

Revenue Estimation & Tax Research Conference

Experience Estimating the Revenue Impact of TCJA – a Microsimulation Modeling Approach

Chainbridge Software, LLC September 24, 2019







Background -- Chainbridge

- Has been developing and delivering tax policy analysis tools for state government clients for nearly two decades
- Eric Cook, PhD, revenue estimator at the US Congressional Joint Committee on Taxation during federal tax reform efforts leading to the Tax Reform Act of 1986
- Directed development of tax modeling projects for state government clients (Price Waterhouse and KPMG), left KPMG to form Chainbridge in 2000





Background --2018

- Early in 2018, two states contracted with Chainbridge to assist in their analysis of the TCJA
- Two microsimulation models developed (individual income tax and corporate income tax) for and delivered to the two states
- Impacts of the (1) individual, (2) business, and (3) international provisions of the TCJA on the these two states were estimated and reports developed





The Chainbridge team

- Eric Cook, PhD, CEO
- Nancy Cook, President
- James Copenhaver, VP Software
 Development
- Stephen Woerner, Software Engineer
- Kirk Copen





Overall approach

- Construct two microsimulation models (individual income tax and corporate income tax)
- For each provision within each provision type (individual, business or international):
 - Determine what the likely impact that the provision has on the state
 - Determine whether an on-model (using the microsimulation models) or off-model approach would be employed
 - Generate the revenue estimates and prepare a report presenting the results



Why microsimulation modeling?

- The "Gold Standard" for modeling tax policy changes
- Accurate method for assessing the impact by simulating a policy change for each taxpayer and aggregating results
- Forecasting and data extrapolation allows policy analysis to be conducted at future year levels





Estimating the impact of the TCJA using microsimulation models

- International provisions
- Individual provisions
- Business provisions





- Deduction for dividends received by domestic corporations from certain foreign corporations (DRD provision)
- Treatment of deferred foreign income upon transition to participation exemption system of taxation (Repatriation provision)
- Taxation of global intangible low-taxed income (GILTI provision)
- Deduction for foreign-derived intangible income derived from trade or business within the US (FDII provision)

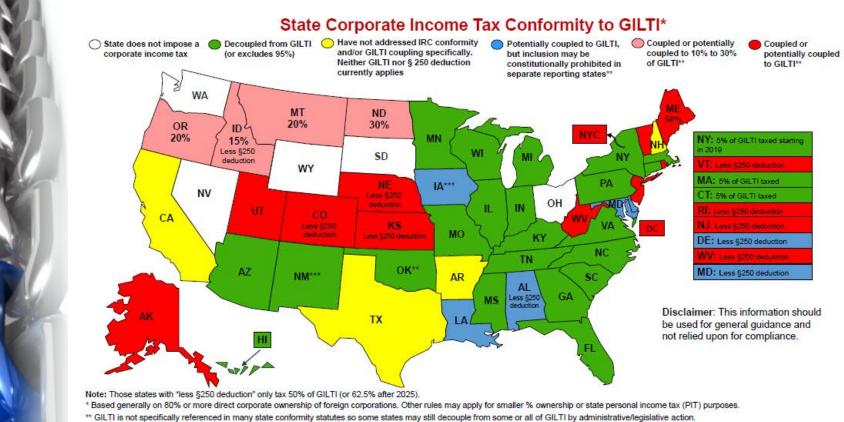




Estimating approach – international provisions

- Corporate income tax model
- Augmented with data from Standard and Poor's Compustat database
- Review of Forms 10-K filed with the SEC
- Individual income tax portion of Repatriation provision – off-model approach





*** Iowa conformity begins in 2019. New Mexico decouples starting in 2020.

Source: Council On State Taxation





State Corporate Income Tax Conformity to IRC §965 Repatriated Income*

* Based generally on 80% or more direct corporate ownership of foreign corporations. Other rules may apply for smaller % ownership or PIT purposes. **No conformity update but taxes a portion of foreign dividends (when distributed) for water's edge filers.

compliance.

