Real Estate

- National Stock of buildings, the land built on, and vacant land
  - Value - second largest component of wealth

- Measured both as a flow and a stock
  - Flow - value of new construction
  - Stock - value of existing buildings and value of all land

- Gross domestic product (GDP)
  - Monetary value of all finished goods and services produced within a country for a specific time period
  - How does real estate fit in?

Annual – 1930 – 2020 – Real in 2012 dollars
Recessions of 1937 and 1949
1949 – end of WWII transition period
Percentage Change Annual – 1930 – 2020

Notice – 2008 recession is largest since Great Depression in terms of duration and depth

GDP = C + I + G + (X − M)

Table 12-1
U.S. GROSS DOMESTIC PRODUCT, FISCAL YEAR 2008

<table>
<thead>
<tr>
<th>Amount (Billion Dollars)</th>
<th>Percent of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption</td>
<td></td>
</tr>
<tr>
<td>Durable goods</td>
<td>1,092</td>
</tr>
<tr>
<td>Nondurable goods</td>
<td>2,864</td>
</tr>
<tr>
<td>Services</td>
<td>5,818</td>
</tr>
<tr>
<td>Total consumption</td>
<td>9,774</td>
</tr>
<tr>
<td>Gross private domestic investment</td>
<td>463</td>
</tr>
<tr>
<td>Residential construction</td>
<td>627</td>
</tr>
<tr>
<td>Total fixed investment</td>
<td>2,126</td>
</tr>
<tr>
<td>Change in inventories</td>
<td>25</td>
</tr>
<tr>
<td>Total investment</td>
<td>2,162</td>
</tr>
<tr>
<td>Government purchase of goods and services</td>
<td>990</td>
</tr>
<tr>
<td>Federal government</td>
<td>990</td>
</tr>
<tr>
<td>State and local government</td>
<td>1,734</td>
</tr>
<tr>
<td>Total purchases</td>
<td>2,717</td>
</tr>
<tr>
<td>Net exports of goods and services</td>
<td>1,604</td>
</tr>
<tr>
<td>Exports</td>
<td>1,604</td>
</tr>
<tr>
<td>Imports</td>
<td>2,380</td>
</tr>
<tr>
<td>Total net exports</td>
<td>-784</td>
</tr>
<tr>
<td>GROSS DOMESTIC PRODUCT</td>
<td>13,971</td>
</tr>
</tbody>
</table>

Source: BEA Economic Report of the President

Annual 1929 – 2020
GDP = C + I + G + (X - M)

**Table 12-1**

U.S. GROSS DOMESTIC PRODUCT, FISCAL YEAR 2008

<table>
<thead>
<tr>
<th>Amount</th>
<th>Percent of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billion Dollars</td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
</tr>
<tr>
<td>Durable goods</td>
<td>1,982</td>
</tr>
<tr>
<td>Non-durable goods</td>
<td>2,834</td>
</tr>
<tr>
<td>Services</td>
<td>5,818</td>
</tr>
<tr>
<td>Total consumption</td>
<td>9,634</td>
</tr>
<tr>
<td>Gross private domestic investment</td>
<td>403</td>
</tr>
<tr>
<td>Nonresidential structures</td>
<td>1,017</td>
</tr>
<tr>
<td>Residential construction</td>
<td>427</td>
</tr>
<tr>
<td>Total fixed investment</td>
<td>2,138</td>
</tr>
<tr>
<td>Change in inventories</td>
<td>25</td>
</tr>
<tr>
<td>Total investment</td>
<td>2,162</td>
</tr>
<tr>
<td>Government purchases of goods and services</td>
<td>5,120</td>
</tr>
<tr>
<td>Federal government</td>
<td>990</td>
</tr>
<tr>
<td>State and local government</td>
<td>1,734</td>
</tr>
<tr>
<td>Total purchases</td>
<td>3,717</td>
</tr>
<tr>
<td>Net exports of goods and services</td>
<td>2,980</td>
</tr>
<tr>
<td>Exports</td>
<td>1,694</td>
</tr>
<tr>
<td>Imports</td>
<td>2,286</td>
</tr>
<tr>
<td>Total net exports</td>
<td>694</td>
</tr>
<tr>
<td>GROSS DOMESTIC PRODUCT</td>
<td>15,317</td>
</tr>
</tbody>
</table>

