times when the 2 variables moved in opposite directions.



Comparison on Real GDP v Colorado Employment (1950s)

US Real GDP

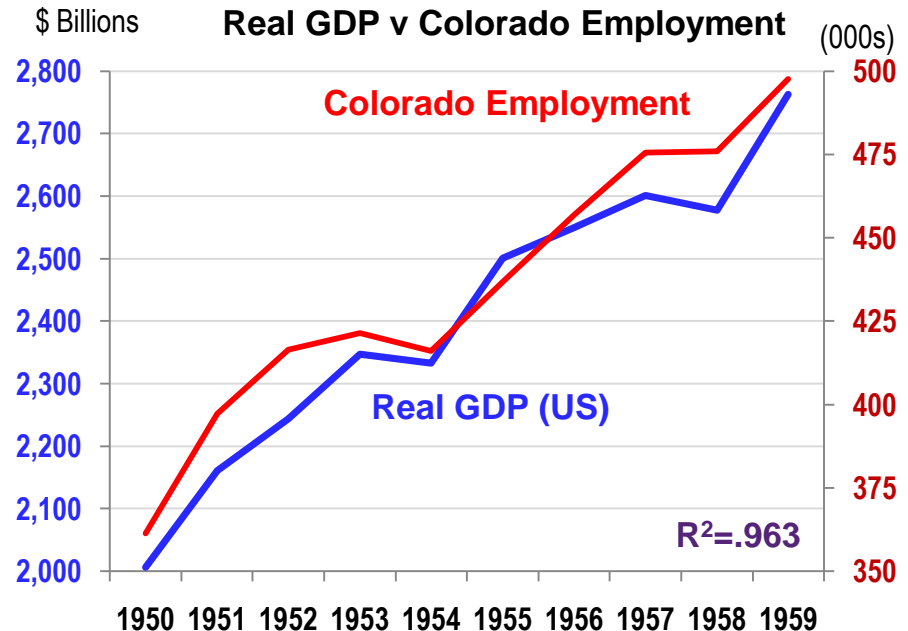
1949	1,844.7
1959	2,762.5
Difference	917.8
Annualized %	4.1%

Colorado Employment

1949	341.5
1959	497.6
Difference	156.1
Annualized %	3.8%

R Squared = .963

There is a very strong correlation between the growth of Real GDP and Colorado employment.



Comparison on Real GDP v Colorado Employment (1960s)

US Real GDP

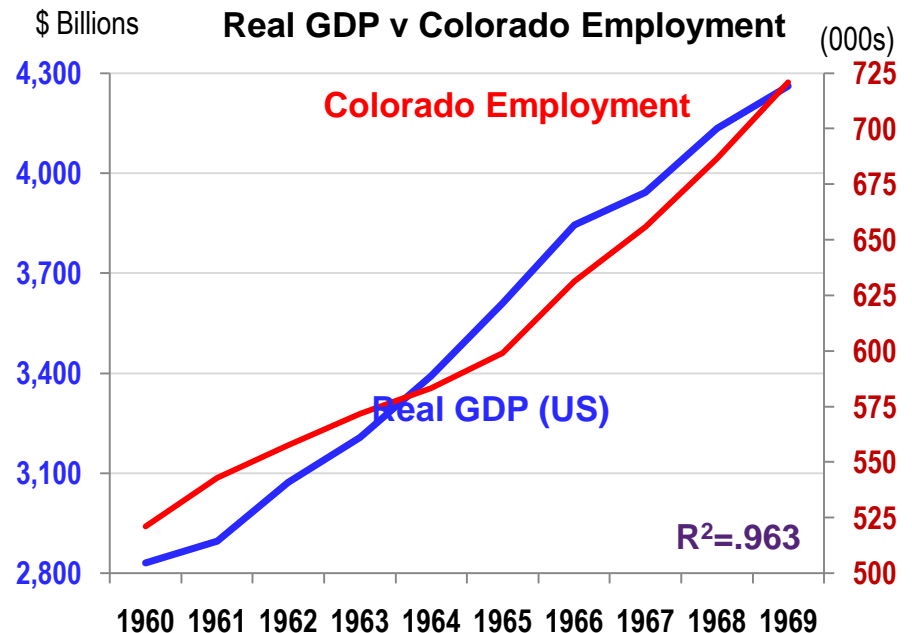
1959	2,762.5
1969	4,261.8
Difference	1,499.3
Annualized %	4.4%