Source: Council On State Taxation



Significant individual provisions

- Standard deduction modification
- Loss limitation for noncorporate taxpayers
- Changes in itemized deductions:
 - Repeal of certain itemized deductions (state and local taxes, non-disaster casualty losses, some miscellaneous)
 - Limitation on mortgage interest deduction



Estimating approach – individual income tax provisions

- Individual Income Tax Model employed for the majority of the provisions as a percentage of the net revenue impact
- Database includes State returns matched with federal returns for residents
- Allows for tax to be recalculated using federal data and federal law (indexing provisions)
- Extrapolation of microdatabase to future years



Estimating issues – individual income tax provisions

- "Stacking order"
- Impact of the standard deduction modification – "switching" issue
- Extrapolation issue federal Earned Income Tax Credit (EITC)



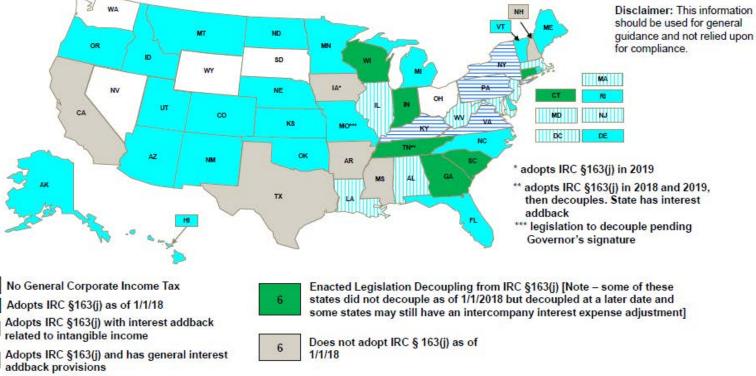


- Limitation on the net interest deduction
- Amortization of research and experimental expenses
- Repeal of the domestic production activities deduction
- Modification of the net operating loss (NOL) deduction
- Increase in IRC § 179 expensing
- Simplified accounting for small business





State Conformity to 30% Interest Expense Limitation



Source: Council On State Taxation



Estimating approach – business provisions

- Corporate Income Tax Model employed for the majority of the provisions as a percentage of the net revenue impact
- Population of state corporate income tax returns
- Matched with pro-forma federal Forms 1120
- Extrapolation of microdatabase to future years



Estimating issues – business provisions

Affect both corporations and pass-through entities – split between corporate and individual

	Corporate Share	Individual Share
Provision	(percent)	(percent)
Bonus Depreciation	70	30
Section 179 Expensing	10	90
Net Interest Deduction	95	5
Small Business Accounting Changes	30	70
Modifications to NOLs	90	10
Amortization of R&D	75	25
Repeal Domestic Production Activities Deduction	75	25
Source: US Congress, Joint Committee on Taxation	า	



Thank you please feel free to contact us:

