Capital Gains Forecasting

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News on 2004

- Partial year processing suggests
  - 48% growth in net gains
  - 11% decline in net loss
  - 57% growth in net
- CBO had forecast 23% growth
  - Difference = half of surprise
- Is partial accurate?

Topics to Cover

- Setting
- "Forecasting" year ending
- Forecasting 10 years ahead

The Setting

Sources of Gains
Data & Budget Cycle
Setting Dictates Strategy

% of gross gains by asset type

Asset type	**1985**	**1998**
Stocks	42	56
Pass-through	19	24
Real Estate	26	10
Other	12	11

Data

- Main variable is net positive gains
- Source is fed. tax returns
- Annual aggregate data
- Available with lags
  - e.g. by Fall 2005 know
  - Final for 2003 (20% growth)
  - Preliminary for 2004 (48% growth)

Budget Cycle

- Report to Congress in January
- Finish Forecast in December
- Need
  - Gains for year ending (e.g. 2005)
  - Gains for 10 years ahead (e.g. 2006-15)
- In states, timing differs,
  - Isn't problem similar?

Setting Dictates Strategy

- "Forecast" year ending
  - Estimate time-series regression
  - Use data from current year to predict
- Forecast 10 years ahead
  - Various methods
  - Forecast explanatory variables too

"Forecasting" Year Ending

Regression Equation
"Forecasting" Errors

Dependent Variable

- De-trend Net Positive Gains
- Ratio of gains to financial assets
- Ratio of gains to potential output
  - See graph in handout
- Growth Rate
- Both

What Should Explain Gains?

- Outstanding gains
- Decisions to trade assets
- Evidence of trades
  - Trick for year-ending

Outstanding Gains on Stocks

- Depend on
  - How long hold stocks
  - Price change while hold
- See table on holding periods
  - Wide variation
  - Average is 6.5 years

Measuring Outstd.Gains on Stock

- Sophisticated measure
- Simpler measure
  - Price growth over several years
- Simplest measure
  - Price growth over last year
  - S&P 500

Outstanding Gains: Other Assets

- Prices on other assets are inaccessible
- Proxy with economic activity
  - Ratio of actual to potential GDP
  - Housing starts
  - or investment / potential GDP

Factors in Decision to Sell

- All of the above
- Tax rates
  - Permanent rate
  - Transitory rate

Evidence of Sales

- Dollar volume on stock markets
- Other Possibilities
  - IPO volume
  - M/A volume

One Regression Equation

- See table in handout
- Equation used for 2004
  - variables
  - transitory effects
- Fits historical data adequately

Forecast Errors for Year Ending

Period	**RMSE forecasting growth rate of gains**
1986-2003	23.3%
1991-2003	15.5%

Forecasting Ahead

CBO's mean reversion method

Alternatives tested

Conclusions so far

Assumption for All Methods

- Explanatory variables must be forecastable
- Stock prices cannot be forecast
  - Random walk in near term
  - Some reversion from decade to decade
- Output, incomes, etc., can be forecast

CBO's Mean Reversion Method

- Use forecast of GDP
- Assume Gains/GDP reverts to historical avg
  - Reverts from predicted ratio for year ending
  - Revert 20% of way each year
  - Historical average changes with tax rates

Forecasting Errors: Year Ahead

Period	**RMSE forecasting growth rate of gains**
1987-2003	23.7%
1992-2003	24.0%

Improvements Seem Possible

- More information is available
  - Many more variables are forecast
  - Recent history might help
- Reversion rate could be estimated
- Could forecast response to tax change
  - 2008 & 2009

Alternatives Tested Year Ahead

1 Estimate with forecasts
2 Integrated Macro Model
3 Modify year-ending equation

#1 $g=a_0+a_1x_1+a_2x_2\ldots.$

- Estimate regression over historical period
- g is historical growth rate of gains
- x_i is historical **forecast** of RHS vars.
- Forecast ahead with forecasts of RHS vars
- Little improvement in RMSE

#2: Integrated Macro Model

- Add Gains equation to macro model
- Macro model is BVAR
  - Up to 6 macro variables
- Improved RMSE for period of fit
- Gains forecast was unstable

#3: Modify Year-Ending Eq.

