Property Taxes

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Lecture Overview

Topics covered

- Definition and administrative steps
- Property value determination and assessment
- Tax rate setting
- Various measures related to equity and policy
- Evaluation regarding equity, efficiency, etc.

Property Taxation

Introduction

Definition

- Tax on the market value of privately owned property
- Theoretically a wealth tax (e.g., real estate, personal property)

Inclusion of all property: Administratively and politically unfeasible

- Including agricultural land, commercial and industrial property, and residential homes
- Exemptions for public property, cemeteries, churches, colleges, nonprofit hospitals, etc. as long as used for intended purpose

Most important tax used by U.S. local governments (Source: U.S. Census 2021 State & Local Government Finance Historical Datasets and Tables)

- 72.5% of local tax revenue
- Economic basis for local autonomy

Key Administrative Steps

Registration

- Identification of properties to be taxed as ownership

Assessment

- Quantification of property value (tax base) and tax rate
- Key difficulty with respect to property taxes
- Key difference to other taxes: Setting of tax base and tax rate by the government
- Trade-off between setting tax base and rate

Collection

- Mailing of bills and processioning of tax receipts

Property Value Determination

Overview

Goal of property value assessment

- Accurate and up-to-date estimate of market value for each property
- Accuracy of assessment affects fairness of property tax

Assessment cost versus accuracy

- Higher accuracy requires more frequent, regular, and ideally annual assessment

Various values for properties

- Market value
- Appraised value
- Assessed value

Types of Property Values

Market value

- Assumption of full information and functioning markets

Appraised value

- Determination by professional appraiser during sale process of property
- Relevance for mortgage lending purposes

Assessed value

- Relevance for property tax purposes
- Likely very different from market or appraised value, e.g., setting of assessed value as a fraction (below 1) of market value by policy
- Assessment conducted at local level and seldom at state level

Market and appraised values easily defensible since based on actual transactions available for comparison

Property Value Assessment Methods

Three methods to assess property values

1. Comparable sales approach
2. Cost approach
3. Income approach

Comparable Sales and Cost Approach

Comparable sales approach

- Residential properties
- Using large amounts of market transaction data

Cost approach for industrial and utility properties

- Reproduction cost: Cost of constructing an replica at current prices
- Replacements cost: Cost of constructing a similar unit using current technology

Income Approach

Example: 10 unit apartment complex that rents for $1,500 per month

- Expense rate: 54% (as percent of gross income)
- Vacancy rate: 6%
- Discount rate: 5% (important factor determining value)

Calculations

- Gross income: $\$1,500 \cdot 10 \cdot 12 \cdot (1 - 0.06) = \$169,200$
- Expenses: $\$169,200 \cdot 0.54 = \$91,368$
- Net income per year: $\$169,200 - \$91,368 = \$71,832$
- Present value: $\$71,832/0.05 = \$1,436,640$

Assumption: Reception of revenue in perpetuity

Assessment Ratio Rule

Assessment ratio: Assessed value as percentage of market value

- Set by state finance laws to differentiate classes of property, i.e., residential, agricultural, commercial, and industrial
- Lower rates for residential as opposed to commercial and industrial property

Assessed value equals assessment ratio (AR) times market value (MV), i.e.,

$$AV = AR \cdot MV$$

Rationales for property classifications

- Perception of fairness
- Slow urban sprawl by taxing farm property at lower rates

Assessment Cycle I

Cyclical assessment

- All properties assessed in assessment year
- Value remains fixed until next schedule assessment but may change if significant changes made to property

Segmental assessment

- Fraction of all properties reassessed each year
- Example: Assessment of one-third of all properties every three years

Assessment Cycle II

Annual assessment

- Possible with improvements in technology
- Assigns value to each characteristic of property
- Adjusts for these values and market trends for the jurisdiction

Assessment on sale

- Reassessment takes place when property is sold
- Leads to significant (horizontal and vertical) inequities due to properties remaining off the market for multiple years

Property Tax Rates

Setting of Tax Rate

Set as part of annual budget process

$$r = \frac{E - NPR}{AV}$$

where

- r is the rate
- E is budget expenditure
- NPR is non-property tax revenue
- AV is the assessed value

Setting property tax rates as part of budgeting process

- Helps officials balance budget and avoid borrowing
- Fluctuations in rates might contribute to political unpopularity of the tax

Terminology

Mill rate: Quotation of property tax rate in mills

- \$1 for every \$1000 of assessed value

Relationship between mill rate (m) and tax rate (r):

$$r = \frac{m}{1000}$$

Example

- Mill rate: $m = 7$
- Tax rate: $r = 0.007 = 0.7\%$

Tax Revenue

Notation

- TR: Tax revenue
- AV: Assessed values

Tax revenue based on tax rate (r)

$$TR = AV \cdot r$$

Tax revenue based on tax rate (m)

$$TR = \frac{AV}{1000} \cdot m$$

Tax Rate

Illustration

- Taxable real property: \$220 million with an assessment ratio of 0.5
- Exemptions reduce assessed value by 3 million
- Total budget: 3.5 million
- Non-property tax revenue: 0.75 million

What is the statutory tax rate?