Colorado Employment

1959	497.6
1969	720.8
Difference	223.2
Annualized %	3.8%

R Squared = .963

There is a very strong correlation between the growth of Real GDP and Colorado employment.



Comparison on Real GDP v Colorado Employment (1970s)

US Real GDP

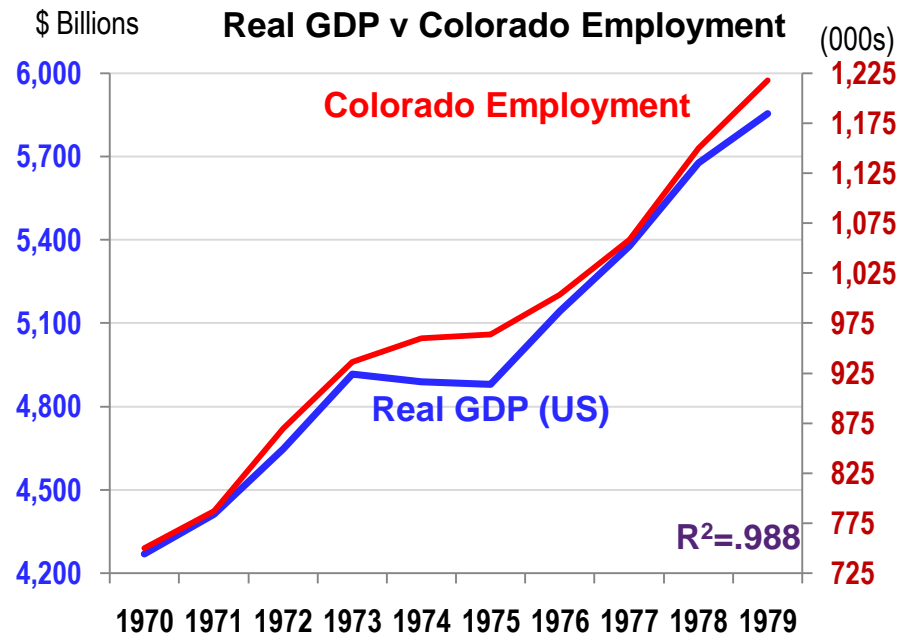
1969	4,261.8
1979	5,856.0
Difference	1,593.2
Annualized %	3.2%

Colorado Employment

1969	720.8
1979	1,218.0
Difference	497.2
Annualized %	5.4%

R Squared = .988

There is a very strong correlation between the growth of Real GDP and Colorado employment, although this was a boom period for Colorado.



Comparison on Real GDP v Colorado Employment (1980s)