Source: US Economic Report of the President

**Table 12-2**

GDP: What's In and What's Not

<table>
<thead>
<tr>
<th>Type of Expenditure</th>
<th>Included in GDP</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer expenditures:</td>
<td>Yes</td>
<td>Autos, TVs, VCRs</td>
</tr>
<tr>
<td>Non-durable goods</td>
<td>Yes</td>
<td>Food, clothes</td>
</tr>
<tr>
<td>Services</td>
<td>Yes</td>
<td>Haircuts, airline tickets</td>
</tr>
<tr>
<td>Gross private domestic investment:</td>
<td>Yes</td>
<td>Corn grown on farm</td>
</tr>
<tr>
<td>Change in business inventories</td>
<td>Yes</td>
<td>Computers, textiles</td>
</tr>
<tr>
<td>Structures:</td>
<td>Yes</td>
<td>Factories, office buildings, shopping malls</td>
</tr>
<tr>
<td>Nonresidential structures</td>
<td>Yes</td>
<td>Houses, condominiums</td>
</tr>
<tr>
<td>Residential structures</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Net exports</td>
<td>Yes</td>
<td>Tractors, computers</td>
</tr>
<tr>
<td>Imports</td>
<td>Yes</td>
<td>Coffee, bananas, rice</td>
</tr>
<tr>
<td>Government purchases of goods and services:</td>
<td>Yes</td>
<td>Fire fighters, police officers</td>
</tr>
<tr>
<td>Intermediate services</td>
<td>Yes</td>
<td>City parks, street cleaners</td>
</tr>
<tr>
<td>Consumption</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Other activity:</td>
<td>Yes</td>
<td>Social security, welfare, unemployment benefits</td>
</tr>
<tr>
<td>Government interest and transfer payments</td>
<td>No</td>
<td>Social security, welfare, unemployment benefits</td>
</tr>
<tr>
<td>Private intermediate goods</td>
<td>No</td>
<td>Wheat, iron ore, plastic, crude petroleum</td>
</tr>
<tr>
<td>Private purchases of used assets</td>
<td>No</td>
<td>Purchase of used home, used autos</td>
</tr>
<tr>
<td>Purchases of farm land</td>
<td>No</td>
<td>Crop land, grazing land</td>
</tr>
</tbody>
</table>
As far as I can tell stopped collecting data in 2012

Source: www.census.gov/compendia/statab/2012/tables/12s0721.xls

Four Quadrant Model

- **Property Market** – space use determined
- **Asset Market** – where buildings / real estate is bought and sold.
- **Links**
  - Rents – translate into asset prices
  - Asset prices – determines stock of real estate available
- **Shocks** – in one of the markets impacts both markets
Owner- Occupied Real Estate

• Does Four–quadrant model work?
• Yes
  – Asset prices and rents determined by same market participants

• Consider owner – occupied housing
  – Demand
  – Annual costs equivalent to rents
  – Same economic and market conditions

• Corporate owned and occupied space
  – Subject to same conditions

Comparative Statics

• Change in one of the quadrants and then trace new equilibrium

• Recall equilibrium no change in prices, rents, stock, or construction levels
  – Comparison of long run or equilibrium conditions

• Three examples
  – Economic Growth – NE quadrant shift in demand
  – Long term interest rate – NW shift in capitalization schedule
  – Supply costs – shift in space supply curve SW quadrant
Housing starts tend to follow changes in national income
Annual 1959-2020 – seasonally adjusted
Period other factors are also important

Housing starts tend to inversely follow changes in unemployment rate
Quarterly 1959 Q1 – 2020 Q4

Decrease in i – Out of Equilibrium

1. Asset Market Valuation
2. Rent $ = R/i
3. Price $ = f(C)
4. Construction (sq. ft.)
5. Property Market Rent Determination
6. Stock (sq. ft.)
7. Property Market Stock Adjustment
8. S = C/δS
9. ΔS = C - δS
10. D[R|economy] = S
House prices tend to be inversely related to mortgage rates

