

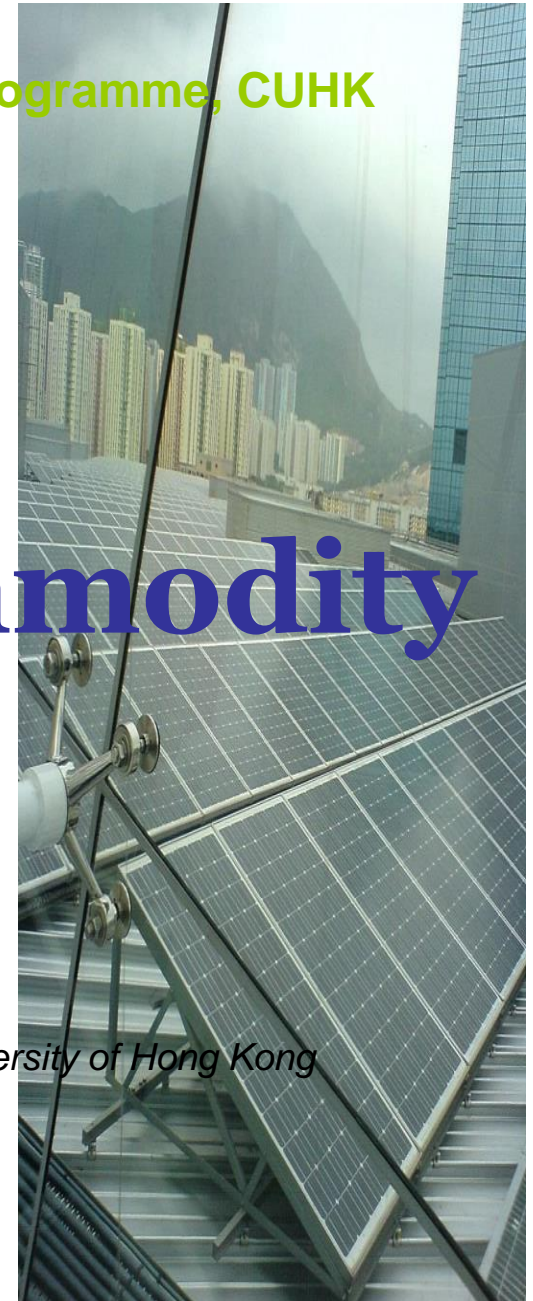
Housing Issues and Policy, Urban Studies Programme, CUHK  
URSP3100

# Housing as a Commodity

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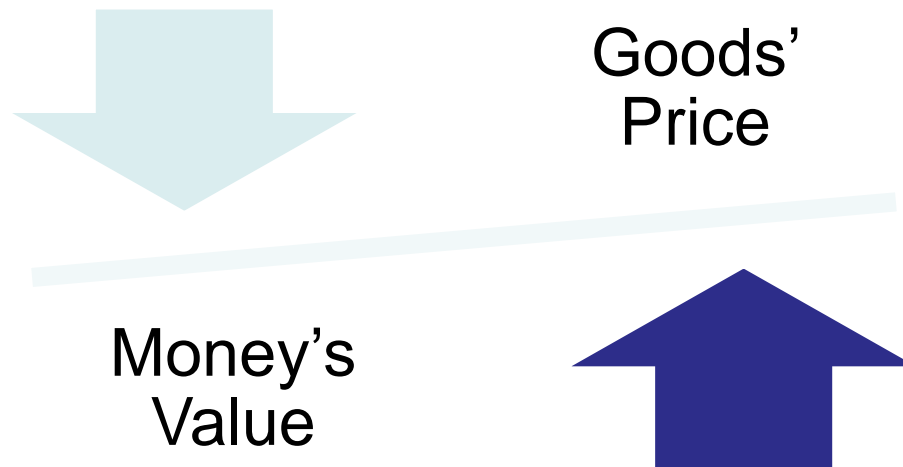


# Expected Outcomes

- What is Inflation?
  - Equation of Exchange
- Why land and housing are good hedge of inflation?

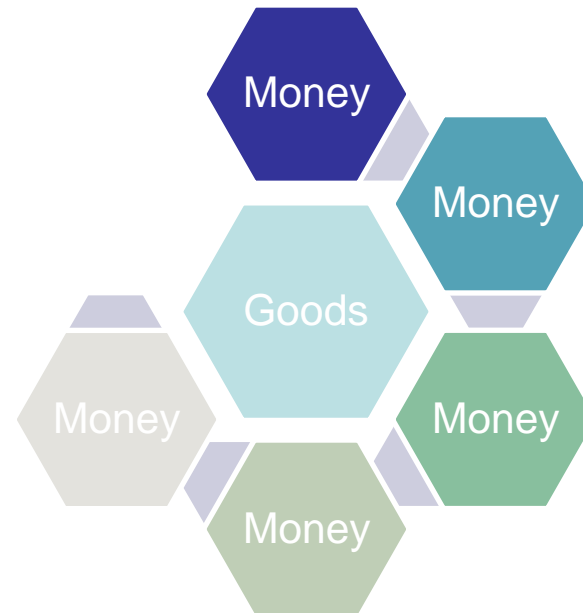
# What is Inflation?

