Trends and Cycles in Montana Income Tax Data: Implications for Revenue Forecasting

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Montana Income Tax Forecasting Process

- 1. Forecast six years' per-capita growth factors for all return line items (back-cast of just completed year, now-cast, and 4 year forecast)
- 2. Calculate tax liability from latest year's resident returns with line items grown at forecast rates => 6 years' forecast of tax liability for fixed population
- 3. Multiply each year's fixed-population forecast by population growth factor and adjustment for non- and part-year-residents
- 4. convert CY liability forecast to forecast of FY revenue
- 5. subtract forecast credits and add forecast audit revenue

Research Questions

Forecasting process assumes that change in line item totals is due to change in per-capita amounts and general population growth, not change in proportion of returns using a line item

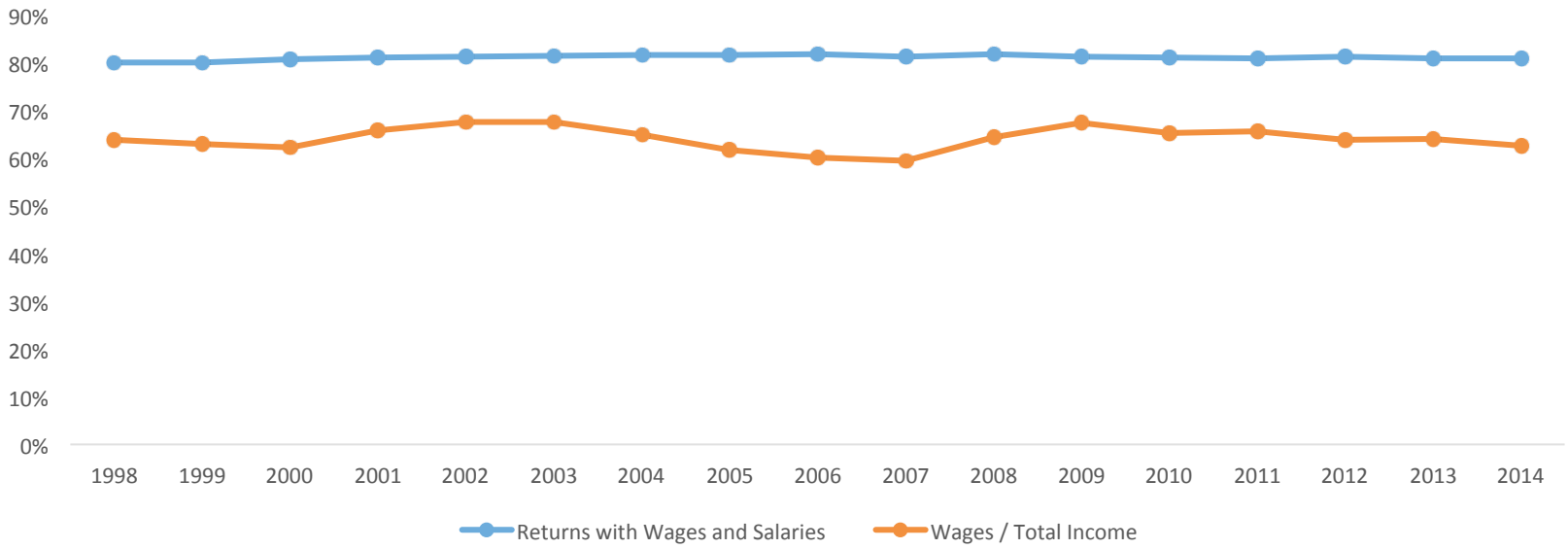
- How badly is this assumption violated?
- Does combination of non-linearity in tax and non-proportional growth significantly bias the forecast?