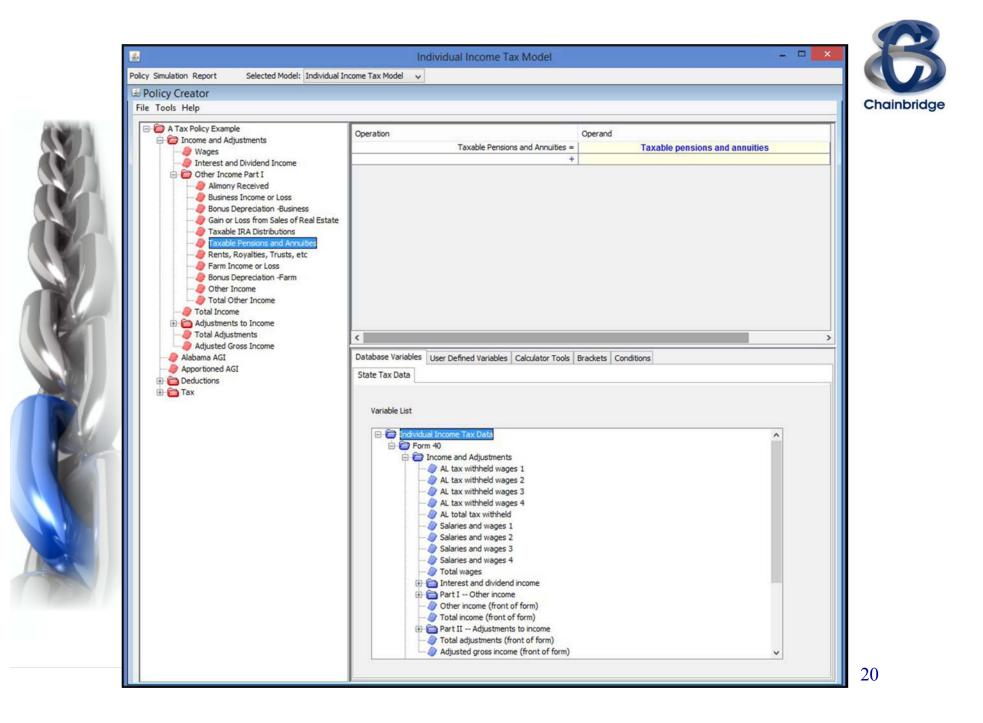
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Appendix:

PolicyLinks Screenshots and Output Tables



Tax Summary

Project Description: Base Policy Description: Default Policy 2010 Alternative Policy Description: Default Policy 2010 Test for fta Unit of Analysis: Returns Filing Status Coverage: All Tax Year: 2012 Classifier: AGI Economic Forecast: EconDefault Effective Tax Rate: Tax/Classifier Resident Coverage: Residents

		Number o	f Returns	Та	xable Return	15		AGI		Ta	axable Incon	ie
	GI lars	Sample (Units)	Aggregate (Units)	Base Plan (000s)	Alternative (000s)	Change (000s)	Base Plan (Millions)	Alternative (Millions)	Change (Millions)	Base Plan (Millions)	Alternative (Millions)	Change (Millions)
-infinity	25000	295,583	299,507	161.26	148.65	-12.62	2,793.47	2,793.47	0.00	1,199.94	1,062.48	-137.47
25001	50000	135,788	137,590	130.41	130.39	-0.03	4,949.26	4,949.26	0.00	3,003.88	2,945.27	-58.60
50001	75000	70,718	71,657	69.37	69.37	-0.00	4,392.47	4,392.47	0.00	2,760.25	2,749.30	-10.96
75001	100000	40,345	40,881	39.93	39.93	0.00	3,533.04	3,533.04	0.00	2,296.22	2,293.31	-2.91
100001	125000	24,288	24,610	24.20	24.20	0.00	2,742.57	2,742.57	0.00	1,837.52	1,842.05	4.53
125001	150000	14,807	15,004	14.81	14.82	0.01	2,046.42	2,046.42	0.00	1,393.49	1,402.34	8.85
150001	175000	8,924	9,042	8.93	8.93	0.00	1,460.18	1,460.18	0.00	998.59	1,005.30	6.71
175001	200000	5,407	5,479	5.40	5.40	0.00	1,023.18	1,023.18	0.00	697.24	701.01	3.77
200001	250000	5,948	6,027	5.95	5.96	0.01	1,335.53	1,335.53	0.00	904.29	936.38	32.09
250001	500000	6,663	6,751	6.66	6.67	0.02	2,231.50	2,231.50	0.00	1,459.15	1,558.63	99.48
500001	1000000	1,907	1,932	1.90	1.90	0.01	1,305.46	1,305.46	0.00	836.31	877.56	41.26
1000001	infinity	800	811	0.78	0.78	0.00	2,168.31	2,168.31	0.00	1,413.00	1,443.33	30.33
To	als	611,178.00	619,290.97	469.60	457.00	-12.60	29,981.38	29,981.38	0.00	18,799.88	18,816.95	17.07