- The value of a dollar does not stay constant when there is inflation.
- The value of a dollar is observed in terms of purchasing power, which is the real, tangible **goods** that **money** can buy.



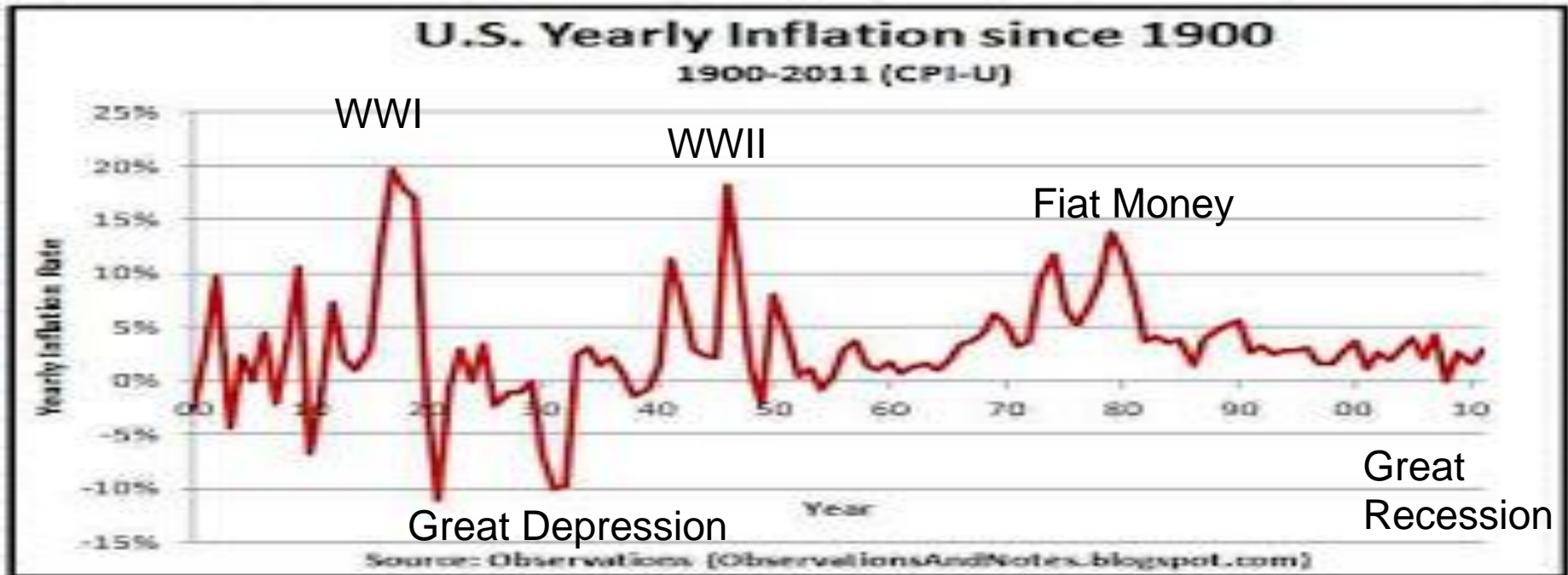
# Causes of Inflation?

- Demand-Pull Inflation:
  - Too much money chasing too few goods; and
- Cost-Push Inflation:
  - Insufficient supply of a common factor of production.



# Monetarism's Definition of Inflation

- Inflation is defined as “a continuing rise in the general price level usually attributed to an **increase in the volume of money and credit** relative to available goods and services.” (Webster)



# Equation of Exchange

- **$MV = PQ$**

- M is the total nominal amount of money in circulation
- V is the velocity of money
- P is the price level (P hike implies inflation)
- Q is an index of real expenditures

- PQ is the nominal GDP

- If V & Q are fixed, then M (money supply) causes inflation (a monetary phenomenon)

