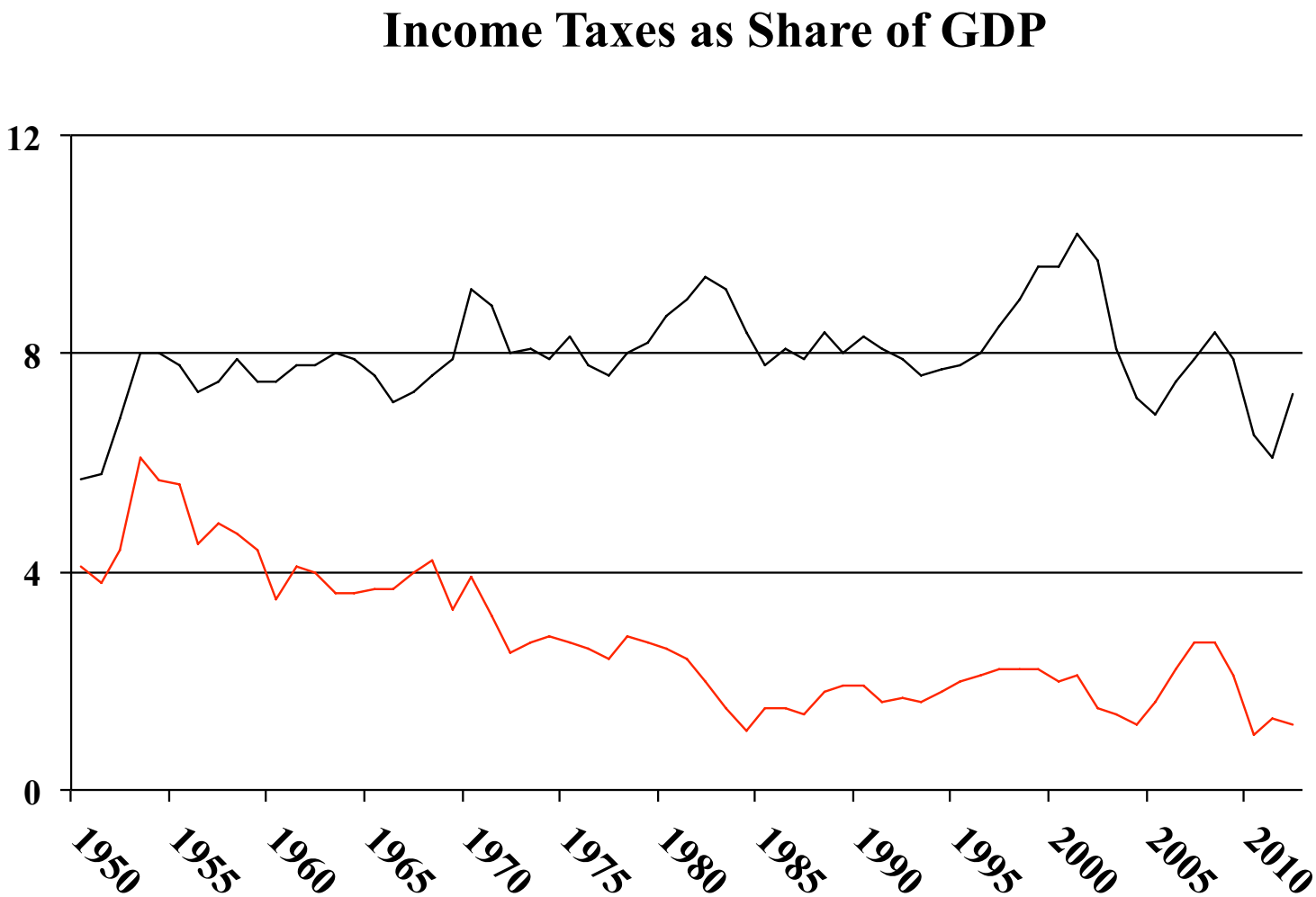
Seminar on Public Finance

Lecture #8: March 21

Business and Corporate Income Taxation

Corporate vs. Individual Taxes



Why Do We Focus on Business?

- How we tax businesses goes a long way towards determining the type of system: Income vs. Consumption.
- Less familiarity with business taxation.
- Taxation of corporations source of significant inefficiency in current tax system.
- The optics are confusing and somewhat unintuitive.
- Many systems can be implemented simply with business-level taxation, such as VATs or National Sales Taxes.

Taxation of Businesses and Business Income

- Four general types of business entities.
  1. C corporations: publicly traded (manufacturers, financial, retail)
  2. S corporations: 100 shareholders at most, limited liability, C corporations and partnerships cannot be shareholders, no foreign shareholders (construction, service, retail)
  3. Partnerships: general and limited, limited liability companies (LLC), income can be distributed in any fashion based on agreement (legal, service, financial)
  4. Sole Proprietors: no limited liability, includes independent contractors, generally very small
- Also: RICs, REITs, Non-Profits, Farms, Coops, Miscellaneous Rentals
- C Corporations: ALL income treated as business income and taxed. For others, "capital income" such as capital gains, interest and dividends "retain their character" and receive same treatment as if individuals reported it.

The Corporate Income Tax

- What is a Corporation?
  - A corporation is a form of business organization in which ownership is usually represented by **transferable stock certificates**
  - Stockholders have **limited liability**
  - Corporations are independent legal entities
  - Can make contracts, hold property, incur debt, sue, and be sued
  - Corporations can raise funds via selling shares

The Corporate Income Tax

- The U.S. tax system is called a "Classical System" of income taxation in that a separate tax is imposed on the earnings of a corporation.
- The tax system treats shareholders separately from the firm.
  - The two levels of tax are **not integrated**
  - Corporate profits are taxed twice: once when earned, again when distributed.

How are C Corporations Taxed?

- Potential for "double tax": tax is levied upon the firm, and again if profits are distributed to shareholders as dividends.
- For 2013, if corporation pays 35% tax, and shareholder pays 15% tax on dividends, then overall tax is 35% + (1-35%) * 15% = 45%.
- For 2013, for high income individuals, the computation is different: 35% + ((1-35%) * (20% + 3.8%)) = 50%.
  - This example assumes immediate taxation - Many dividends paid to pension funds and reinvested.
- Corporation does NOT need to distribute all earnings. May retain them for future use.
- Income is taxed immediately, but tax losses cannot be used by shareholders. They are "trapped" in the corporation. Firms must wait until future to use them.
- No special rate on capital gains. Treated as ordinary income. Capital losses can only offset capital gains.

How Are Other Businesses Taxed?