			Tax			Distribution		Eff	ite	
A	GI	Base Plan	Alternative	Change	Base Plan	Alternative	Change	Base Plan	Alternative	Change
Dol	lars	(Millions)	(Millions)	(Millions)	(%)	(%)	(%)	(%)	(%)	(%)
-infinity	25000	53.03	46.75	-6.28	5.92%	5.21%	-0.71%	1.90%	1.67%	-0.22%
25001	50000	141.26	138.34	-2.92	15.77%	15.42%	-0.35%	2.85%	2.80%	-0.06%
50001	75000	131.31	130.77	-0.55	14.66%	14.57%	-0.08%	2.99%	2.98%	-0.01%
75001	100000	109.99	109.84	-0.15	12.28%	12.24%	-0.03%	3.11%	3.11%	-0.00%
100001	125000	88.30	88.53	0.22	9.86%	9.87%	0.01%	3.22%	3.23%	0.01%
125001	150000	67.30	67.74	0.44	7.51%	7.55%	0.04%	3.29%	3.31%	0.02%
150001	175000	48.40	48.73	0.33	5.40%	5.43%	0.03%	3.31%	3.34%	0.02%
175001	200000	33.85	34.04	0.19	3.78%	3.79%	0.02%	3.31%	3.33%	0.02%
200001	250000	43.98	45.57	1.59	4.91%	5.08%	0.17%	3.29%	3.41%	0.12%
250001	500000	71.11	76.05	4.94	7.94%	8.48%	0.54%	3.19%	3.41%	0.22%
500001	1000000	40.76	42.80	2.04	4.55%	4.77%	0.22%	3.12%	3.28%	0.16%
1000001	infinity	66.59	68.08	1.49	7.43%	7.59%	0.15%	3.07%	3.14%	0.07%



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Winners and Losers

Project Description: Base Policy Description: Default Policy 2010 Alternative Policy Description: Default Policy 2010 Test for fta Unit of Analysis: Returns Filing Status Coverage: All Tax Year: 2012 Classifier: AGI Economic Forecast: EconDefault Resident Coverage: Residents



		Returns	with a Tax D Amount	ecrease	Returns	with a Tax Ir Amount	icrease	To	tal Tax Chang Amount	ge	
AGI (Dollars)		Number of Returns (Units)	of Tax Decrease (Millions)	Average (\$)	Number of Returns (Units)	of Tax Increase (Millions)	Average (\$)	Number of Returns (Units)	of Tax Change (Millions)	Average (\$)	Percent (%)
-infinity	25000	132,502.84	-6.28	-47.40	0.00	0.00	0.00	132,502.84	-6.28	-47.40	-462.51%
25001	50000	47,876.20	-2.92	-60.97	0.00	0.00	0.00	47,876.20	-2.92	-60.97	-214.95%
50001	75000	8,540.89	-0.55	-64.02	0.00	0.00	0.00	8,540.89	-0.55	-64.02	-40.27%
75001	100000	2,306.21	-0.15	-62.93	0.00	0.00	0.00	2,306.21	-0.15	-62.93	-10.69%
100001	125000	818.73	-0.05	-62.09	2,911.14	0.28	94.52	3,729.86	0.22	60.14	16.52%
125001	150000	320.19	-0.02	-68.63	1,321.31	0.46	350.26	1,641.50	0.44	268.55	32.46%
150001	175000	158.07	-0.01	-73.42	693.08	0.35	498.70	851.15	0.33	392.45	24.60%
175001	200000	109.43	-0.01	-75.69	331.34	0.20	590.23	440.77	0.19	424.90	13.79%
200001	250000	114.50	-0.01	-70.94	5,056.24	1.60	316.76	5,170.74	1.59	308.17	117.35%
250001	500000	123.62	-0.01	-73.28	5,540.58	4.94	892.40	5,664.20	4.94	871.32	363.45%
500001	1000000	16.21	-0.00	-67.74	1,516.87	2.04	1.347.12	1.533.08	2.04	1,332.16	150.40%
1000001	infinity	8.11	-0.00	-57.39	574.53	1.49	2,597.07	582.63	1.49	2,560.14	109.85%
Totals		192,895.00	-10.00	-51.86	17,945.09	11.36	633.08	210,840.09	1.36	6.44	100.00%

