

Simulations of the Economic Effects of Consumption and Income Tax Reforms

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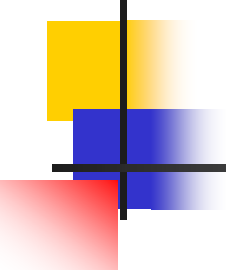
Overview

- Introduction
- OLG-CGE Models
- Analyses of Consumption Tax Reforms
- Analyses of Business Income Tax Reforms
- Issues with OLG-CGE Models
- Conclusions



Introduction

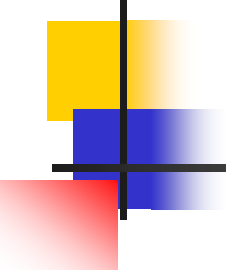
- Tax reform is perennial item on policy agendas
- In the U.S.
 - VAT to reduce deficits or finance health care reform
 - 2005 Tax Reform Panel: income, consumption-based (PCT=X-Tax), and “hybrid” reform proposals
 - Corporate rate cuts (international competitiveness)
- Mirrlees Review in the U.K.
- Proposals for common consolidated corporate tax base in E.U., ACE tax, CBIT

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- One critical question is estimating the economic effects of various reform proposals
 - A common approach: Use a dynamic computational general equilibrium (CGE) model with overlapping generations (OLG) to estimate effects of reforms on
 - Growth in GDP, saving, investment, labor supply
 - Intragenerational and intergenerational welfare
 - Will focus on analyses of reform in U.S. (but similar studies in many other countries available as well)



OLG-CGE Models

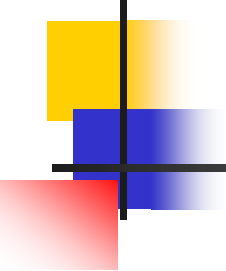
- Basic structure of “typical” CGE model
 - Far-sighted consumers planning consumption, saving, labor supply over lifecycle
 - Change saving when rates of return change
 - Change labor supply when wages change
 - Overlapping generations structure
 - Allows examination of intergenerational redistributions
 - Important for consumption tax reforms□

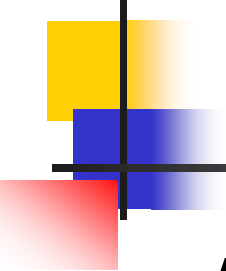
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- Far-sighted business owners choose investment to maximize profits, subject to adjustment costs
 - Track investment over time
 - Allows analysis of transition effects
 - Usually competitive markets (but some models consider imperfect competition in some sectors)
 - Many closed economy models (e.g., for U.S. or E.U. as a whole), but more recent allow capital flows



CGE Analyses: Consumption Tax Reforms

- One factor in generating interest in C-Tax reform
- Summers (1981) – Replacing I-Tax with C-Tax
 - Model yields huge long run gain of 11.2% of lifetime income, if personal expenditure tax
 - Yields long run gain of 7.0% of lifetime income, if wage tax (equivalent over life cycle, but does not tax “old” capital)
 - But implied large response of individual savings to increases in rates of return (elasticities of 1-3), and labor supply assumed fixed (no tax effects)

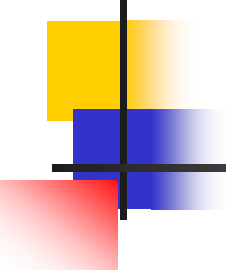
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- Many subsequent analyses, most important is:
 - Auerbach-Kotlikoff (AK) model and extensions
 - More realistic with more moderate responses
 - More realistic wage profiles over life cycle
 - Allows labor supply to vary
 - More realistic parameters
 - Tracks economy each period, including transition
 - Most recent version includes 12 income groups in each of 55 generations