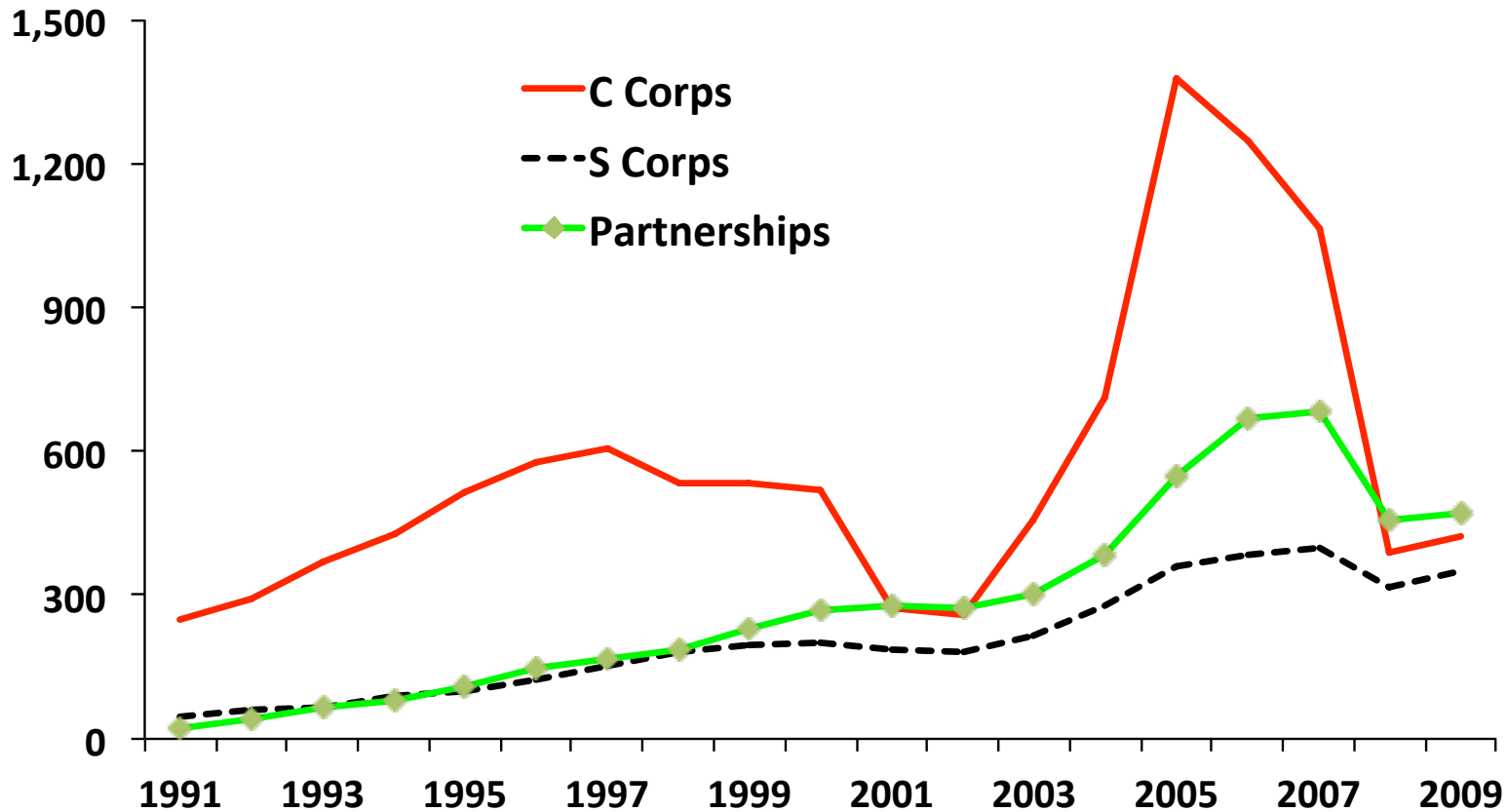
- "Pass-Through" Entities: S corporations, Partnerships, Sole Proprietorships.
  - Tax is not levied on the firm. All income is passed through to owners and taxed at individual rates.
  - Any **tax losses are passed through as well** and may be used to offset all other types of income: wages, interest, capital gains, income from profitable businesses. For this reason, start-up firms prefer to organize as a pass-through.
  - Any **capital gains, interest, rent and dividends reported by the business retains its character** when it is passed through to the individual so it gets preferential rates.
  - Firms cannot retain earnings. All profits must be distributed.

Types of U.S. Business Entities

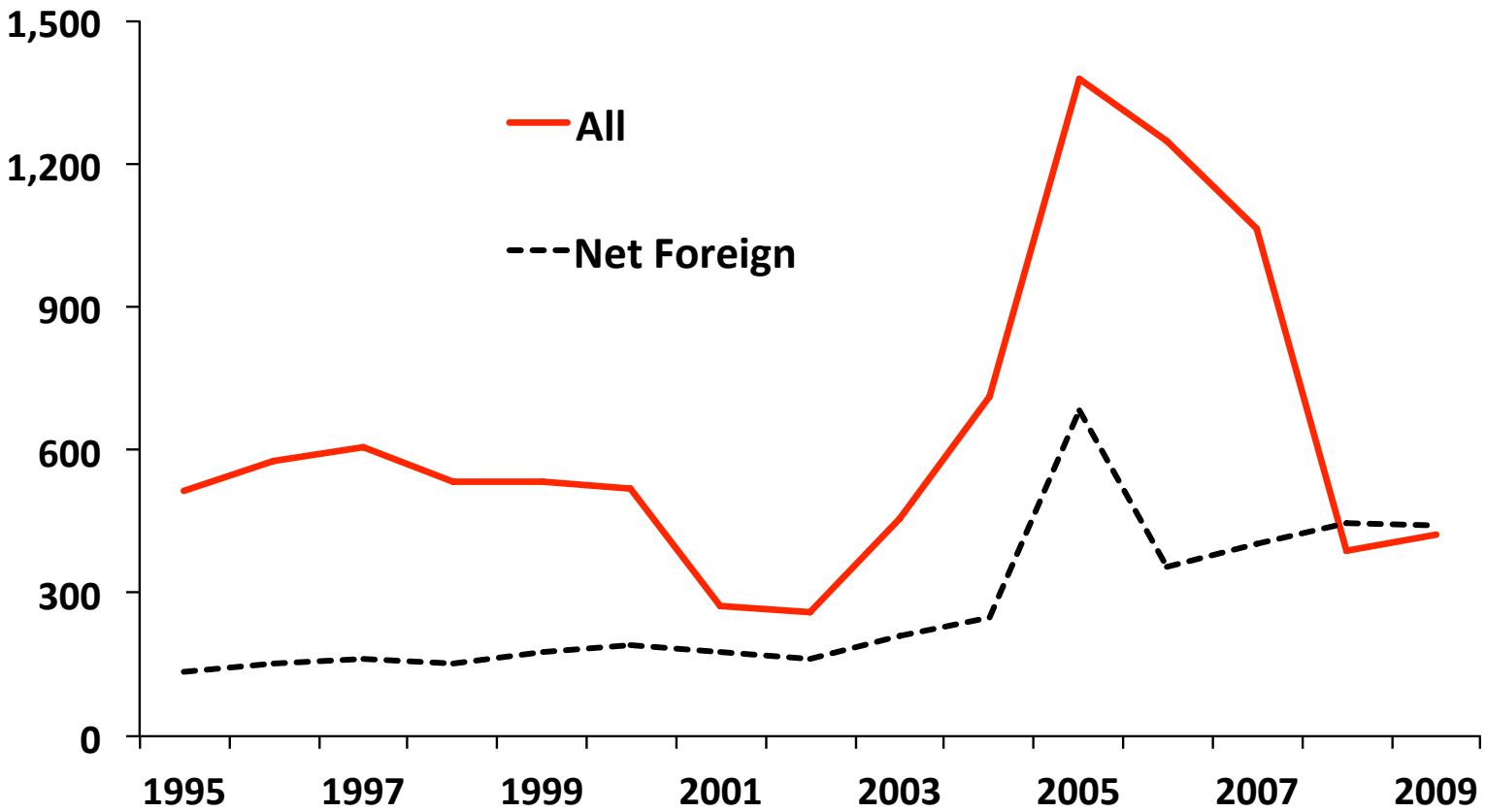
C Corporations	1986	share		2006	share		2008
Number (millions)	2.60	0.15		1.96	0.06		1.78
Total Income (billions)	8,115	0.85		21,034	0.66		18,704
Net Income (billions)	203	0.71		1,248	0.48		387
Positive	327	0.60		1,473	0.47		1,079
Negative	124	0.48		225	0.41		690
S Corporations							
Number (millions)	0.83	0.05		3.87	0.13		4.05
Total Income (billions)	484	0.05		5,815	0.18		6,126
Net Income (billions) /1	8	0.03		386	0.15		317
Partnerships							
Number (millions)	1.70	0.10		2.95	0.10		3.14
Total Income (billions)	397	0.04		3,913	0.12		4,701
Net Income (billions) /1	-17	-0.06		667	0.26		458
Non-Farm Sole Props							
Number (millions)	12.39	0.71		22.07	0.72		22.61
Total Income (billions)	559	0.06		1,278	0.04		1,317
Net Income (billions)	90	0.32		278	0.11		265

/1 Excludes capital gains.