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Diagnostic Table

Project Description: Base Policy Description: Default Policy 2010 Alternative Policy Description: Default Policy 2010 Test for fta Resident Coverage: All (Residents and Non-Residents) Tax Year: 2012 Economic Forecast: EconDefault



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	Base	eline Policy	Altern	ative Policy	Policy 1	Differences
	Number		Number		Change	Change
Variable	of Returns (000s)	Aggregate Totals (000s)	of Returns (000s)	Aggregate Totals (000s)	in Returns (000s)	in Aggregat (000s)
Wages 4	528	27,224,793	528	27,224,793	0	
Interest_and_Dividend_Income_5	97	2,547,809	97	2,547,809	0	
Alimony Received 9	2	32,939	2	32,939	0	
Business_Income_or_Loss_10	102	-1,952,866	102	-1,952,866	0	
Bonus_Depreciation_Business_11	0	0	0	0	0	
Gain_or_Loss_from_Sales_of_Real_Estate_1	58	494,615	58	494,615	0	
Taxable_IRA_Distributions_13	44	633,742	44	633,742	0	
Taxale Pensions and Annuities 14	59	821,257	59	821,257	0	
Rents_Royalties_Trusts_etc_15	72	11,977,719	72	11,977,719	0	
Farm_Income_or_Loss_16	17	-277,183	17	-277,183	0	
Bonus_Depreciation_Farm_17	0	0	0	0	0	
Other_Income_18	58	3,082,963	58	3,082,963	0	
Total_Other_Income_19	267	14,813,186	267	14,813,186	0	
Total Income 20	609	44,585,789	609	44,585,789	0	
Primary_IRA_Deduction_22	9	51,975	9	51,975	0	
Spouse s IRA Deduction 23	4	16,481	4	16,481	0	
Payments to KEOGH 24	2	45,091	2	45,091	0	
Penalty on Early Withdrawal of Savings 2	5	1,229	5	1,229	0	
Alimony_Paid_26	3	45,517	3	45,517	0	
Adoption Expenses 27	0	1,010	0	1,010	0	
Moving Expenses 28	3	8,465	3	8,465	0	
Self_Employed_Health_Ins_Deduction_29	16	103,789	16	103,789	0	
Payments_to_AL_PACT_30	2	5,998	2	5,998	0	
Total_Adjustments_31	38	279,555	38	279,555	0	
Total_Adjustments_33	38	279,555	38	279,555	0	
Adjusted_Gross_Income_32	610	44,306,234	610	44,306,234	0	
AGI_106	610	44,306,234				
Apportioned_AGI_109	606	29,981,382	606	29,981,382	0	
Medical_and_Dental_Expenses_37	165	850,870	165	850,870	0	
AGI_Threshold_38	599	1,809,855	599	1,809,855	0	
Excess_of_Medial_Expenses_over_AGI_Limit	605	-958,985	605	-958,985	0	
Max_Excess_Medical_Expenses_at_Zero_40	112	584,853	112	584,853	0	
Total_of_Taxes_Paid_42	372	2,286,215	372	2,286,215	0	
Social_Security_Tax_110	528	1,669,533	528	1,669,533	0	
Medicare Tax 111	528	394,759	528	394,759	0	