- Dependent var: Gains / Potential GDP
- Explanatory vars:
  - GDP / potential (or Investment / potential)
  - Tax rates
  - Other variables
- Estimate with serial correlation adjustment

#3 continued: Findings

- No new variables helped
- RMSE similar to mean reversion's
- Estimates reversion rate
- Predicts effect of tax change in 2009
- Stock market bubble destabilizes estimates

Next Steps

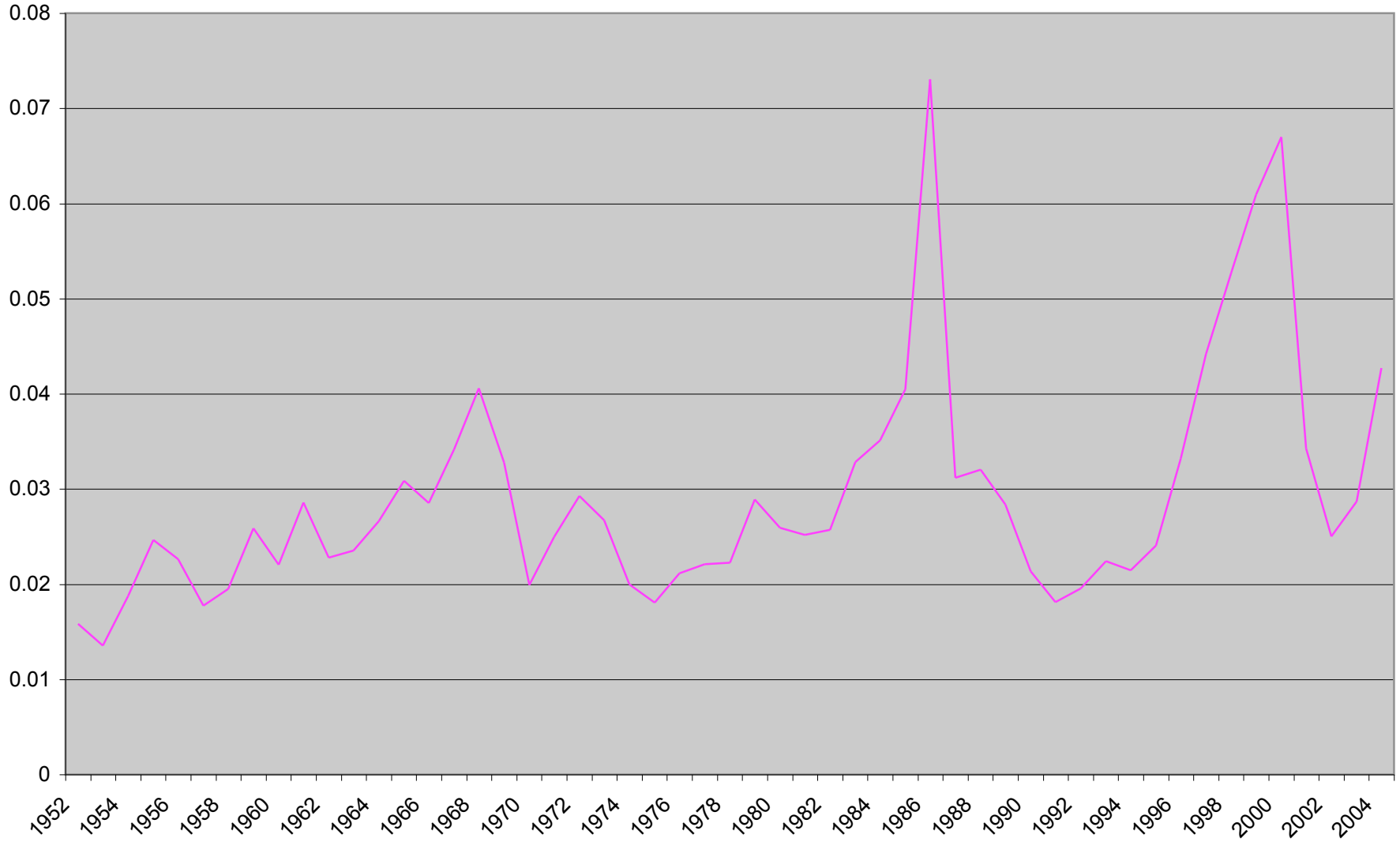
- Add stock prices.
  - To improve estimation.
  - But How forecast?
  - Following practice in some states.
- Other Suggestions?