Business Net Income by Entity Type billions of dollars (exclude capital gains of pass through entities)



Net Business Income of C Corporations (billions of dollars)



Corporate Income Tax: History

- First used in 1862-1864
  - Withholding tax, certain corporate dividends and interest
  - Double taxation explicitly avoided on philosophical basis
- Corporate tax starts in 1909 using single rate of 1%
  - technically an excise tax on profits (income taxation illegal) levied on the privilege of conducting business, levied on earnings
- Revenue Act of 1913 enacts formal corporate income tax:
  - Rate starts at 1%, increased to 6% (1917) and 12% (1918)
  - Further increased to 40% (1940) and 38% (1946)
  - Peaks at 52% during 1952-63
  - Reduced to 48% (1971-78), 46% (1979-1986)
  - TRA 1986 reduces to 34% (1987-1993), but much base broadening
  - Increased to 35% in 1993

Corporate Income Tax: History

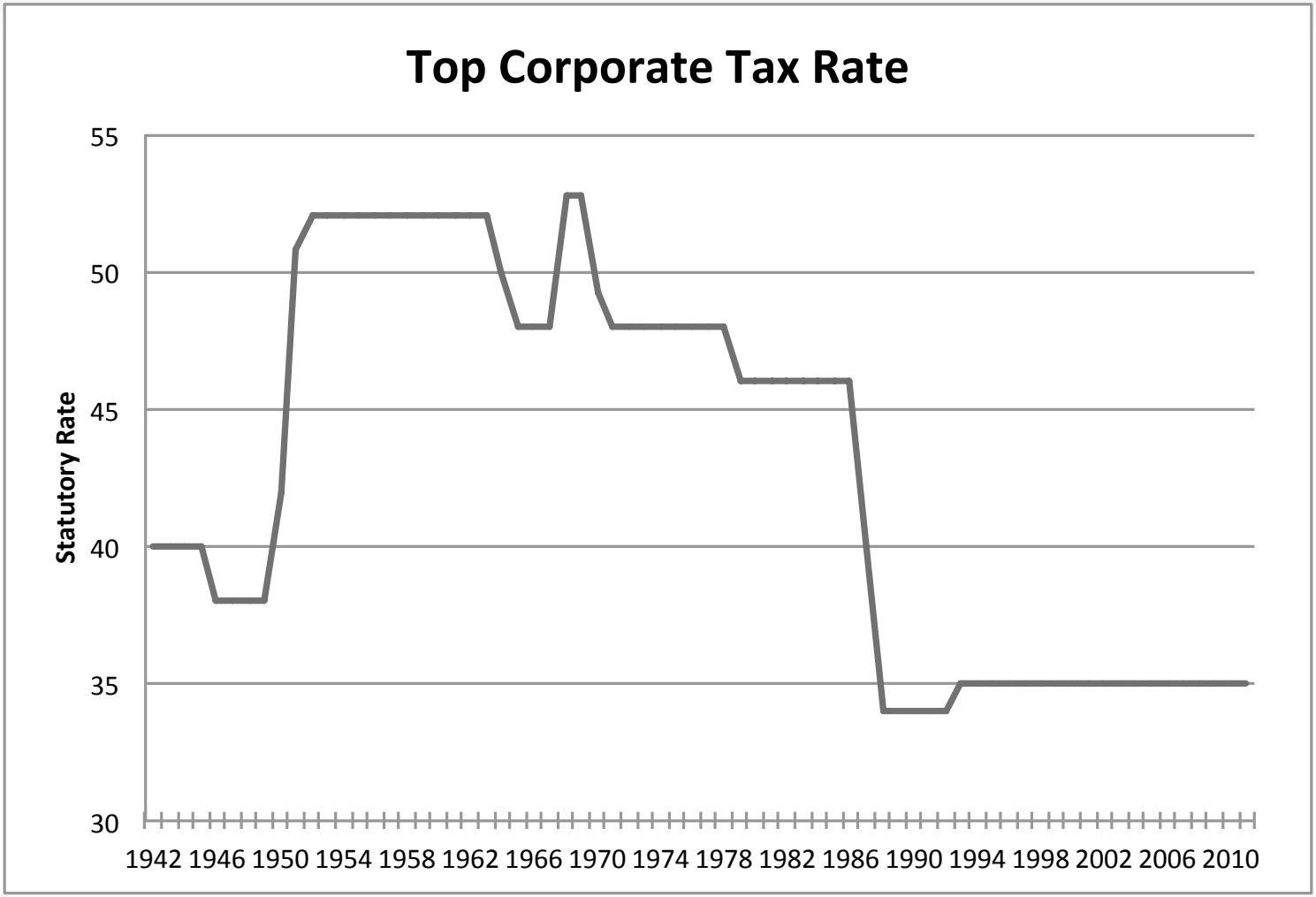


Figure : Historical Corporate Tax Rates

Corporate Income Tax Receipts

$ billions

FY Year	Receipts	Growth	GDP	Receipts / GDP
1991	99	5.6%	5,996	1.6%
1992	100	1.6%	6,338	1.6%
1993	118	17.1%	6,657	1.8%
1994	140	19.5%	7,072	2.0%
1995	157	11.8%	7,398	2.1%
1996	172	9.4%	7,817	2.2%
1997	182	6.1%	8,304	2.2%
1998	189	3.5%	8,747	2.2%
1999	185	-2.1%	9,268	2.0%
2000	207	12.2%	9,817	2.1%
2001	151	-27.1%	10,128	1.5%
2002	148	-2.1%	10,487	1.4%
2003	132	-10.9%	10,961	1.2%
2004	189	43.7%	11,686	1.6%
2005	278	46.9%	12,434	2.2%
2006	354	27.2%	13,178	2.7%
2007	370	4.6%	14,078	2.6%
2008	304	-17.8%	14,441	2.1%
2009	138	-54.7%	14,119	1.0%
2010	191	38.7%	14,624	1.3%
2011	181	-5.2%	15,000	1.2%

Corporate Tax Structure

- Tax system can safely be presented as a flat rate of 35%
  - Taxable income $>$ 0 but $\leq$ 50,000, rate is 15%
  - Taxable income $>$ 50,000 but $\leq$ 75,000, rate is 25%
  - Taxable income $>$ 75,000 but $\leq$ 100,000, rate is 34%
  - Taxable income $>$ 100,000 but $\leq$ 18,300,000, rate ranges from 34% - 39%
  - Taxable income $>$ 18,300,000, rate is 35%

NOTE: Statutory rate (35%) gives relatively little information about the **effective tax rate** or the true tax burden, because we need to know:

1. what is included/excluded in income
2. what deductions are allowed
3. how investment is treated (e.g., gains, interest, dividends)
4. allow for credits.

Corporate Tax Structure

Tax is **very concentrated**. For tax year 2007:

- Top 50 firms remit 30% of tax
- Top 100 firms remit 41%
- Top 500 firms remit 70%

- Most firms (two-thirds) remit no tax.
- Almost half (45%) report a loss.
- Very largest firms (approximately 1500-2000) under constant audit by IRS.

Corporate Tax Base (see tax form)

- Income Included
  - "Ordinary Income": Sales less Cost of Goods Sold
  - Capital Income: Rent, Royalties, Interest, Dividends, Capital Gains and Profits from Partnerships
- Deductions Allowed
  - Employee Compensation: Wages, Health and Pension Benefits
  - Depreciation
  - Interest paid on debt
  - Other Operating Expenses: Rents, Taxes, Advertising, Fuel, Office Supplies,
- "Special" Deductions
  - Net Operating Losses (past losses carried forward to offset income)
  - Dividends Received from Other Corporations (to prevent multiple layers of tax)
- Credits
  - Foreign Tax Credit, Research and Experimentation Credit, Low Income Housing Tax Credit, miscellaneous energy credits

Should We Tax Corporations?

- Since only "real people" pay tax (incur the burden of tax), why not just tax the incomes of corporate shareholders via the personal income tax?
- The income of corporations should show up as (1) dividends paid out or (2) a capital gain if earnings are retained.
- **Vast** majority of literature suggests that corporate income tax is a costly way to generate revenues:
  - High compliance costs (complexity, record-keeping)
  - Since it is a tax on capital (in theory), it discourages investment
  - Tax potentially influences **many** choices made by the firm, so lots of "excess burden" associated with the tax:
    - Corporate vs. non-corporate form
    - Debt vs. equity financing (possible over-leveraging)
    - Dividend payouts vs. retained earnings

Should We Tax Corporations?

Other negative features include:

- Certain industries favored over others (wide range of effective tax rates)
- Certain assets favored over others (equipment vs. structures)
- Certain projects (non-risky) favored over others
- Certain types of firms favored over others
  - New vs. old firms
  - Diversified vs. undiversified
- Capital is highly mobile. Suggests significant excess burdens from taxation.
  - Jorgensen and Yun (2002): 24% of revenues collected

Should We Tax Corporations?

However, there are justifications for the corporate income tax.

- Ability to Pay and **Progressivity**
  - Owners are disproportionately wealthy so tax adds to progressivity of system.
- If it is a pure tax on "economic rent" (profits above a "normal" return), there is no impact on behavior and no distortions. This is true in some cases.
- Corporation tax **protects the integrity of the personal income tax**. Cannot simply accumulate income within the corporation to defer tax payments indefinitely. Step-up basis at death avoids tax altogether.
- Allows additional **policy flexibility** due to tax levied at entity level. Lawmakers can attempt to influence behavior, attempt to stimulate the economy, and reward or punish certain industries.