- Gross assessed value: \$220 million $\times$ 50% = \$110 million
- Net assessed value: \$110 million – \$3 million = \$107 million
- Statutory tax rate: r=(3.5–0.75)/107=0.0257 or $m = 25.7$

Public Services and Rate Setting

Setup

School Districts

Parcel A $100	Parcel B $50	Parcel C $200
Parcel D $150	Parcel E $200	Parcel F $100

Waste Water Treatment Districts

Parcel A $100	Parcel B $50	Parcel C $200
Parcel D $150	Parcel E $200	Parcel F $100

Fire Districts

Parcel A $100	Parcel B $50	Parcel C $200
Parcel D $150	Parcel E $200	Parcel F $100

Library Districts

Parcel A $100	Parcel B $50	Parcel C $200
Parcel D $150	Parcel E $200	Parcel F $100

Expenditures

ID	Public Service	Parcels	Expenditure	Tax Base	Millage
1	School District 1	A+B+C	20	350	0.0571
2	School District 2	D+E+F	10	450	0.0222
3	Waste Water District 1	A+D	5	250	0.0200
4	Waste Water District 2	B+E	5	250	0.0200
5	Waste Water District 3	C+F	5	300	0.0167
6	Fire District 1	A+B+D+E	40	500	0.0800
7	Fire District 2	C+F	20	300	0.0667
8	Library 1	B+D+E+F	60	500	0.1200
9	Library 2	A	10	100	0.1000
10	Library 3	C	10	200	0.0500

Rate by Parcel

Parcel	Value	School	Waste	Fire	Library	Millage	Tax Bill
A	100	1	1	1	2	0.2571	25.71
B	50	1	2	1	1	0.2771	13.86
C	200	1	3	2	3	0.1905	38.10
D	150	2	1	1	1	0.2422	36.33
E	200	2	2	1	1	0.2422	48.44
F	100	2	3	2	1	0.2256	22.56

Technical Aspects of Property Taxes

Equity Related Measures and Policies

Measures of dispersion of assessed values and progressiveness

- Coefficient of dispersion (COD)
- Price related differential (PRD)

Property tax relief for equity purposes

- Homestead exemption
- Circuit breaker

Coefficicent of Dispersion (COD): Overview

Overview

- Measure of assessed value dispersion and horizontal equity
- Average deviation around the median assessment ratio as a percentage of the median
- Indication of assessed values being clustered around median (i.e., little variation in the assessed values)

Interpretation of magnitude

- Small size as a positive measure
- Acceptable COD range: 10%-15% for residential and 15%-20% for commercial

Coefficicent of Dispersion (COD): Example

Property	A	B	C
Market value	\$40,000	\$60,000	\$100,000
Assessed value	\$25,000	\$30,000	\$40,000
Assessment ratio	0.625	0.5	0.4
Difference from median	0.125	0	0.1

Calculations

- Median assessment ratio: 0.5 (median of 0.4, 0.5, and 0.625)
- Average difference from median: $(0.125 + 0 + 0.01)/3 = 0.075$
- COD: $0.075/0.5 = 0.15$
- Average of assessment ratios are 15% from the median

Price Related Differential (PRD): Overview

Measurement of progressiveness

- $PRD = 1$: Proportional tax
- $PRD > 1$: Regressive tax (i.e., under-assessment of high value parcels relative to low value parcels)
- $PRD < 1$: Progressive tax (i.e., over-assessment of high value parcels relative to low value parcels)

Equation

$$PRD = \frac{1/N \cdot \sum_i A_i/M_i}{\sum_i A_i / \sum_i M_i}$$

where

- A_i: Assessed value of property i
- M_i: Market value of property i

Price Related Differential (PRD): Example

Example with five properties

	Assessment	
Market Value	Progressive	Regressive
\$50,000	\$35,000 (0.70)	\$47,500 (0.95)
\$75,000	\$60,000 (0.80)	\$67,500 (0.90)
\$100,000	\$85,000 (0.85)	\$85,000 (0.85)
\$150,000	\$135,000 (0.90)	\$120,000 (0.80)
\$250,000	\$237,500 (0.95)	\$175,000 (0.70)
PRD	0.95	1.061

Homestead Exemption: Overview

Homestead exemption: Absolute reduction in taxable property values (e.g., $30,000).

- Subtraction of exemption from assessed value to calculate tax
- Lower home value $\Rightarrow$ Higher percent reduction in taxes
- Application to owner-occupied housing only (not renters)

Advantages

- Provision of tax relief and improved vertical equity for lower to middle income homeowners

Disadvantages

- Not helpful to renters who are often lower income households
- Not helpful to cities with large portion of renters

Homestead Exemption: Example

	Property A	Property B
Market value	$100,000	$500,000
Assessment ratio	70%	70%
Assessed value	$70,000	$350,000
Exemption	$30,000	$30,000
Taxed value	$40,000	$320,000
Tax rate	4%	4%
Tax without exemption	$2,800	$14,000
Tax with exemption	$1,600	$12,800
Real rate without exemption	2.80%	2.80%
Real rate with exemption	1.60%	2.60%

Circuit Breaker: Overview

Characteristics

- Provides rebate/credit on state income tax for high property taxes.
- Neither lowers property tax bill nor directly affects local tax revenue.
- Can be applied to both, homeowners and renters, and is usually means-tested.