- Interest rate increasing: House values decreasing
- Interest rate flat: House values flat
- Interest rate decreasing: House values increasing

Housing starts tend to be inversely related to mortgage rates

1976 Q1 - 2020 Q4 - average
Increase in construction costs – Out of Equilibrium

Increase in construction costs – New Equilibrium

Elastic demand – New Equilibrium
Housing starts tend to be inversely related to short term interest rates
- cost of construction
- 1959 Q1 – 2020 Q4

Real Estate and Public Policy

- Brief
- Federal, state, and local governments influence real estate markets
- Four effects
  - Publicly assisted housing
  - Local government regulations
  - Taxation of real estate
  - Real estate financial institutions
Publicly Assisted Housing

• Construction of publicly-owned housing
  – Decrease demand for privately-owned housing
  – Public displacement of private construction

• Rental assistance programs
  – Increase demand for privately-owned housing
  – Proponents
  – Opponents

• Impacts demand on elasticities of the curves

Local Government Regulations

• Public interest
  – Zoning

• Federal, state, and local governments regulate the amount and type of developments on private land

• Costs
  – Increase time to complete a development
  – Scarcity of sites
  – All shift supply schedule is SW quadrant to left
  – Lower costs – shift to the right

Taxation of Real Estate

• Federal favorable
  – Interest payments
  – Depreciation by firms
  – Homeowners and capital gains
  – Shifts NW quadrant capitalization schedule counter clockwise

• Local unfavorable
  – Property taxation
  – Shifts NW quadrant capitalization schedule clockwise
  – Opposite affects as federal
Rent $ = \frac{P}{i}

\Delta S = C - \delta S
(S = C/\delta)

Real Estate Financial Institutions

• Brief examples
  • Savings and loans
    – Shifts NW quadrant capitalization schedule counter clockwise

• Short term interest rates
  – Increase / decrease costs of construction
Defining Markets – Property Types

- Property Types
  - Residential
  - Nonresidential

- Macro level
  - Institutions differ that govern the markets

- Micro level
  - Compete for the same land
  - Location closely linked
  - Government regulations impact both

Defining Markets – Areas

- What is appropriate geographical definition of a real estate market?
  - Spatial aggregation
  - Conceptually vs. practicality

Real Estate Microeconomics

- Product – differentiated market
- Patterns land markets tend to follow
  - Prices of individual properties or land parcels vary widely and systematically with the physical or location characteristics of the property
  - Relative prices of different properties remain stable over time
  - Relative prices tend to change mainly when the characteristics of parcels change

- Micro principles suggest that the price of land and its density or use are determined simultaneously
• Three general principles
  – Short run movements in the overall economy together with local conditions such as industrial mix and competitiveness determine growth
  – Real estate markets move closely with an area’s growth
  – Regions or areas adjust slowly to economic change because of immobility of resources

Quarterly 1975 Q1 – 2016 Q1. Data no longer freely available.
http://www.lincolninst.edu/subcenters/land-values/land-prices-by-state.asp
Causes of the Housing Bubble

- Low mortgage interest rates
- Low short-term interest rates
- Relaxed standards for mortgage loans
- Irrational exuberance

Low Mortgage Interest Rates

Monthly April 1971- March 2021 average mortgage30us
Low Short-Term Interest Rates


Relaxed Standards for Mortgage Loans

- Govt. programs
- Fannie Mae and Freddie Mac
- Greater Competition
- Securitization of Home Loans
Irrational Exuberance
1963 Q1 – 2020 Q4 end of period

Oops – The Bubble
Monthly Jan. 1987 – February 2021

TED Spread
The price difference between three-month futures contracts for U.S. Treasuries and three-month contracts for Eurodollars having identical expiration months.
Monthly 1/1986-1/2021

The Ted spread can be used as an indicator of credit risk. As the Ted spread increases, default risk is considered to be increasing. As the spread decreases, the default risk is considered to be decreasing.