While economists think this tax is poor, politicians and the public like it since they want business to pay its "fair share" and think it is highly progressive.

Corporate Taxation Topics

- Digression on Average vs. Marginal Effective Tax Rates
- Depreciation and Investment
  - Policy experiment: does investment stimulus work?
- Financing: Debt vs. Equity
- Treatment of Corporate Tax Losses
  - Policy experiment: does stimulus via refunding of tax losses work?
- Multinational Corporations
  - Policy experiment: did repatriation tax break create jobs?
- Dividend Payouts
  - Policy experiment: did corporations pay out more dividends after the 2003 tax cuts reduced tax on dividends to 15%?
- Corporate Tax Incidence

Average vs. Marginal Effective Tax Rates

- For individuals, the **average tax rate** (ATR) is the tax burden on income earned the past year.
  - Equal to tax / adjusted gross income.
  - Note that the denominator is defined by the tax code. No attempt is made to determine whether or not it is "appropriate" or proper.
  - If the tax system is progressive, ATR increases with income.
  - The ATR is associated with the income effect and burdens.
  - When we eliminate preference, we increase the ATR.
- For individuals, the **marginal tax rate** (MTR) is the tax on the last dollar of income. The **marginal effective tax rate** (METR) is the change in tax / change in income.
  - In many cases, they are not equal due to the phase out of credits, exemptions and deductions at higher income levels.
  - The METR is associated with the substitution effect and efficiency.

Average Tax Rates for Corporations

- We could do this for corporations, but it would not be meaningful.
  - ATR = tax paid / net income. For 2008, = 59%. For 2006, = 28%
  - How do we treat firms with losses that pay no tax?
  - How do we treat foreign income that is already taxed and receives a credit?
  - Nearly all large firms taxed at 35% rate.
  - Computation would show three cases: 0% (loss firms), 35% (no tax credits), and 30-35% (firms who use tax credits).
  - Would be misleading.
- We need a broad profits measure in the denominator.
  - Use **"economic" profits** or some close alternative. We think this reflects the "true" profits of the firm. That measure does not rely on special exclusions or deductions granted by the tax code.
  - The National Income and Product Accounts (NIPA) attempts to do this with their corporate "Profits" measure. For example, it includes an imputation for all unreported income. It eliminates inflationary gains.
  - We refer to this measure as the **"average effective tax rate."**

Marginal Tax Rates for Business

- For business, we use **marginal effective tax rates** (METR) to examine investment incentives, as well as efficiency and allocation issues.
  - Like the average effective rate, the METR corrects for measurement issues in the profits denominator. Specifically, how depreciation is measured (will discuss later).
  - We must draw a distinction between the tax burden on OLD investment versus NEW investment.
  - Change in tax / change in profits = marginal tax rate on old investment. For example: Firm lowers price to generate more sales and profits. Firm hires more employees.
  - That rate does not impact investment incentives. Little information regarding impact of tax code on the next or marginal investment.
  - We care about the METR on NEW investment. This is what we will refer to for rest of class.

Investment and Depreciation

What Do We Mean by Investment?

- Investment is the purchase of capital or durable assets used in the line of business such as machinery, equipment and buildings.
  - Note that tax law does not treat Advertising as investment.
  - Technically it is. It builds brand value and the outlays should be depreciated over time. Income is realized over many years.
  - Same with Research and Development.
  - Instead, they are "expensed" or deducted immediately. Certain R&D even qualifies for tax credits.

Investment and Economic Depreciation

Crucial: How should investment outlays be treated in determining taxable income? Is it like any other expense, such as wages? No.

- Buying a machine is simply an exchange of assets. **It does not change wealth, hence it does not affect income. The machine has not been "consumed".**
- Income = consumption + change in wealth (savings).
- Income = actual consumption + potential consumption.
- As it is used, it is subject to wear and tear, which decreases its value. The true decline in value, called **economic depreciation**, is an economic cost to the firm and should be deductible under an income tax as it is incurred.
- An income tax attempts to match deductions with the actual declining value of the asset due to wear and tear.
- The reduction in value is a reduction in wealth and reduces income.
- Deduction is granted only when decline is value is realized.

Investment and Tax Depreciation

Very difficult to measure "true" or "economic" depreciation, or even the useful life of an investment. Instead, tax law specifies a "tax life" for each type of investment and this is somewhat arbitrary:

- For each asset, tax law defines:
  1. the total number of years the taxpayer must depreciate an asset (tax life)
  2. the proportion of the cost that can be deducted or recouped each year (depreciation schedule).
- **KEY**: How much are those future deductions worth NOW (the net present value or NPV).
- Higher NPVs imply lower marginal effective tax rates for the firm, and encourages investment, all else equal

Investment and Tax Depreciation

- Why do we care about depreciation and how quickly firms can take deductions for investments?
  - Many think that depreciation allowances have a major impact on the marginal effective tax rate of corporations (METR).
- The METR is for NEW investment only; the next project which we assume is barely profitable or just breaks even.

Investment and Tax Depreciation

- Conventional (neoclassical) theory of investment:
  - Assumes the firm already invests in all profitable projects.
  - Assumes that firms line-up all potential projects and stops at the break even point where MB = MC.
    - Or the after-tax return = cost to borrow = cost to hold physical asset.
  - Assumes unlimited ability to borrow at market rates, and firms are fully taxable.
  - These are strong assumptions, but they greatly simplify the analysis.

The Current Tax Depreciation System

- The Modified Accelerated Cost Recovery System or MACRS.
  - Implemented by the Tax Reform Act of 1986. Largely unchanged.
  - Very loose attempt to mimic what we think really happens (i.e., economic depreciation).
  - Treasury used to have a Depreciation Analysis Division (DAD) which had authority to study the proper tax life and depreciation patterns of assets.
- A "tax life" is defined for each type of asset.
  - For machinery, six asset classes: 3, 5, 7, 10, 15 and 20 years.
  - Residential buildings: 27 years. Non-residential: 39.5 years.
- A depreciation pattern is applied.
  - The "double declining balance" method (3, 5, 7 or 10-year property) or the "150% declining balance" (15 and 20-year) method. Switch to "straight line" when more generous.
  - Most use the "half year" convention. Assumes asset place in service in middle of tax year.

Simple Example

Deductions Allowed by Year, $100 Investment

Assume actual rate of depreciation is 20% per year.

Assume tax life or recovery period is 5 years (really 5.5)

	1	2	3	4	5	6	7	8	9
Economic Depreciation									
Basis Remains	100.0	90.0	72.0	57.6	46.1	36.9	29.5	23.6	18.9
Factor	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Deduction	**10.0**	18.0	14.4	11.5	9.2	7.4	5.9	4.7	3.8
MACRS Depreciation									
Basis Remains	100.0	80.0	48.0	28.8	17.3	5.8			
Factor: 200% DB	0.40	0.40	0.40	0.40					
Deduction	**20.0**	**32.0**	**19.2**	**11.5**					
Factor: Straight Line	0.18	0.22	0.29	0.40	0.67	1.00			
Deduction	9.1	17.8	13.7	11.5	**11.5**	**5.8**			

switch to straight line method in year 5

straightline factor is equal to 1 / remaining useful life

The Modified Accelerated Cost Recovery System (MACRS)

	Deductions Allowed by Year, $100 Investment											
	1	2	3	4	5	6	7	8	9	10	11	12
3 yr property	33.3	44.5	14.8	7.4								
5 yr property	20.0	32.0	19.2	11.5	11.5	5.8						
7 yr property	14.3	24.5	17.5	12.5	8.9	8.9	8.9	4.5				
10 yr property	10.0	18.0	14.4	11.5	9.2	7.4	6.6	6.6	6.6	6.6	3.3	
15 yr property	5.0	9.5	8.6	7.7	6.9	6.2	5.9	5.9	5.9	5.9	5.9	5.9
20 yr property	3.8	7.2	6.7	6.2	5.7	5.3	4.9	4.5	4.5	4.5	4.5	4.5
Buildings (39.5)	1.3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Net Present Value of Deductions

	2%	5%	10%	discount factor, or opportunity costs
3 yr property	96.2	90.9	83.2	
5 yr property	94.6	87.5	77.3	
7 yr property	93.2	84.2	72.1	
10 yr property	91.0	79.7	65.4	
15 yr property	85.9	69.8	51.7	
20 yr property	82.3	63.5	44.2	
Buildings (39.5)	66.9	42.2	23.6	