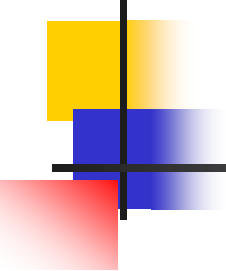
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- AK et al. model effects of various C-Tax reforms
 - Flat Tax: long run increase in GDP of 4.5%
 - Flat Tax + transition relief: long run GDP up 1.9%
 - X-Tax (top rate=30%) w/o transition relief
 - Long run GDP up by 6.4%, due to bigger hit on existing capital
 - Each income group gains in long run
 - Transition losses to elderly = 1-2% of remaining welfare – and do not consider transition relief

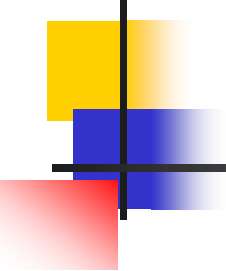


■ The Diamond-Zodrow Model

- One of many progeny of the AK Model
- Adds housing (owner-occupied and rental) sectors
 - Housing loses relative benefits under C-Tax reforms
 - Other investments benefit much more
 - No deductions for mortgage interest, property taxes
 - Transitional losses for housing might be large (but limited by interest rate declines, capital reallocation)
- Model explicitly effects on housing values

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- Also model explicitly effects on business values during transition and in long run, considering
 - Adjustment costs and
 - Remaining depreciation on existing assets
 - Losses might also be large, for example, due to loss of depreciation deductions
 - Model time path of investment in all three sectors
 - Model existing holdings of tax-preferred assets
 - Adding multiple income groups in each generation

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- Analysis of Consumption Tax Reform – Flat Tax with no Transition Rules (Finanzarchiv, 2007)
 - General patterns
 - Initially, investment in owner housing declines by 8%, while investment in other two sectors increases by 10-20%
 - In long run, investment in owner housing increases slightly, while investment in the other two sectors increases by roughly 15%
 - Net result is significant capital reallocation

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- Wages initially decline by $<1\%$, as labor supply increases by 2-3% with capital stock fixed
 - In the long run, labor supply increases by 2-3%, as wages increase with increased capital accumulation
 - GDP increases by $<5.5\%$ in long run



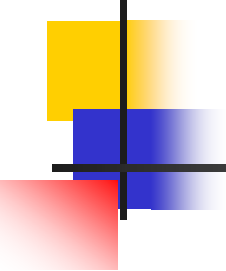
- Effects on asset values

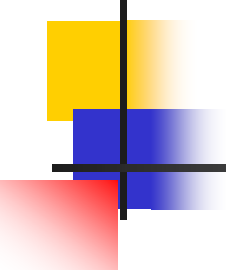
- With no adjustment costs, business asset prices fall by 15%
- With adjustment costs, no decline
- Prices of owner housing decline by 2-5%
- But prices of rental housing decline by 20-30%, due to loss of depreciation deductions on very long-lived asset



- Analysis of Consumption Tax Hybrids

- Business-level consumption tax (expensing) + individual taxation of capital income
- A popular option
 - Provides generous treatment of investment, including foreign investment
 - Maintains some taxation of capital income – desirable, for example, for equity reasons
 - Various theoretical arguments for some taxation of capital income (type of dual income tax)

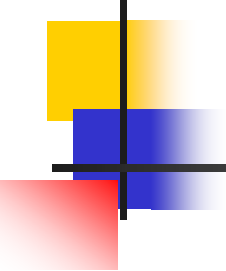
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- Consistent with recent proposals
 - US Treasury (2005) proposal for “Growth and Investment Tax” (GIT)
 - Business cash flow tax with 30% rate
 - Progressive labor income tax with max rate=30%
 - Individual capital income tax at rate of 15%
 - Phase out depreciation deductions over 5 years
 - Mirrlees Review discussion of ACE (allowance for corporate equity) business tax + individual level capital income tax

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- Analysis of Flat Tax + Add-On Capital Income Tax
 - Business and individual labor income tax rate of 20% with 10% individual level capital income tax
 - Reduces increases in capital accumulation, GDP in long run, with taxation of saving, investment
 - But only by roughly 15-25%, as still eliminate largest inefficiencies
 - Analysis of US Treasury GIT (30%/15% rates)
 - Reduces investment and GDP gains, relative to pure consumption tax, by 20-30%