# Why Home Owners Like (mild) Inflation?

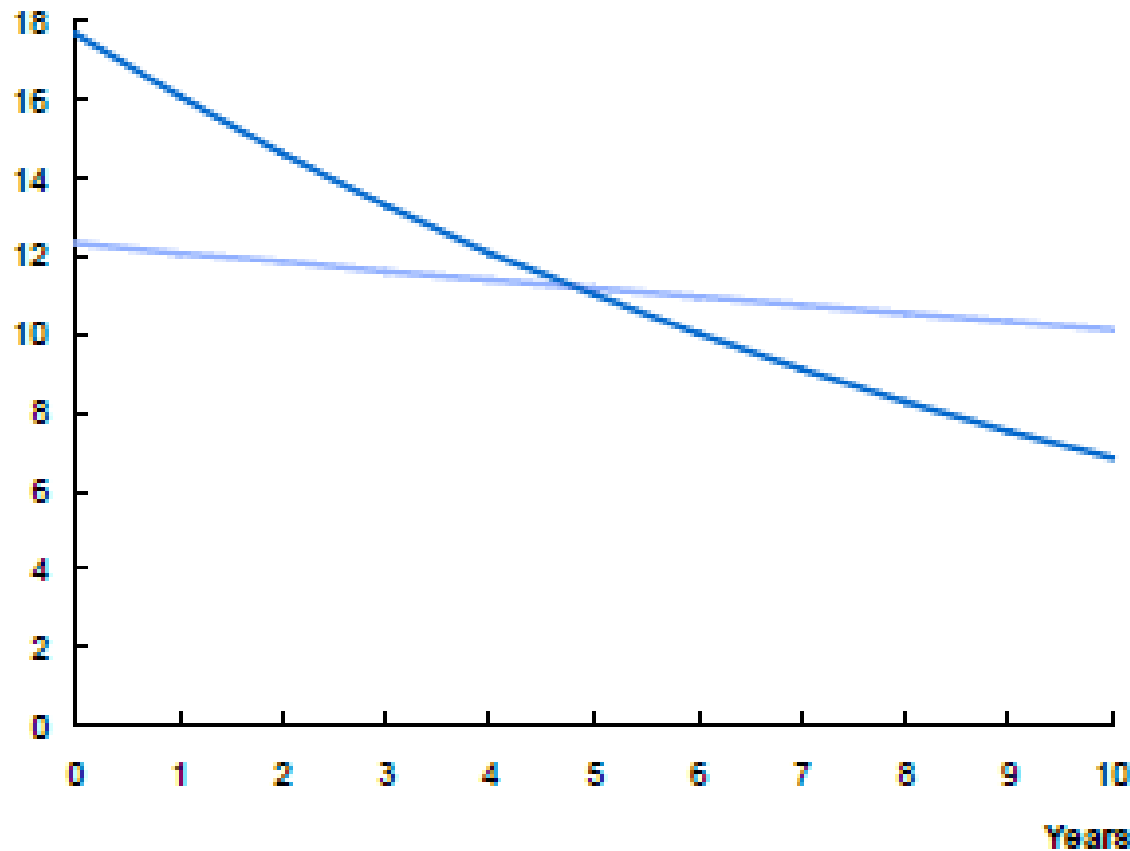
- Homeowners with mortgages are debtors;
- Larger mortgage, longer repayment years remaining, larger the benefit.
- Mortgage monthly repayment \$10,000 in 2004 = \$3,365 in 2014 (if discount rate = 2%)
- Option to earn housing price appreciation;
- Very low risk due to the high leverage and moral hazard.

Real \$	2004	2005	...	2012	2013	2014
If buy	\$10,000	\$9,804	...	\$4,902	\$4,102	\$3,365
If rent	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

## Exhibit 59

In high-inflation scenarios, higher real value payments in early periods are offset by lower real value payments in later periods

Real value of payment  
\$ thousand



Principal of \$100,000 paid over 10 periods  
Fixed-rate mortgage in which nominal value of payment is the same throughout and equivalent to the payments made in period 0

	Mortgage rate	Inflation rate
Low-inflation scenario	4%	2%
High-inflation scenario	12%	10%

SOURCE: McKinsey Global Institute analysis



# Inflation is a Crime

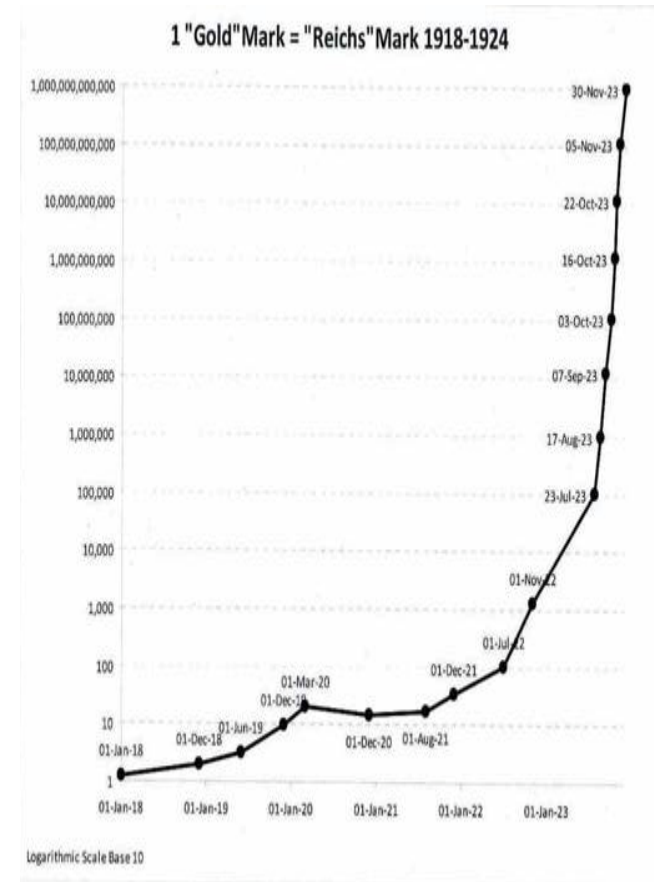
- Inflation by money supply is a crime!
- The first batch (bankers/borrowers) who got the money sure wins by buying land and housing;
- The last batch (employees) who fights for income increase to reduce the loss of purchasing power sure losses by paying higher rent, deteriorating living standards.