"Economic" Depreciation: What We Really Think Happens

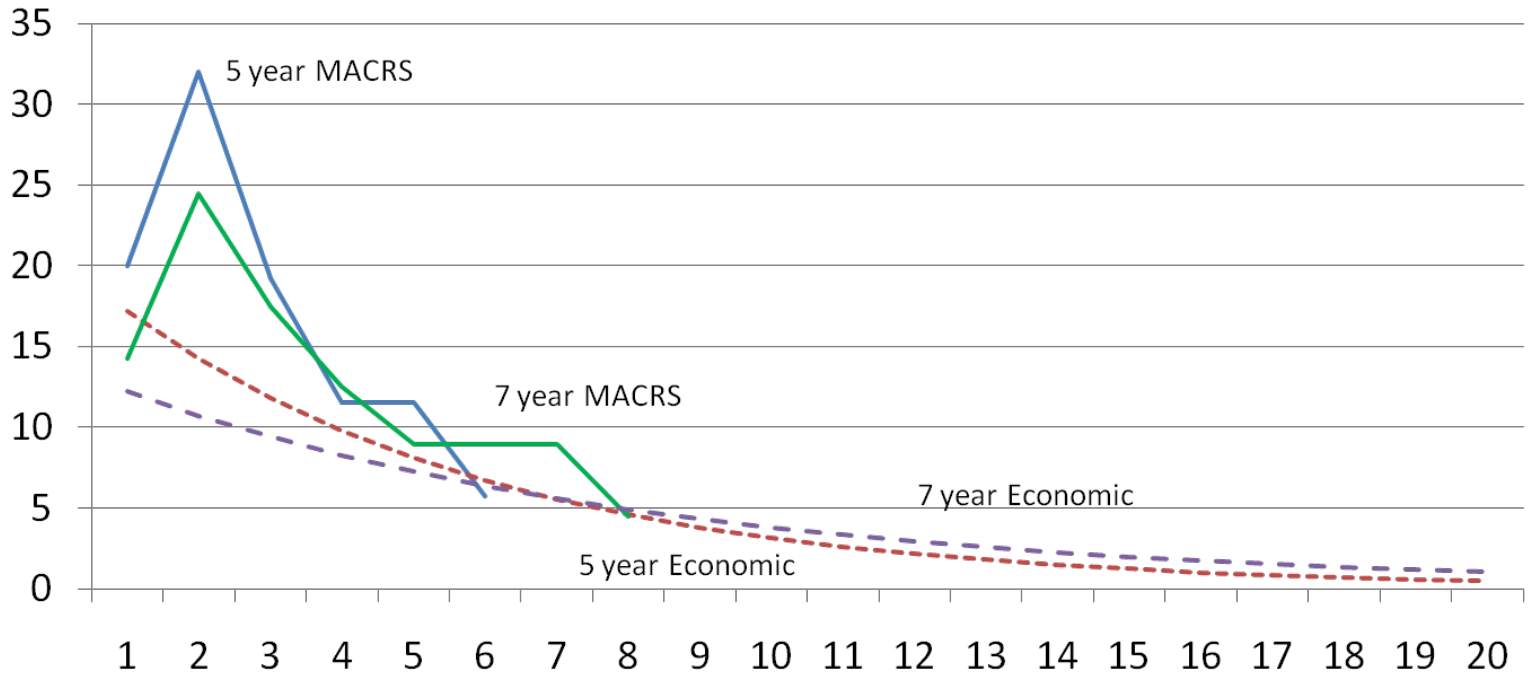
	Factor		1	2	3	4	5	6	7	8
3 yr property	33.3%	Remains	100.0	66.7	44.5	29.7	19.8	13.2	8.8	5.9
		Deduct	33.3	22.2	14.8	9.9	6.6	4.4	2.9	2.0
5 yr property	17.2%	Remains	100.0	82.8	68.6	56.8	47.0	38.9	32.2	26.7
		Deduct	17.2	14.2	11.8	9.8	8.1	6.7	5.5	4.6
7 yr property	12.2%	Remains	100.0	87.8	77.1	67.7	59.4	52.2	45.8	40.2
		Deduct	12.2	10.7	9.4	8.3	7.2	6.4	5.6	4.9
10 yr property	7.5%	Deduct	7.5	6.9	6.4	5.9	5.5	5.1	4.7	4.3
15 yr property	3.3%	Deduct	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6
20 yr property	3.0%	Deduct	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.4
Buildings	2.9%	Deduct	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.4

Under economic depreciation, deductions exactly match how you actually recoup the original cost of the machine via income you receive. They offset.

The residual income you receive in any year is the return on the investment, and that is taxed at the statutory rate (35%).

Tax vs. Economic Depreciation

Annual Deduction Allowances, $100 Purchase



Summary: Economic vs. Tax Depreciation

- Tax depreciation is accelerated because it outpaces true or economic depreciation.
- **NOTE** what this implies. Deductions are granted and claimed before income from investment is realized, reported and taxed. Deductions effectively offsetting other income.
- The income the machine or investment generates over time can be thought of in two parts: recouping the initial outlay (economic depreciation) + the return on the value that remains.

Why Does Rate of Depreciation Matter?

- The incentive to invest depends on Marginal Effective Tax Rate (METR).
- Simple METR = (before tax return - after tax return) / before tax return
- (8% - 6%) / 8% = 25% effective tax rate
- It is the **net reduction in the return caused by the tax system**.

The Conventional View or Neoclassical Model

- Based on Hall and Jorgensen, "Tax Policy and Investment Behavior" (1967, AER)
- Attempt to explain investment behavior and the impact of interest rates, tax rates, depreciation, investment tax credits.
- Everything is in terms of true or economic income.
    - Again, we need to use a consistent, broad base that does not grant special treatment like the tax code to make meaningful statements.
- If METR $= 25\%$, then effect of tax system (at 35% rate) has same effect as taxing economic income at 25%.

The Conventional View or Neoclassical Model

Three General Cases:

1. If tax depreciation $>$ economic depreciation, then METR $<$ statutory rate (35%) (e.g., nearly all machinery).
2. If tax depreciation $<$ economic depreciation, then METR $>$ statutory rate (e.g., buildings).
3. If they are the same, then METR $=$ statutory rate.

The Neoclassical Model: User Cost of Capital

- User Cost of Capital: Costs firm incurs from holding wealth in the form of physical assets and using the assets for production.
  - Simply purchasing the physical capital does not entail an opportunity cost since you are merely holding your wealth in a different form.
- BUT, over time, the firm incurs three types of costs from physical assets:
  - Forgoes real interest if funds had been invested
  - The physical asset losses value or depreciates (wear and tear)
  - Risk of obsolescence (but disregard for our purposes)
- Simple User Cost $= r + d$
  - $r =$ required **real** after-tax return $=$ opportunity cost of funds
  - $d =$ economic depreciation rate
  - NOTE that inflation has no impact on either r or d
  - Inflationary gains not taxed under economic income
  - In any event, it "washes out" and impact is illusory

The Neoclassical Model: User Cost of Capital

- Example: Purchase machine for \$1000, it loses \$250 in value every year for four years; alternatively you could receive a 5% after-tax rate of return if invested.
- Year 1: user cost is \$250 + \$50 = \$300
- Year 2: user cost is \$250 + \$38 = \$288
- Year 3: user cost is \$250 + \$25 = \$275
- Year 4: user cost is \$250 + \$13 = \$263
- Year 5: user cost is \$0
- In our computations, $r + d$ will take a constant value: interest rates assumed constant and same with economic rate of depreciation
- If the proposed investment cannot generate $r + d$, you are better off with the alternative or counterfactual
- Now, add taxes.

The Neoclassical Model: User Cost of Capital

- When we allow taxes, we must gross-up the required return to allow for their payment. They are simply another cost to hold the asset.
- Let corporate tax $= u =$ 35% and individual tax on dividends $= t =$ 15%
- Must gross-up required return by (1 - .35) * (1 - .15) = .553
- So User Cost of Capital $= C = (r + d)/.553$
- **BUT**, depreciation deductions reduce tax cost by $u * z$
- $z =$ net present value of all future depreciation deductions for a $1 investment
  - NOTE: inflation DOES impact that computation since tax depreciation deductions are FIXED once you make the purchase, they cannot respond to inflation so their real value is eroded.
  - NOTE: to compute the NPV and z, we use also use r. In equilibrium, $r =$ real required return $=$ real discount rate used by firm.
- $C = (r + d) * (1 - uz)/[(1 - u) * (1 - t)]$

Marginal Effective Tax Rate

- Simple METR = (Pre-tax return - Post-tax return) / Pre-tax return
  - e.g., (8% - 6%) / 8% = 25%
- = (Cost of Capital - Real Required Rate of Return) / Cost of Capital
  - The "cost of capital" is the pre-tax rate of return on a barely profitable investment (i.e., the marginal investment) that covers the investment's tax cost while still leaving the investor with his required after-tax rate of return. (Hall and Jorgensen, 1967)
- Keep investing if the return on the marginal project $>$ cost of capital.
- In other words, if MB $>$ MC.