CGE Analyses: Business I-Tax Reforms

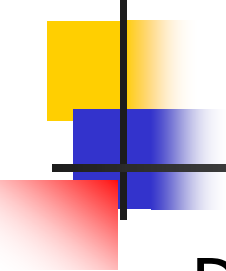
- Traditional rate-reducing, base-broadening reforms
 - Improves efficiency of capital allocation
 - May lower cost of capital and increase investment, including foreign investment (small open economy argument), but depends on base broadening
 - Reduces incentives for income shifting
 - Attracts investment that earn firm-specific rents
 - BUT, lowers taxation of existing capital and location-specific rents, and encourages labor income shifting

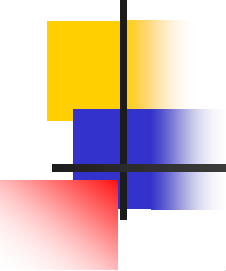
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- DZ Analysis of US Corporate Rate Cut
 - Extend model to include
 - Base broadening by eliminating tax preferences
 - Potential for income shifting
 - Imperfectly competitive component of corporate sector earning firm-specific economic rents
 - Includes international capital flows

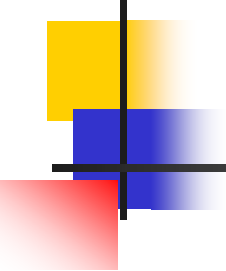


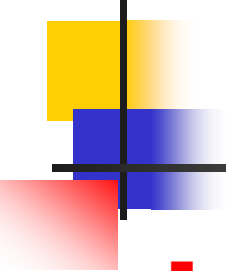
- Simulation results

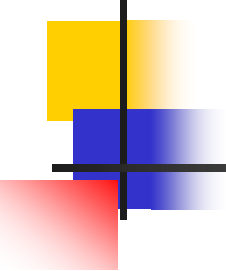
- Generally get declines in investment of about 3-4% and declines in GDP of about 0.5-1.0%
- Very small effects on cost of capital as rate reduction offset by base broadening
 - Little new investment, including foreign investment
- Attracts some FDI to imperfectly competitive sector
- BUT, lose revenues from old capital, including capital in imperfectly competitive sector

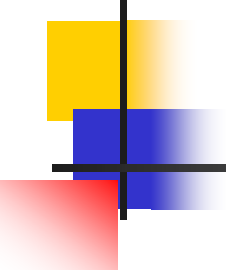
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- De Mooij-Devereux analyze two EU harmonized reforms that eliminated debt-equity distortions
 - ACE: **consumption-based business tax** that allows an extra deduction for cost of equity, with **higher business tax rate** (variations in Croatia, Belgium, Italy, Austria, Brazil) – favors ordinary investments
 - CBIT: **income tax** that denies business interest deductions, **with lower business tax rate** (many countries (60% EU) limit interest deductions) – favors investments that earn economic rents

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- CGE model with 27 EU countries + US + Japan
 - Basic model (w/transfer pricing) + extensions to income shifting to tax havens and mobile rents
 - Study many unilateral and system-wide harmonized reforms – will consider only latter, with revenue changes made up with business tax rate changes
 - In basic model, coordinated ACE reforms increase welfare (about 0.2-0.8%) in all EU countries
 - Lower cost of capital
 - No EU transfer pricing problems with coordination

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- But welfare gains largely or fully offset if add tax havens, due to higher ACE rate
 - (And unilateral ACE much less desirable if add firm-specific rents with discrete location choices, due to taxation of mobile rents, and even worse with tax havens as well)

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- Harmonized CBIT reforms with additional revenues financing corporate rate reductions
 - Raises costs for debt-financed investment and loses revenue on existing capital, including capital earning location-specific rents
 - But less taxation of investments with firm-specific rents and smaller incentives for income shifting