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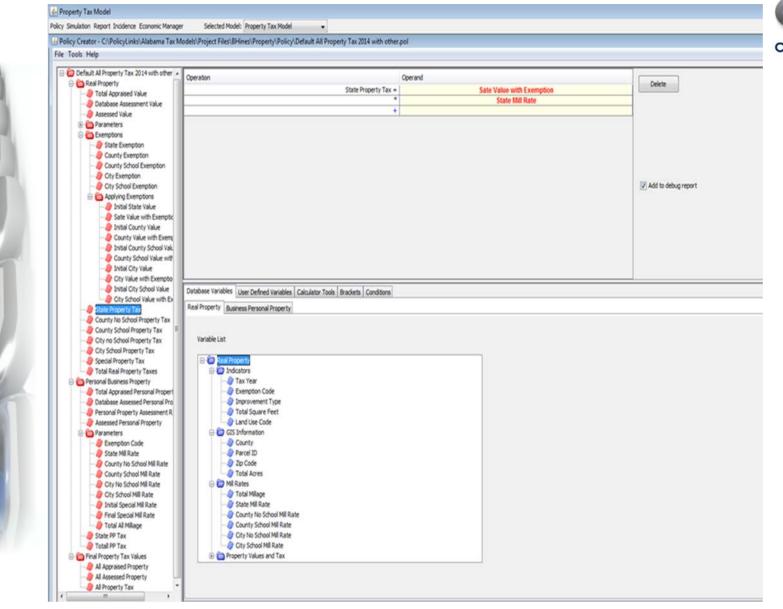
👍 Property Tax Model

Policy Simulation Report Incidence Economic Manager Selected Model: Property Tax Model +

Policy Creator - C:\PolicyLinks\Alabama Tax Models\Project Files\BHines\Property\Policy\Default All Property Tax 2014 with other.pol File Tools Help



Default All Property Tax 2014 with other	Operation	Operand	
🕀 🛅 Real Property	All Appraised Property =	Total Appraised Value	Delete
Personal Business Property	*	Total Appraised Personal Property	
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- 🥔 City School Mill Rate			
- 🥔 Initial Special Mil Rate			
- 🥔 Final Special Mil Rate			
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🖻 🛅 Final Property Tax Values			
- 8 All Appraised Property			
- J Al Assessed Property	Database Variables User Defined Variables Calculator Tools Brackets Conditions		
- J Al Property Tax			
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	Variable List		
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	🕀 🤖 GIS Information		
	🕀 🤖 Mil Rates		
	Property Values and Tax		



Property Tax Model

· Report Parameters

🖯 🎍 County Reports

🕀 🎍 Custom Brackets

• comparison.htm

MapReport.htm

debug.htm
 tax_summer

· CountyBook.xlsx · County Report ALL ALL htm

· County Report ALL_Class 1.htm · County Report ALL_Class 2.htm

· County Report ALL_Class 3.htm

· County Report ALL_Class 4.htm

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. Tax_SummaryClass 1_ALL.htm

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 Winners_and_LosersClass 3_ALL.hb
 Total Value . Winners_and_LosersClass 4_ALL.ht Dollars . Winners_and_LosersOther_ALL.htm Winners_and_LosersPersonal Propert infinity

Winners_and_LosersReal Property_ 25001

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Selected Model: Property Tax Model okcy Simulation Report Incidence Economic Manager .

50001

75001

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1000001

Totals

Property Tax Mode Policy Smulation Report
Report Generation
File Tools
Report Tree Report Parame Reports County Res County Res County Res County Count