The Cost of Capital and Marginal Effective Tax Rate

- Cost of Capital $= p = [(r + d)(1 - uz)/(1 - u)] - d$
  - $r =$ real discount rate or real required after-tax return
  - $d =$ economic depreciation rate
  - $z =$ present value of depreciation allowances
  - $u =$ statutory corporate tax rate
- We subtract the "d" so we can focus on the return and not recouping the original outlay. So it is comparable to an interest rate.
- METR $= (p - r)/p$
- *Note: Assumes no debt financing, have ignored individual taxes.*
- Special Cases
  1. If tax depreciation = economic depreciation, then $z = d/(r + d)$ so that $p = r/(1 - u)$
     Cost of capital is simply the "grossed-up" aftertax return that investors require such as 6% / (1 - 35%) or 9.2% and the METR = statutory tax rate
  2. If expensing is allowed , then $z = 1$, d=0, and $p = r$ so that METR = 0

Some Computations

Office of Tax Analysis, Working Paper 98	
Assumes 40% is debt financed.	
Includes individual level taxes.	
Required real return = 3.5%	
Inflation = 3%	
See Table 2	
	METR
3 yr property	0.287
5 yr property	0.268
7 yr property	0.275
10 yr property	0.267
15 yr property	0.263
20 yr property	0.295

Corporate Marginal Effective Tax Rate Example

Assumptions									
Real return required by investors				5.0%					
Economic depreciation				12.3%		*7-year property*			
Inflation				0.0%		*Ignore individual level taxes*			
Tax Rate				35.0%					
	Residual	required	econ	cash	pre-tax	tax	taxable		after-tax
Year	Value	return	depr	sale	cash flow	depr	income	tax	cash flow
0	100.0				**-100.0**	14.3	**-14.3**	-5.0	-95.0
1	87.8	5.0	12.3		17.3	24.5	-7.2	-2.5	19.8
2	77.0	4.4	10.7		15.1	17.5	-2.4	-0.8	16.0
3	67.6	3.9	9.4		13.3	12.5	0.8	0.3	13.0
4	59.3	3.4	8.3		11.7	8.9	2.7	1.0	10.7
5	52.0	3.0	7.3		10.2	8.9	1.3	0.5	9.8
6	45.7	2.6	6.4		9.0	8.9	0.0	0.0	9.0
7	40.1	2.3	5.6		7.9	4.5	3.4	1.2	6.7
8	35.2	2.0	4.9		6.9		6.9	2.4	4.5
9	30.8	1.8	4.3		6.1		6.1	2.1	3.9
10	27.1	1.5	3.8	27.1	32.4		**32.4**	11.3	21.1
Internal Rate of Return					**5.00%**				**3.99%**
METR					**20.2%**				
NOTE	Economic depreciation rate has NO effect on pre-tax Internal Rate of Return								

METR Example: Tax Depr = Economic Depr

Assumptions									
Real return required by investors				5.0%					
Economic depreciation				12.3%		*7 year property*			
Inflation				0.0%		*Ignore individual level taxes*			
Tax Rate				35.0%					
		required	econ	cash	pre-tax	tax	taxable		after-tax
Year	Basis	return	depr	sale	cash flow	depr	income	tax	cash flow
0	100.0				-100.0		0.0	0.0	-100.0
1	87.8	5.0	12.3		17.3	12.3	5.0	1.8	15.5
2	77.0	4.4	10.7		15.1	10.7	4.4	1.5	13.6
3	67.6	3.9	9.4		13.3	9.4	3.9	1.3	11.9
4	59.3	3.4	8.3		11.7	8.3	3.4	1.2	10.5
5	52.0	3.0	7.3		10.2	7.3	3.0	1.0	9.2
6	45.7	2.6	6.4		9.0	6.4	2.6	0.9	8.1
7	40.1	2.3	5.6		7.9	5.6	2.3	0.8	7.1
8	35.2	2.0	4.9		6.9	4.9	2.0	0.7	6.2
9	30.8	1.8	4.3		6.1	4.3	1.8	0.6	5.4
10	27.1	1.5	3.8	27.1	32.4	3.8	**1.5**	0.5	31.9
Internal Rate of Return					**5.00%**				**3.25%**
METR					**35.0%**				

Expensing: The Tax Value of Immediate Deduction Equals NPV of Future Taxes									
Economic Rate of Depr	12.2%	(for example, general industrial equipment)							
Return on Investment	5.0%								
Inflation	0.0%								
Tax Rate	35.0%								
	0	1	2	3	4	5	6	7	8
Remaining Value Investment	100.0	87.8	77.1	67.7	59.4	52.2	45.8	40.2	35.3
Depreciation (deduction)	100.0								
Tax Value of Deduction	35.0								
Income 1: recoup capital		12.2	10.7	9.4	8.3	7.2	6.4	5.6	40.2
Income 2: return on asset		5.0	4.4	3.9	3.4	3.0	2.6	2.3	2.0
Total Income		17.2	15.1	13.3	11.6	10.2	9.0	7.9	42.2
Tax		6.0	5.3	4.6	4.1	3.6	3.1	2.8	14.8
Present Value		5.7	4.8	4.0	3.4	2.8	2.3	2.0	10.0
Sum	35.0								
METR = 0, Upfront deduction exactly offsets present value of all future taxes.									

Marginal Effective Tax Rates on Investment							
Rate of Return on Investment			0.05				
Statutory Tax Rate			0.35				
		Economic Rate of Depreciation					
		0.10	0.15	0.20	0.25	0.30	0.35
Present	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Value	0.90	0.14	0.18	0.21	0.24	0.27	0.30
of Tax	0.80	0.24	0.30	0.35	0.39	0.43	0.46
Deduction	0.70	0.33	0.39	0.45	0.49	0.53	0.56
	0.60	0.39	0.46	0.52	0.56	0.60	0.63
	0.50	0.45	0.52	0.57	0.62	0.65	0.68
	0.40	0.49	0.56	0.62	0.66	0.69	0.72
	0.30	0.53	0.60	0.65	0.69	0.73	0.75
	0.20	0.56	0.63	0.68	0.72	0.75	0.78

Adding Some Wrinkles

- If there is inflation, this increases the METR. The "real" value of depreciation deductions is eroded each year.
- If the firm cannot immediately use the depreciation deductions to offset taxable income, this increases the METR. The tax savings are not realized immediately, but are delayed.
- If the firm borrows to finance the investment, this reduces the METR since they get a deduction for the interest paid on loan.
- **Important result**: If we allow expensing and the firm borrows to invest, then the METR could be negative. The investment would be effectively subsidized.

A Policy Experiment: "Bonus Depreciation"

- Policymakers recently attempted to stimulate the economy by providing more generous depreciation allowances to firms, both corporate and non-corporate.
- Allows firms to claim deductions quicker. **It is a timing issue. It essentially delays taxes, pushes them into the future. Does not change overall amount of tax due.**
- This should lower the METR on investment, encourage more investment, increase GDP and employment. The virtuous cycle.
    - Job Creation and Worker Assistance Act of 2002: 30% bonus depreciation for 2002-04
    - Job Growth, Tax Reform and Reconciliation Act of 2003: increase to 50% in May 2003
    - EESA 2008: 50% bonus depreciation for 2008
    - ARRA 2009: 50% bonus depreciation for 2009
    - Small Business Act 2010: 50% bonus depreciation for 2010
    - TRUIRJCA 2010: 100% bonus (expensing) for 2011, 50% for 2012