US Real GDP

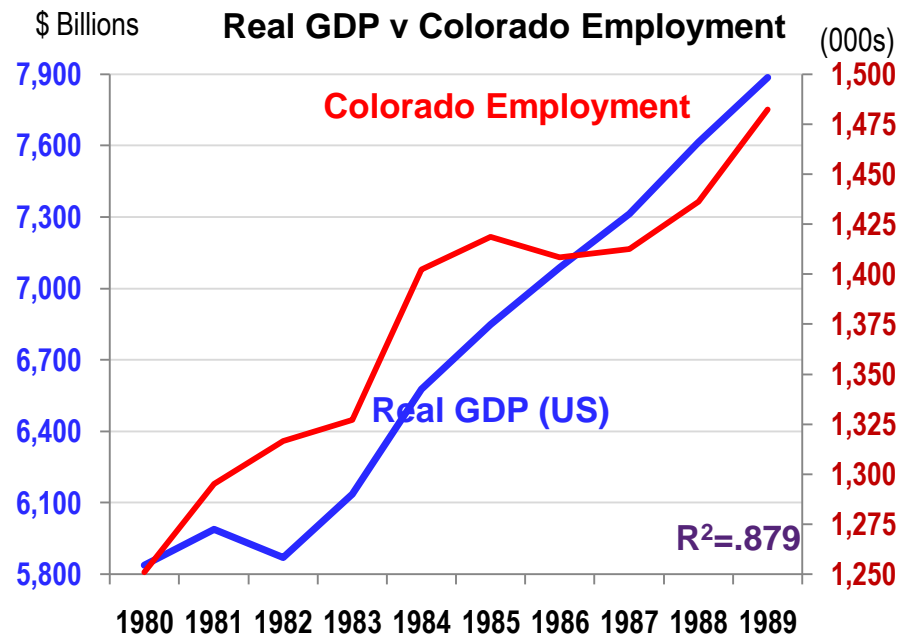
1979	5,855.0
1989	7,885.9
Difference	2,030.9
Annualized %	3.0%

Colorado Employment

1979	1,218.0
1989	1,482.3
Difference	264.3
Annualized %	2.0%

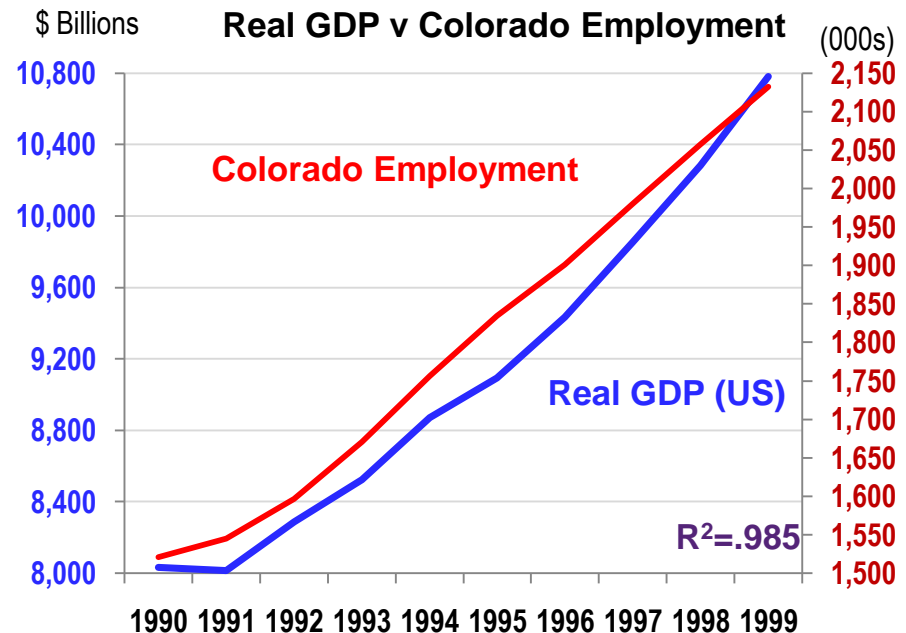
R Squared = .879

There is a strong correlation between the growth of Real GDP and Colorado Employment. It is weaker than other decades because of regional issues (oil and gas boom and bust, S&L crisis, overbuilt housing market, and net out-migration for 5 years). On one occasion Colorado employment declined when there was positive Real GDP growth.



Comparison on Real GDP v Colorado Employment (1990s)

US Real GDP	
1989	7,885.9
1999	10,779.8
Difference	2,893.8
Annualized %	3.2%
Colorado Employment	
1989	1,482.3
1999	2,132.6
Difference	650.3
Annualized %	3.7%
R Squared =	.985



There is a very strong correlation between the growth of Real GDP and Colorado employment.