Non-Linearity in MT Income Tax

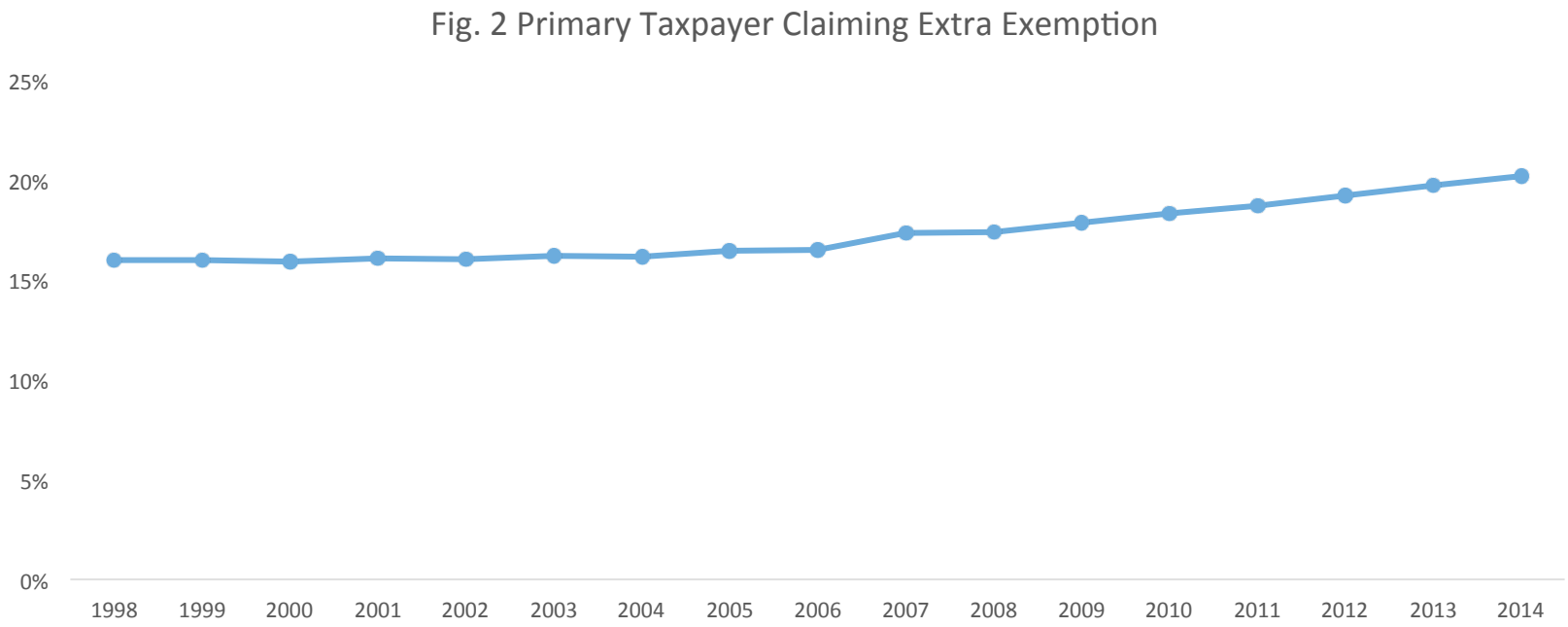
- Tiered Rates
- Strange Standard Deduction
- Caps and Floors on Deductions
- Preferential Taxation of Capital Gains Income