50% "Bonus" Depreciation

	Deductions Allowed by Year, $100 Investment											
	1	2	3	4	5	6	7	8	9	10	11	12
3 yr property	66.7	22.2	7.4	3.7								
5 yr property	60.0	16.0	9.6	5.8	5.8	2.9						
7 yr property	57.1	12.2	8.7	6.2	4.5	4.5	4.5	2.2				
10 yr property	55.0	9.0	7.2	5.8	4.6	3.7	3.3	3.3	3.3	3.3	1.6	
15 yr property	52.5	4.8	4.3	3.9	3.5	3.1	3.0	3.0	3.0	3.0	3.0	3.0
20 yr property	51.9	3.6	3.3	3.1	2.9	2.6	2.4	2.3	2.2	2.2	2.2	2.2
Buildings (39.5)	na	na	na	na	na	na	na	na	na	na	na	na
Difference with MACRS or "Regular" Depreciation												
3 yr property	33.4	-22.3	-7.4	-3.7								
5 yr property	40.0	-16.0	-9.6	-5.7	-5.7	-2.9						
7 yr property	42.8	-12.3	-8.8	-6.3	-4.4	-4.4	-4.4	-2.3				
10 yr property	45.0	-9.0	-7.2	-5.7	-4.6	-3.7	-3.3	-3.3	-3.3	-3.3	-1.7	
15 yr property	47.5	-4.7	-4.3	-3.8	-3.4	-3.1	-2.9	-2.9	-2.9	-2.9	-2.9	-2.9
20 yr property	48.1	-3.6	-3.4	-3.1	-2.8	-2.7	-2.5	-2.2	-2.3	-2.3	-2.3	-2.3

Impact of Accelerated Depreciation and Bonus Depreciation (OTA #98)

	Present Value of Deduction (6.5%)				Marginal Effective Tax Rate			
Tax Life	Economic	MACRS	Bonus	Expense	Econ Depr	MACRS	Bonus	Expense
3 year	90.5	93.2	95.0	100.0	35.0%	28.7%	22.8%	0.0%
5 year	83.1	89.0	92.9	100.0	35.0%	26.8%	19.1%	0.0%
7 year	77.7	85.0	90.9	100.0	35.0%	27.5%	18.7%	0.0%
10 year	68.2	79.5	88.2	100.0	35.0%	26.7%	17.3%	0.0%
15 year	48.5	67.4	82.1	100.0	35.0%	26.3%	16.4%	0.0%
20 year	46.2	60.0	78.4	100.0	35.0%	29.5%	18.4%	0.0%
39.5 year	45.3	36.3	na	100.0	35.0%	40.7%	na	0.0%

NOTE

Even if investment is not stimulated, bonus depreciation reduces NPV of taxes and improves cash flow.

Bonus depreciation reduces taxes in first year, but increases taxes in later years.

Impact of Bonus Depreciation on NPV Cash Flow (lower taxes now, but higher later), $1 million investment

3 year	6,400
5 year	13,700
7 year	20,700
10 year	30,400
15 year	51,500
20 year	64,500

Did Bonus Increase Investment? Ways to Model Corporate Investment

- Do features like accelerated depreciation and investment tax credits stimulate investment demand?
- It depends on what model you believe captures reality:
  - Accelerator model
  - Neoclassical model (cost of capital)
  - Cash flow model
- Accelerator model (Clark, 1917)
  - Main determinant of investment is changes in the level of total output demanded
  - Depreciation allowances and investment tax credits basically irrelevant

Modeling Corporate Investment

Neoclassical model (Hall and Jorgensen, 1967)

- Key variable is user cost of capital the cost the firm incurs as a consequence of owning an asset.
- Includes direct costs like depreciation and taxes.
- Most elegant model: able to derive equation from firm profit maximization (not a "reduced form" model)
- Many neoclassical studies find that investment is responsive to depreciation and investment tax credits.
- Chirinko (2002) finds an elasticity of investment with respect to user cost of capital of -0.4.
- Completely ignores the potential existence of "internal" funds.

Modeling Corporate Investment (2)

Cash Flow Model

- Cash flow is the difference between revenues and expenditures for inputs, a type of profits measure.
- The more money on hand, the greater the capacity for investment. Retained earnings have a strong impact on investment.

Summary: Investment process is very complicated and "lumpy." All three factors likely affect investment levels to some degree.

Policy Experiment: Bonus Depreciation for 2002-04 and 2008-12

- In reality, there are two effects from "bonus" depreciation: (1) we are temporarily reducing the tax cost on all projects (all projects now look more attractive, invest in new projects) and (2) encourage firms to make investments sooner before the tax break expires (pull them forward in time).
  - Similar to "Cash for Clunkers"
- This effect sounds small, but non-residential business investment in 2008 was \$1.7 trillion. A mere 5% increase implies \$85 billion of new investment outlays.
- That should translate into higher GDP. Increased investment also makes labor more productive.
- We want to induce firms to spend money, not simply retain it as cash.
- Perverse: Some articles suggest firms investing in machinery in lieu of hiring: the jobless recovery? Subbing K for L?

JOINT COMMITTEE ON TAXATION
February 8, 2008
JCX-17-08

ESTIMATED BUDGET EFFECTS OF THE
"ECONOMIC STIMULUS ACT OF 2008,"
AS PASSED BY THE HOUSE OF REPRESENTATIVES AND THE SENATE ON FEBRUARY 7, 2008

Fiscal Years 2008 - 2018

[Billions of Dollars]

Provision	Effective	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2008-13	2008-18
I. Recovery Rebates and Incentives for Business Investment														
1. 2008 Recovery Rebate for Individuals - $600 single filer ($1,200 for joint filers); plus $300 per qualifying child for the child tax credit; credit reduced by 5% of so much of the taxpayer's adjusted gross income as exceeds $75,000 ($150,000 for joint filers) [1]; and treatment of the U.S. Possessions [2]	tyba 12/31/07	-106.7	-10.0	---	---	---	---	---	---	---	---	---	-116.7	-116.7
2. Disregard rebate income for purposes of means tested Federal programs [3]	DOE	*No Budgetary Effect*												
3. Appropriations to carry out recovery rebates	DOE	-0.2	-0.1	---	---	---	---	---	---	---	---	---	-0.3	-0.3
4. Social Security Administration Funding [3]	DOE	[4]	[4]	---	---	---	---	---	---	---	---	---	[4]	[4]
5. Increase Section 179 Expensing and Phaseout Amounts for 2008 ($250,000 and $800,000)	tyba 12/31/07	-0.9	-0.6	0.5	0.3	0.2	0.2	0.1	0.1	---	---	---	-0.3	-0.1
6. 50% Bonus Depreciation for Property Placed in Service in 2008 [5]	[6]	-43.9	-5.6	11.2	8.5	7.4	5.8	3.6	2.3	1.3	1.0	1.0	-16.7	-7.4
Total of Recovery Rebates and Incentives for Business Investment		**-151.7**	**-16.3**	**11.7**	**8.8**	**7.6**	**6.0**	**3.7**	**2.4**	**1.3**	**1.0**	**1.0**	**-134.0**	**-124.5**
II. Housing GSE and FHA Loan Limits - Temporary Conforming Loan Limit Increase for Fannie Mae and Freddie Mac [3]	**DOE**	**[4]**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**[4]**	**[4]**
NET TOTAL		**-151.7**	**-16.3**	**11.7**	**8.8**	**7.6**	**6.0**	**3.7**	**2.4**	**1.3**	**1.0**	**1.0**	**-134.0**	**-124.5**