Comparison on Real GDP v Colorado Employment (2000s)

US Real GDP

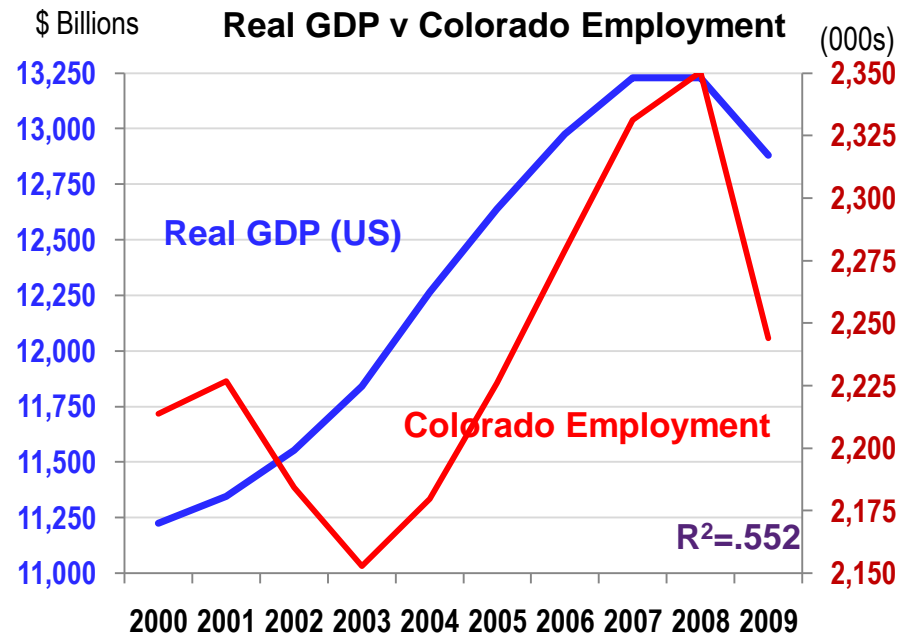
1999	10,779.8
2009	12,880.6
Difference	2,100.8
Annualized %	1.8%

Colorado Employment

1999	2,132.6
2009	2,244.0
Difference	111.4
Annualized %	.5%

R Squared = .552

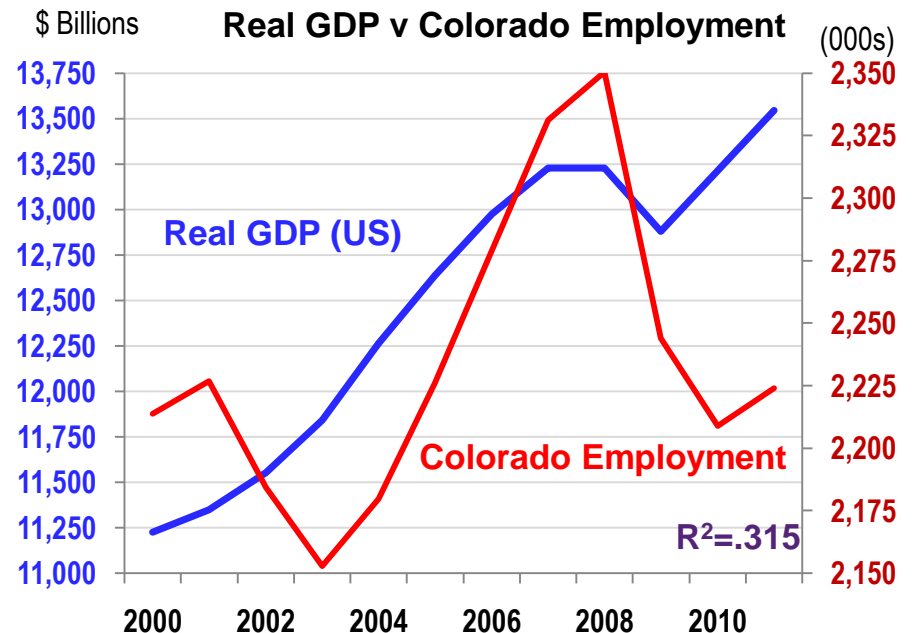
There is a comparatively weak correlation between the growth of Real GDP and Colorado Employment. This is a result of two recessions and the “Lost Decade”. There were periods where Real GDP growth and employment moved in opposite directions.