Assumption looks good for largest income line item – wages and salaries

Fig. 1 Wages and Salaries



Assumption does not look so good for taxpayers age 65+



Assumption looks baaad for capital gains income

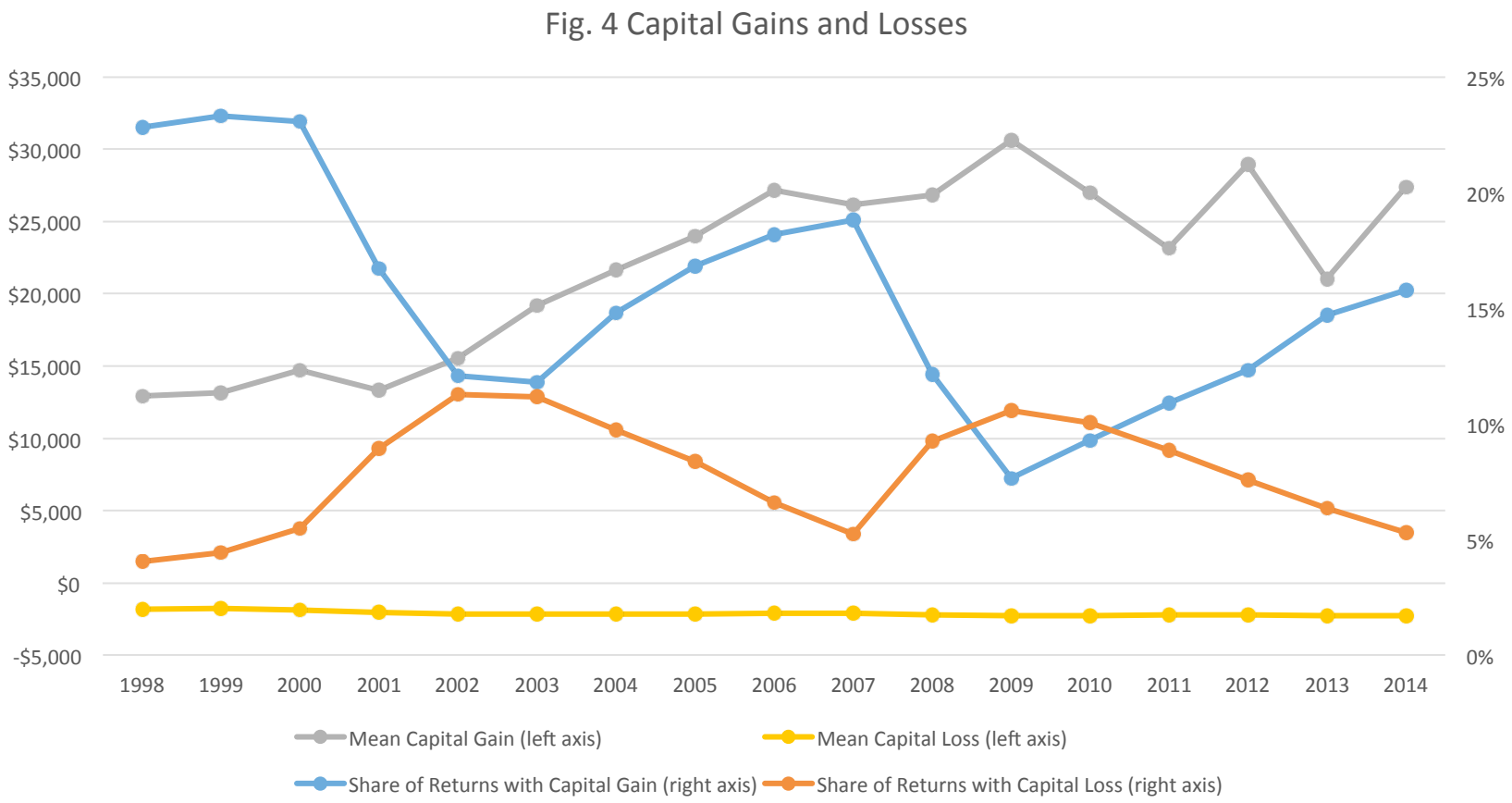


Table 1. Applicability of Proportional Growth Assumption		
item	trend	cycle
Wage and salary income	Applies: Proportion of returns with wages and salaries approximately constant. Ratio of highest to lowest is 1.02.	Applies: Cyclic variation is primarily due to change in wages per capita rather than in proportion with wages.
Taxable interest	Does not apply: Long term downward trend in proportion of returns with interest. Ratio of highest to lowest is 1.81.	Maybe: Cyclic variation is a combination of changes in proportion with interest and in per capita interest.
Dividends	Does not apply: Long term downward trend in proportion of returns with dividends. Ratio of highest to lowest is 1.46.	Applies: Cyclic variation is primarily due to changes in dividends per capita.
Sole proprietor income (Schedule C)	Does not apply: Long term downward trend in proportion of returns with Schedule C income. Ratio of highest to lowest is 1.17	Maybe: Cyclic variation is relatively small.
Capital gains	Hard to tell: Large changes, but it is not clear whether there is trend or just data starting and ending at different points in the cycle.	Does not apply: Cyclic variation is a combination of changes in the proportion with capital gains and in per capita gains.
Pass-through and passive income (Sched E)	May apply: There is variation but no obvious long-term trend. Ratio of highest to lowest proportions is only 1.09	Probably applies: Strong cyclic variation in per capita Sched E. Small changes in proportion do not seem to follow business cycles.
Taxable Social Security	Does not apply: Long term upward trend in proportion of returns with social security. Ratio of latest year to earliest year is 2.02	Probably applies: Cyclic variation in both proportion of returns with social security and per capita social security, but both small.
Taxable IRA distributions	Does not apply: Long term upward trend in proportion of returns with taxable IRA distributions. Ratio of latest year to earliest year is 1.55	Maybe not: Cyclic variations in both proportion of returns with IRA income and in mean IRA income.
Taxable pensions and annuities	Does not apply: Long term upward trend in proportion of returns with social security. Ratio of latest year to earliest year is 1.13	Probably not: Cyclic variation is almost all in proportion of returns with retirement income, not in per capita amount.
Dependents	Does not apply: Long term downward trend in proportion of returns with dependents. Ratio of earliest year to latest year is 1.16	Maybe not: Some cyclic change in proportion of returns with dependents.
Age 65+ checked for primary taxpayer	Does not apply: Long term upward trend in proportion. Ratio of latest year to earliest is 1.27. Almost all of increase since 2004.	Probably: Little cyclic variation in proportion of returns with age 65+ checked.
Filing Status	Does not apply: Single filers growing twice as fast as separate returns on same form and seven times as fast as joint returns.	Maybe not: Some cyclic movement between joint (single income) and separate on same form (two incomes)

Testing for bias

- Base case forecast with uniform growth

Compare to

- Change cases with different subpopulation growth keeping total population and income growth same as base case