Conclusions

- Mean reversion is hard to beat
- Modified eq. is more sophisticated version
  - estimates reversion rate
  - forecasts response to tax changes
- Knowing distribution of errors helps

References

- Forecasting Capital Gains Realizations, CBO Technical Paper, August 2005
- Estimating and Forecasting Capital Gains with Quarterly Models, CBO Technical Paper, September 2004
- Testing Alternative Methods for Forecasting Capital Gains, CBO Technical Paper, March 2005


Ratio of Gains to Potential GDP (2004 is preliminary)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004

Equation for Year Ending

Dependent variable: dlog(Gains/GDPFE)
Annual Data from 1952 to 2002

R-squared	0.845
Mean of dep var	0.0046
Std Error of dep var	0.259
Std Error of estimate	0.109
Durbin-Watson Stat	2.161
Jarque-Bera	2.636
Significance fo J-B	0.268

Independent Variables	Coeffic	Std Error	t-Stat
constant	-0.013	0.016	-0.79
d(Tax Rate)	-1.871	0.712	-2.63
Dummy 1986	0.447	0.111	4.01
Dummy 1987	-0.716	0.128	-5.61
dlog(investment/GDPFE)	1.274	0.255	4.99
dlog(S&P/GDPFE)	0.466	0.145	3.21
dlog($volume/GDPFE)	0.329	0.097	3.41

Notes
d indicates first difference
log indicates natural logarithm
QGDPFE is potential GDP
Tax Rate is top statutory tax rate on long-term gains
See citiations for further information

Table 4B. -- Tax Year 1998 Short-Term and Long-Term Capital Asset Transactions, By Selected Asset Type and Length of Time Held.

[All figures are estimates based on samples --transactions are in thousands, money amounts are in thousands of dollars]

Type of transaction, month of sale	Corporate stock							
	Gain Transactions1				Loss Transactions			
	Number of transactions	Sales Price	Basis	Gain	Number of transactions	Sales Price	Basis	Loss
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Short-term transactions								
Total:	**26,780**	**543,295,274**	**494,751,649**	**51,493,887**	**20,868**	**354,103,642**	**409,964,525**	**(52,078,381)**
Long-term transactions								
Total:	**19,887**	**349,738,721**	**149,500,435**	**200,699,468**	**7,614**	**53,290,221**	**84,252,554**	**(29,068,357)**
Under 18 months *3*	3,834	45,164,549	30,578,142	14,694,690	2,400	14,896,950	23,519,193	(7,971,592)
18 months under 2 years	2,473	32,127,646	18,910,227	13,401,339	1,194	7,737,283	12,112,793	(4,193,075)
2 years under 3 years	3,046	39,926,245	20,131,076	19,852,802	1,344	8,309,276	13,358,850	(4,971,702)
3 years under 4 years	1,581	24,105,974	11,376,524	12,811,787	483	3,250,188	5,146,387	(1,897,771)
4 years under 5 years	1,037	15,651,114	6,496,968	9,155,163	358	2,461,672	3,684,019	(1,239,695)
5 years under 10 years	2,078	43,750,202	15,129,150	28,346,575	585	3,688,724	5,801,799	(2,111,531)
10 years under 15 years	773	22,062,400	5,942,630	16,086,824	204	1,002,419	1,913,055	(914,740)
15 years under 20 years	342	11,405,891	2,297,652	9,102,444	58	367,405	826,455	(459,050)
20 years or more	388	20,991,425	3,457,033	17,534,454	66	483,346	793,244	(310,399)
Period not determinable	4,335	94,553,275	35,181,035	59,713,389	923	11,092,958	17,096,758	(4,998,802)

1. Transactions with no gain or loss are included with gain transactions.

2. Dates showed holding period to be 1 year or more and transactions not reclassified during editing.

3. Includes some transactions where holding period was under 1 year and transactions not reclassified during editing.

4. Bonds and other securities includes U.S. Government obligations, State and local Government obligations and other notes and debentures.

5. Real estate includes residential rental property, depreciable business property, farmland and other land.

6. Other asset types includes all other asset categories not inlcuded in the above categories, including put and call options;

futures contracts; all mutual funds; partnership, S corporation, and estate or trust interests; pass-through gains and losses; livestock; timber;

involuntary conversions; depreciable business personal property; residences; unidentifiable assets; and capital gain distributions.

only the gain is reported for capital gain distributions from mutual funds and pass-through gains or losses and (b) part of the total gain or

loss on certain deprecibale assets is treated as ordinary income.

Notes: Detail may not add to totals because of rounding. Sales price minus basis does not always equal gain or loss because: (a)

only the gain is reported for capital gain distributions from mutual funds and pass-through gains or losses and (b) part of the total gain or

loss on certain deprecibale assets is treated as ordinary income.

Source: Excerpted from Janette Wilson, "Sales of Capital Assets Reported on Individual Income Tax Returns, 1998 and 1997" IRS Statistics of Income Bulletin (Summer 2002)