Comparison on Real GDP v Colorado Employment (2000 – 2011)

If the period is extended from 2000 through 2011, with Real GDP growth projected at 2.6% and 2.5% for 2010 and 2011 respectively, the value of R^2 drops to .315.

Three times during these 12 years, Colorado employment recorded net losses, yet Real GDP increased. In another case, Colorado employment increased, while Real GDP remained flat.

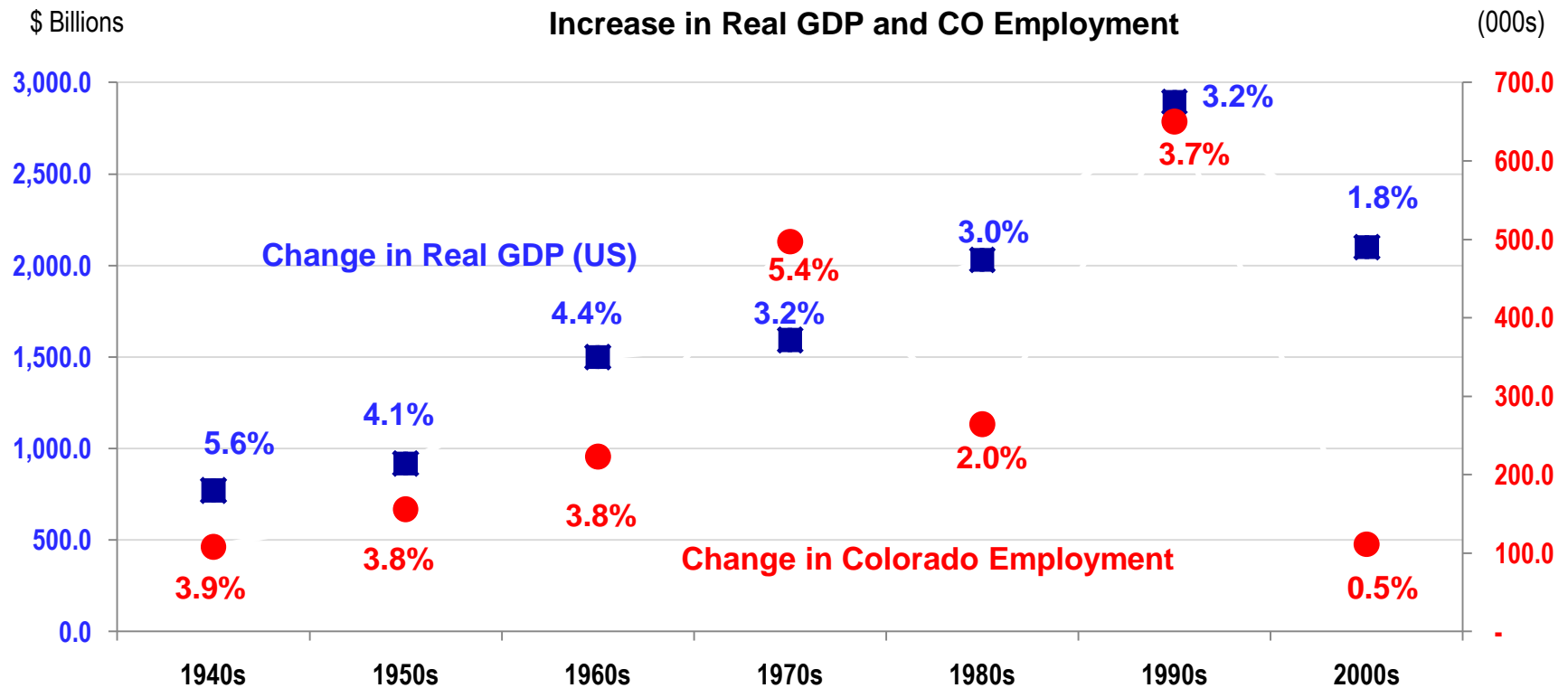


Increase in Real US GDP and Increase in Colorado Employment

The chart on the following slide illustrates the following for each of the 7 decades evaluated in this analysis:

- The **blue squares** represent the change in the value of the Real GDP (left axis). For example, during the 1940s, the value of Real GDP increased by **\$771.9** billion dollars, or an annualized rate of **5.6%**.
- The **red dots** represent the change in Colorado employment (right axis). For example, during the 1940s, Colorado employment increased by **108,000 workers**, or **3.9%**.

Increase in Real US GDP and Increase in Colorado Employment



Colorado's Worst Job Losses (1940 to 2010)

Colorado has lost jobs 8 times (red dots) since employment data has been recorded (beginning in 1939).

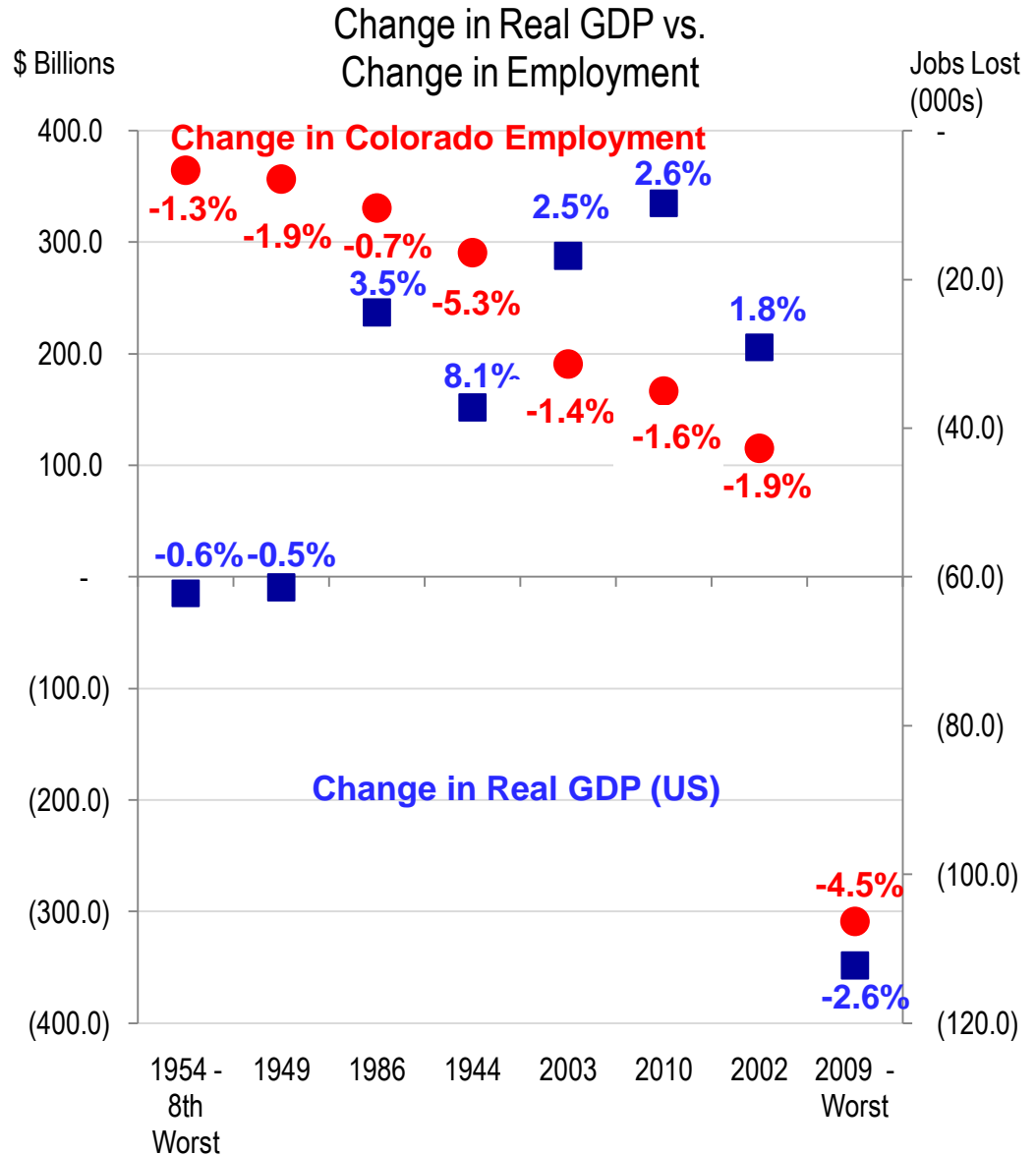
Half of those times were recently:

- 2002 42,700 jobs lost
Real GDP = 1.8%.
- 2003 31,400 jobs lost.
Real GDP = 2.5%.
- 2009 106,300 jobs lost.
Real GDP = -2.6%
- 2010 35,000 jobs lost.
Real GDP = 2.6%.

On 5 of the 8 occasions when Colorado encountered job losses, the U.S. recorded positive Real GDP growth, in the range of 1.8% to 8.1%.

Since 1939, Real GDP has been negative 12 times (8 times it was less than -1%). Of those 12 times, Colorado experienced employment losses in only 3 years.

Given projected Real GDP growth of 2.5% for 2011, what lies ahead for Colorado employment?



Relationship Between Real GDP and Colorado Employment - Conclusions

From this analysis, the following conclusions can be drawn:

- There is a strong relationship between the value of Real GDP growth and Colorado employment over the past 70 years. This is not necessarily a cause and effect relationship.
- There is a strong relationship between the two variables on a decade-by-decade basis.
- The weakening of this relationship occurs during times of economic turmoil.
- Economic events can be identified that are related to the deterioration of this relationship, particularly during the 1940s, 1980s, and 2000s.
- The deterioration of the relationship between these two variables is weakest for the period 2000 to 2011, illustrating the severity of the problems associated with the recent recession(s).
- During the past decade Colorado employment has declined on 3 occasions despite the expansion of the U.S. economy. While it is possible for Colorado to have another year of job losses in 2011 with expansion of the U.S. economy, this analysis does not serve as tool for determining whether that will happen.

Comments/Questions

The following comments/questions are raised as a result of the work on this analysis. Some of them are based on ongoing discussions focused on the past two recessions and the long-term effects these downturns might have on the relationship between Real GDP and Colorado employment.

- A case can be made that Colorado has performed out of sync with the nation for 20 of the last 30 years based on the comparatively weaker relationship between Real GDP and Colorado employment for the decades of the 1980s and 2000s. Is there any validity to this point?
- Will there be growth in both Real GDP and Colorado employment in 2011? If so, will this be a sign that the economy is returning to “normal”?
- Has the recession caused a structural change in Colorado industries that will impact the role of labor in future economic expansions, i.e. to what extent have companies invested in capital expenditures to permanently reduce labor costs?
- Have supply chains been altered? Have critical masses in some industries/clusters been reduced or eliminated because of employment declines during the “Lost Decade”?
- Will there be strong M&A climate as some companies are accumulating wealth while others are struggling because of slow sales? Would such an environment further extend the time for Colorado’s job recovery?
- Will the continued development of disruptive technologies extend the length of Colorado’s job recovery?
- Will the recent economic turmoil result in the revising the level of the natural rate of unemployment?



Prepared by
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October 15, 2010

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