		Number of	of Returns		Taxable Return	15			Total Value				Assessed Valu	e	
Total Value		Sample	Aggregate	Base Plan	Alternative	Change	Ba	se Plan	Alternative	Change	B	Sase Plan	Alternative	Change	
Dollars		(Units)	(Units)	(000s)	(000s)	(000s)	(3	lillions)	(Millions)	(Millions)	0	Millions)	(Millions)	(Millions)	
infinity	25000	943,26	2 943,26	2 845.2	6 845.3	2	0.05	8,525.4	8,525.	41	0.00	1,310.22	1,310.2	2	0.00
25001	50000	403,32	403,32	1 363.0	9 363.1	1	0.02	14,800.6	14,800.0	52	0.00	2,087.72	2,087.7	2	0.00
50001	75000	300,33	300,33	1 264.0	6 264.0	7	0.01	18,578.9	18,578.	91	0.00	2,471.22	2,471.2	2	0.00
75001	100000	232,30	8 232,30	8 203.5	5 203.5	6	0.01	20,206,4	8 20,206.	48	0.00	2,559.03	2,559.0	3	0.00
100001	125000	194,17	194,17	1 172.0	9 172.1	0	0.01	21,750.6	7 21,750.0	57	0.00	2,665.04	2,665.0	4	0.00
125001	150000	156,840	5 156,84	5 140.9	5 140.9	6	0.01	21,479.6	21,479.	50	0.00	2,574,81	2,574.8	1	0.00
150001	175000	120,92	120,92	1 110.1	0 110.1	1	0.01	19,566.9	19,566.9	21	0.00	2,332.01	2,332.0	1	0.00
175001	200000	90,83	90,83	3 83.9	0 \$3.9	1	0.01	16,972.6	16,972.	50	0.00	2,009.38	2,009.3	8	0.00
200001	250000	121,85	8 121,85	8 114.0	9 114.1	1	0.01	27,134.8	27,134.	80	0.00	3,230.10	3,230.1	0	0.00
250001	500000	187,99	8 187,99	8 180.2	8 180.3	2	0.04	62,868,3	4 62,868.	34	0.00	7,827,91	7,827.5	1	0.00
500001	1000000	48,06	48,06	5 47.1	2 47.1	7	0.04	32,200.5	3 32,200.	53	0.00	4,662.70	4,662.7	0	0.00
1000001	infinity	23,73	5 23,73	6 23.3	6 23.5	5	0.19	91,466.9	91,466.9	20	0.00	17,528.54	17,528.5	4	0.00
Totals		2,823,650.0	2.823,650.0	2,547.8	8 2,548.2	*	0.40	355,551.7	7 355,551	77	0.00	51,258.69	51,258.6	10	0.00

	Tax			Distribution		1	Iffective Tax Rate	
Base Plan	Alternative	Change	Base Plan		Change	Base Plan	Alternative Chan	ge
(Millions)	(Millions)	(Millions)	(%)	(%)	(%)	(%)	(%) (%)	
19.0	55 19.7	9 0.1	4 2.14	2.12%	-0.025	6 0.235	0.23%	0.00
28.1	15 28.3	4 0.1	8 3.06	3.03%	-0.039	6 0.199	0.19%	0.00
32.0	56 32.9	1 0.2	5 3.55	3.52%	-0.039	0.189	0.18%	0.00
32.5	85 33.2	2 0.3	\$ 3.57	% 3.56%	-0.019	6 0.169	0.16%	0.00
33.7	72 34.4	0.0	7 3.67	% 3.68%	0.029	6 0.169	0.16%	0.00
32.0	57 33.5	2 0.8	5 3.55	3.59%	0.045	6 0.159	0.16%	0.00
30.4	48 31.3	0 0.8	3 3.31	1% 3.35%	0.049	6 0.165	0.16%	0.00
26.9	27.6	8 0.7	8 2.92	2.965	0.04*	6 0.169	0.16%	0.00
45.1	19 46.5	0 1.3	4.91	% 4.98%	0.075	6 0.179	6 0.17%	0.00
122.3	27 125.6	8 3.4	1 13.25	13.46%	0.179	6 0.199	0.20%	0,01
84.7	77 86.4	3 1.6	7 9.21	9.25%	0.049	6 0.26%	6 0.27%	0.01
430.0	67 434.1	7 3.4	9 46.81	% 46.49%	-0.335	6 0.479	6 0.47%	0.00
919.5	933.9	4 13.9	6 100.00	100.00%	0.005	0.269	0.26%	0.00

Chainbridge Software Inc.

25000

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