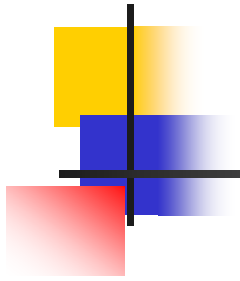
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- In basic model, most countries lose
 - Cost of capital increases
 - Little EU transfer pricing benefits since all tax rates decline
 - But tends to raise welfare of most countries with tax havens (due to lower rate)
 - (And unilateral CBIT is more attractive with mobile economic rents and tax havens)
 - Also consider combined ACE/CBIT

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- Devereux et al. on EU corporate tax harmonization plus consolidation with formula apportionment (CCCTB)
 - Similar model for EU-27
 - CGE analysis suggests small gains
 - From reducing rate differentials, loss consolidation
 - But existing distortions replaced with new distortions due to apportionment formula (e.g., relocating factors in formula to low-tax countries)

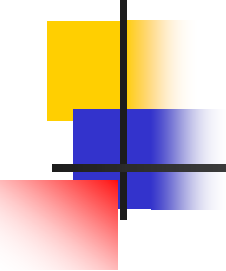


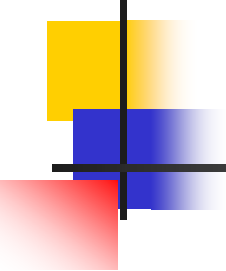
Issues in OLG-CGE Models

- Size of behavioral responses
 - Saving and labor supply responses large, especially in short run
 - Moderate with parameter choices
 - Ongoing debate (Prescott/Jacobs; Gruber)
 - Use of Prescott's labor supply parameters double growth effects in AK model
 - Jacobs supports Prescott's magnitudes, when add human capital and retirement decisions



- Summers theoretical model implies large savings elasticities
- Gruber's empirical work finds large potential for substitution across periods
- Labor supply also responds to interest rates, which is controversial
- More generally, labor supply flexibility (hours worked, participation) may be limited, especially in short run

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- Alternative Models of Saving Behavior
 - Life-cycle model requires complex rationality
 - Are individuals far-sighted or myopic?
 - Does saving follow simple “rules of thumb”
 - not affected by rates of return
 - And are firm managers far-sighted as well?

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- Alternative saving motive: **Precautionary saving**
 - Target saving or “buffer stock” saving
 - Implies far less sensitivity to rates of return, and may change sign of effect
 - Alternative saving model: **Behavioral economics** models, with saving determined by psychological factors, and institutional features (e.g., design of savings incentives) important



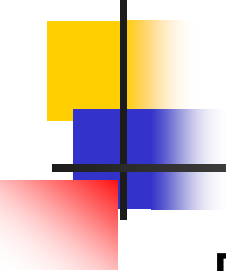
- Which Model of Bequest Behavior?

- Altruism toward heirs – infinite-lived individuals
- “Joy of Giving” – bequest is just another consumption good (or “target” bequest)
- Accidental bequests – fear of outliving assets
- Strategic bequests – alter behavior of heirs
- Difficult to choose among options – some evidence favors “joy of giving” which is most commonly used

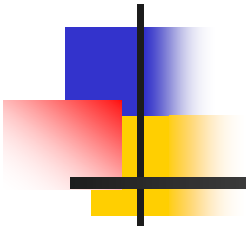


Conclusion

- OLG-CGE Modeling has limitations, but very useful tool for evaluating tax reforms
 - Case for consumption tax is subtle – efficiency gains reduced with transition rules and greater progressivity, and must be coupled with gains in equity and administration/compliance simplicity
 - Transition problems with C-Tax are smaller than sometimes assumed, but still significant, especially for rental housing – need some transition rules, but must limit to get efficiency gains

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- Base-broadening, rate-reducing income tax reforms attract investments earning firm-specific rents and reduce incentives for income shifting, but may reduce welfare due to lower taxation of existing capital, including capital with location-specific rents
 - Harmonized corporate income tax reforms in EU may improve welfare due to reduced distortions and reduced income shifting and tax competition within EU, but gains limited by income shifting and tax competition outside EU, and by tax distortions of new systems

Thank You





Last Revised:

March 4, 2010