Table 2. Subpopulation Growth Rates

	With Item	Without Item	Difference
Interest	-4.08%	4.98%	-9.06%
Dividends	-1.76%	1.83%	-3.59%
Sole Proprietor Income	-0.37%	1.24%	-1.61%
Social Security	5.25%	0.32%	4.93%
IRA Distributions	4.47%	0.61%	3.86%
Pensions and Annuities	2.05%	0.69%	1.36%
Dependents	0.10%	1.31%	-1.21%
Age 65+	3.53%	0.40%	3.13%

	Positive	Negative	Zero
Pass-Through and Passive Income	1.62%	1.17%	0.0084

Filing Status	Single	Joint	Separate Same Form	Separate Not Same Form	Head of Household
	1.40%	0.20%	0.74%	1.92%	0.69%

Capital Gain Change Case

- *Three hundred subpopulations: positive, negative, zero capital gains by percentile*
- *Within each percentile*
  - *mean loss constant*
  - $mean\ gain\ growth\ rate = 0.06104 - 0.0808\ number\ of\ gains\ growth\ rate$
  - $number\ of\ losses\ growth\ rate = -1.0895\ number\ of\ gains\ growth\ rate$
  - *number of gains set to give same total net gain as base case*

Impact on Revenue Forecast of Dividing Population into Sub-Populations with Different Growth Rates
Subpopulations With and Without Types of Income or Other Attributes

Year	Baseline Tax Liability ($ million)	Taxable Interest		Dividends		Sole Proprietor Income (Schedule C)		Capital Gains		Pass-Through and Passive Income		Taxable Social Security	
		$ million	%	$ million	%	$ million	%	$ million	%	$ million	%	$ million	%
2015	1027.998	-23.547	-2.3%	-6.549	-0.6%	1.613	0.2%	9.494	0.9%	3.448	0.3%	1.538	0.1%
2016	1086.908	-48.286	-4.4%	-13.280	-1.2%	5.473	0.5%	10.725	1.0%	9.713	0.9%	2.675	0.2%
2017	1144.897	-72.404	-6.3%	-19.192	-1.7%	8.181	0.7%	17.472	1.5%	13.459	1.2%	2.983	0.3%
2018	1198.844	-96.013	-8.0%	-24.218	-2.0%	10.090	0.8%	28.451	2.4%	7.451	0.6%	2.488	0.2%
2019	1260.625	-121.587	-9.6%	-30.096	-2.4%	12.857	1.0%	35.703	2.8%	0.685	0.1%	2.967	0.2%
2020	1327.715	-147.893	-11.1%	-35.851	-2.7%	16.392	1.2%	43.300	3.3%	-5.885	-0.4%	4.152	0.3%

Year	Baseline Tax Liability ($ million)	Taxable IRA Distributions		Taxable Pensions and Annuities		Dependents		Age 65+		Filing Status	
		$ million	%	$ million	%	$ million	%	$ million	%	$ million	%
2015	1027.998	-2.755	-0.3%	-5.601	-0.5%	-1.079	-0.1%	0.080	0.0%	-1.747	-0.2%
2016	1086.908	-7.045	-0.6%	-16.323	-1.5%	-2.242	-0.2%	0.310	0.0%	-3.652	-0.3%
2017	1144.897	-13.440	-1.2%	-33.366	-2.9%	-3.544	-0.3%	0.455	0.0%	-5.695	-0.5%
2018	1198.844	-21.609	-1.8%	-55.136	-4.6%	-4.965	-0.4%	0.547	0.0%	-7.868	-0.7%
2019	1260.625	-28.157	-2.2%	-73.020	-5.8%	-6.552	-0.5%	0.556	0.0%	-10.251	-0.8%
2020	1327.715	-34.415	-2.6%	-90.941	-6.8%	-8.302	-0.6%	0.524	0.0%	-12.835	-1.0%

Difference in Budget Window >2% only in Three Cases

- Interest
- Pension and Annuity Income
- Capital Gains Income

Take-aways for forecasters - interest

- Decline in proportion of returns with interest appears inconsistent with other data and likely a reporting problem (people who fall below 1099 threshold don't report their interest income).
- If interest rates rise in future, proportion of returns reporting interest likely to rise
- If not taken into account, will under-forecast

Take-aways for forecasters – pension & annuity income

- Demographic change has multiple effects, not all in same direction
- Should consider how to adjust forecast process for demographic change, not just this one effect

Take-aways for forecasters – capital gains

- *If* we could forecast capital gains, taking into account cyclic changes in proportions of returns with gains and losses could yield marginal, but possibly significant, improvement
- Since we can't forecast capital gains, probably not a good use of forecaster's time

Take-aways for forecasters - general

- Incorporating subpopulation growth rates is not technically difficult
- Choosing subpopulations and their growth rates well could be a large task