Circuit breaker structure

$$R = p \cdot (PT - k \cdot I)$$

where

- R: Tax credit
- p: Percentage specified by law and usually declining with income after a threshold
- PT: Property tax paid (estimate for renters)
- $k \cdot I$: Excessive tax burden specified as percent (k) of income (I)

Circuit Breaker: Examples

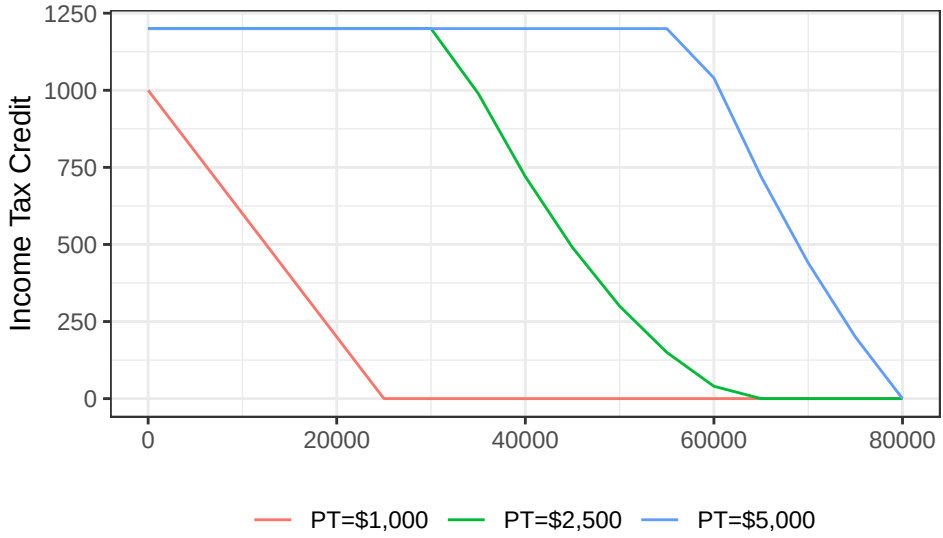
Simple example: Tax credit of 50% on excess burden if property taxes larger than 5% of income

- Income: \$30,000
- Property tax: \$2,000
- Income tax credit: $R = 50\% \cdot (\$2,000 - 5\% \cdot \$30,000) = \$250$

More complex example

- Tax credit limit: \$1,200
- Credit reduction (i.e., reduction in p): 10 percentage points for every \$5,000 over \$30,000 of income
- $k = 4$

Circuit Breaker: More Complex EXample



Circuit Breaker: Advantages and Disadvantages

Advantages

- Property tax relief can be targeted to lower and middle income homeowners and renters
- Benefit can decline with income

Disadvantage

- Households can only benefit if they file income tax returns

Evaluation Criteria

Equity

Effective tax rates (i.e., tax burden relative to ability to pay)

- Two possible measures: Taxes divided by (1) income and (2) market value

Horizontal equity (i.e., same taxes given same ability-to-pay)

- Horizontal inequities given inaccurate assessment value
- Horizontal inequities even with accurate assessments if measurement based on income

Vertical equity

- Residential properties: Tax burden on homeowner
- Rental and business properties: Tax burden on landlord, tenants, owners, employees, or customers depending on market conditions

Equity Illustration

	Family		
	A	B	C
Household size	8	2	2
Income	80,000	30,000	80,000
Adjustment factor	1.32	0.80	0.80
Adjusted income	60,606	37,500	100,000
Assessed value	250,000	100,000	250,000
Tax rate	2%	2%	2%
Taxes liability	5,000	2,000	5,000
ETR (Adjusted income)	8.25%	5.33%	5.00%

Source: Adjustment factors

Efficiency

Key questions

- Distortion of economic decisions due to the tax
- Magnitude of distortions

Distortion of economic decisions

- Consumption decisions between housing and other goods
- Investment decisions
- Business production decisions
- Location decisions of individuals and firms

Adequacy

Variations in revenue raising capacity across jurisdictions

- Differences in wealth
- Increase in revenue raising capacity due to large industry
- Undermining of revenue raising capacity via exemptions

Elasticity (i.e., increase in tax revenue through income growth without changes in tax base and/or rate)

- Matter of the relationship between income growth, market value of homes, and assessment method

Feasibility and Stability

Feasibility

- Assessment as the most difficult part with trade-off between horizontal equity and administrative costs
- Politically feasible but very visible tax due to its payment as a lump sum (e.g., annual, semi-annual)
- Hesitation to increase commercial rates by elected officials for concern of driving out businesses

Stability

- Broad tax base with little fluctuation over time
- Fluctuations as assessment dependent