Joint Committee on Taxation

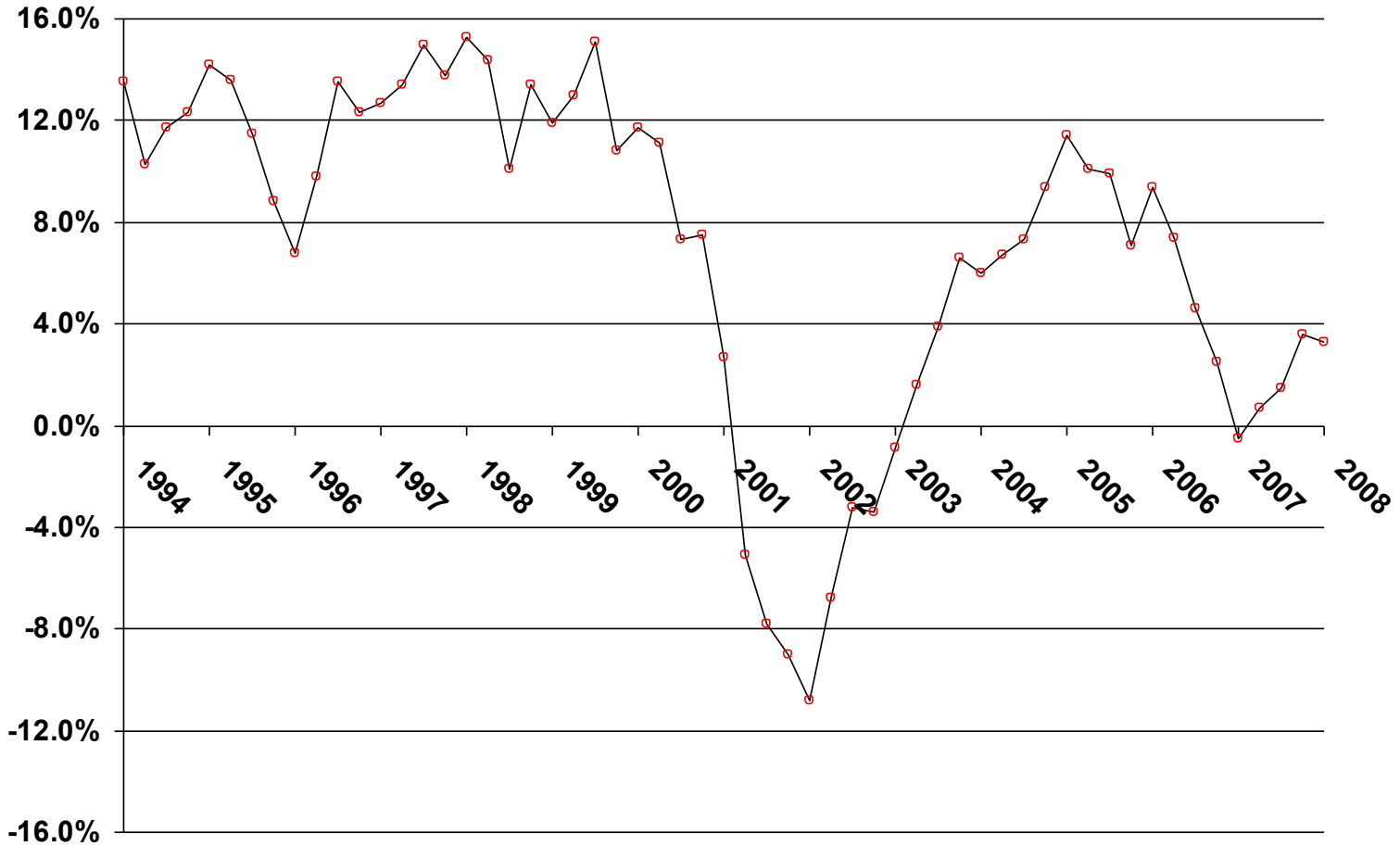
NOTE: Details may not add to totals due to rounding. The date of enactment is assumed to be March 1, 2008.

Legend for "Effective" column: tyba = taxable years beginning after
DOE = date of enactment

tyba = taxable years beginning after

[Footnotes for JCX-17-08 appear on the following page]

Did Bonus Depreciaiton Work? NIPA Real Equipment Investment: Annual Change



Tax Data: Equipment Investment Patterns

Aggregate Trends Suggest Possible Impact in 2002 and 2004

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
NIPA (1)	7.0%	8.0%	8.1%	8.1%	7.4%	-7.1%	**-7.3%**	0.5%	**7.2%**	9.4%
Tax Sample (2)	0.4%	15.8%	14.2%	9.2%	12.6%	1.4%	**-7.8%**	-10.2%	**-2.8%**	4.2%
"Bonus" Firms	-1.4%	17.4%	13.0%	13.1%	15.9%	1.4%	**-0.8%**	-12.1%	**-1.6%**	5.9%
Non-Bonus	2.6%	13.9%	15.6%	4.6%	8.5%	1.3%	**-17.4%**	-7.0%	**-4.6%**	1.2%

(1) National Income and Product Accounts. All Businesses. Excludes software purchases.

(2) Tax data adjusted to conform with calendar year convention used by NIPAs.

Bonus Depreciation Studies

- House and Shapiro (2007)
  - Strong effect for investment with long tax recovery periods
  - Effects especially strong when bonus first enacted in 2002
- Cohen and Cummins (2006)
  - Focus on expected drop off in investment for 2005 Q1; very limited impact, if any
- Knittel (2007, OTA Working Paper 98)
  - Examination of "take-up rates": share of eligible investment claiming bonus
  - C corp take-up rates are: 54% (2002), 58% (2003), 61% (2004)
  - Many firms forgo bonus depreciation altogether; some are profitable
- Dauchy and Martinez (2008)
  - Very small but statistically significant effect
- Desai and Goolsbee (2004)
  - Small effect, 1%-2% increase to investment

Bonus Depreciation Studies

Summary: bonus likely had a very modest impact on overall investment. Perhaps 2-4 percent increase.
Policymakers like the provision because:

- It may stimulate investment. Appear to "take action."
- It provides an immediate tax reduction. Even if it does not stimulate investment, it improves cash flow.
- It is largely a timing issue, so the "cost" to the Treasury is very modest over the ten-year budget window. Perhaps 90% of the cost will be recouped over 10 years.
- Easy to implement.

Big Problem: Most states choose to "decouple" from federal system and disallow extra deductions

White House Proposal: 100% Expensing

- On October 29, 2010, White House calls for 100% expensing of all business investment for rest of 2010 and all of 2011.
- Estimates that taxes immediately reduced by $150 billion for 2 million firms.
- Net cost of proposal less than $30 billion over then years.
- Projects that investment would increase by $50 billion.
- Expensing: METR reduced to zero.
- Results for corporations:
  - METR with Regular Tax Depreciation = 31.0%
  - METR with 50% Bonus Depreciation = 19.1%
  - METR with 100% Bonus Depreciation = 2.5%

Why is Expensing Important?

- Immediate expensing **eliminates** the tax on business investment.
- **Expensing goes a long way to transforming the corporate income tax into a consumption tax (but we would also need to exclude things such as capital gains).**
- In reality, it does NOT eliminate the tax on ALL investment, ONLY marginal investment that has a "normal" return.
- Investment that receives an above-normal or supernormal return will STILL be taxed (referred to as economic rents)
- Expensing only eliminates tax on the "normal" return or the return to waiting.
- In theory, the tax would not effect the firm's decision to invest in a project with a very high return, only marginal projects.
- If no impact on decision, then no inefficiency. Pure profits tax.

Some Objections to Conventional View

- Although still heavily relied upon, the conventional view (i.e., neoclassical) has come under increasing attack as unrealistic.
- Many critics claim it fails to accurately account for many other relevant factors that affect investment decisions.
- Specifically, if the choice is between more accelerated depreciation and lower rates, critics claim that conventional analysis is biased against rate cuts.

Rate cuts vs. Accelerated depreciation

- All corporate tax reform packages ultimately come down to these factors.
- If revenue neutrality matters, depreciation MUST be altered if you want to lower tax rates.
- All other "corporate preferences" are much smaller.

Rate Cuts or Accelerated Depreciation?

- Question: if we want to reduce the "double tax" on corporate earnings and spur investment, should we allow more accelerated tax depreciation such as "bonus depreciation" or simply lower the tax rate?
- Treasury: reducing tax rate gives you less "bang for the buck"
  - "Old capital" will benefit, has no impact on investment decisions
  - Helps investment that firm would undertake regardless (has very high return, not marginal).
- If you have limited funds to "spend," then you get more induced investment per dollar of tax cut with more accelerated depreciation than tax cuts.
- Benefit is reserved for marginal investments.

Some Objections to Conventional Analysis

- Lowering the rate reduces the bias in favor of debt (deduction worth less). Accelerating depreciation does nothing.
- Lowering the rate reduces the bias against corporations. More accelerated depreciation must be offered to all firms, corporate and non-corporate.
- Lower rate reduces the value of tax shelters.
- Lower rates encourages firms to unlock foreign earnings and bring back to US.
- Lower rates help investments that are "intangibles" and are currently expensed such as R&D and computer databases.

Increasing Capital Mobility Matters

- In an international context, a country's statutory tax rate affects location decision (entire firm) while METR affects expansion decision.
- When locating a firm, you care about the tax rate on ALL investment, not just marginal investment. Very lumpy.
- Europe: nearly all countries have lowered their statutory rates and paid for them by offering less generous depreciation allowances (recoup outlays more slowly).
- Lower rates also help combat income shifting between countries:
  - Transfer pricing: high tax country overpays to low tax affiliate
  - Related party debt: high tax county borrows for low tax affiliate
  - Location of intangibles in low tax countries