# Why Land / Housing are Good Hedge of Inflation?

- Land and housing are excellent **store of value**
  - Limited supply, esp. land
  - High utility and commonly treasured
  - Durable, esp. land
- Land and housing are MONEY?

# A Real Case of Land-Standard Money

- Hyperinflation caused the gold reichsmark US dollar exchange rate changed from 4.2:1 to 11 trillion:1
- Gustav Stresemann (and Hjalmar Schacht) ended the Reichsbank, and created a new currency, **the rentenmark, backed by land** rather than gold.
- To limit the total number of rentenmarks in circulation to 2.4 billion. (Ayres, 2014, p.88)
- The idea is from Karl Helfferich

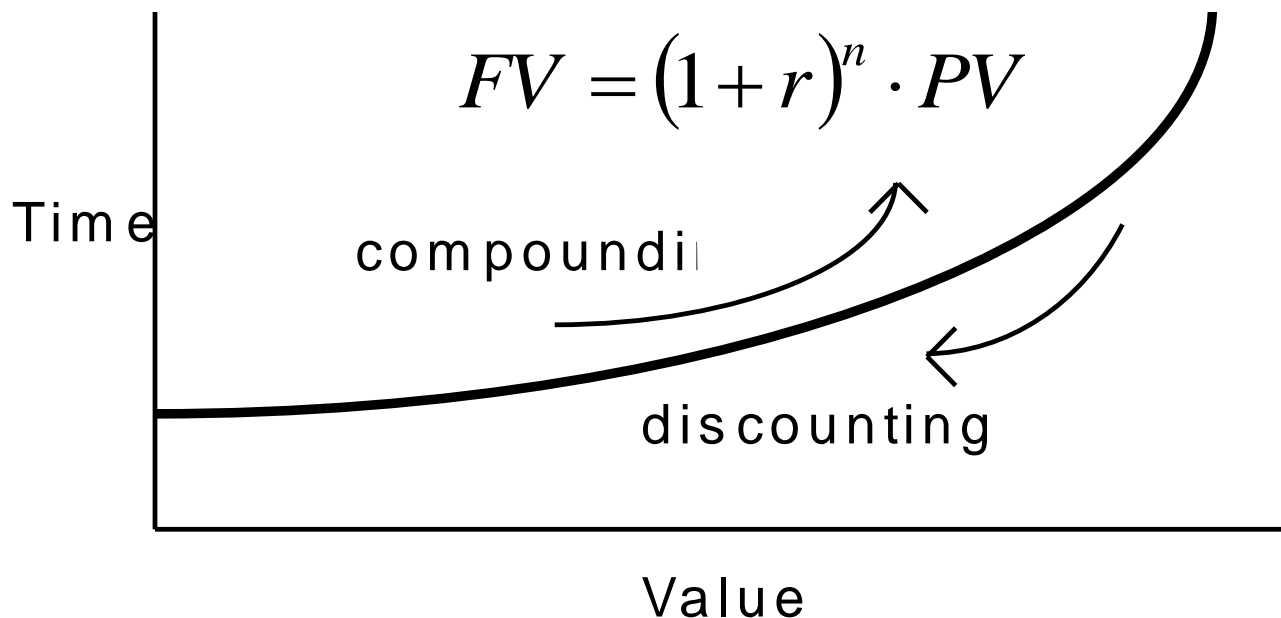


# Shortcomings of Holding Land / Housing

- Land and housing are NOT commonly used as money, because:
  - Non-divisible
  - Lumpy
  - Quality not standardisable
  - Latent defects, esp. housing
  - Immovable and illiquid
  - High transaction costs
  - Government interventions

# Housing is NOT for USE, but for INFLATION HEDGE

- If Housing is for accommodation use, its housing value should be the discounted sum of future rental income:



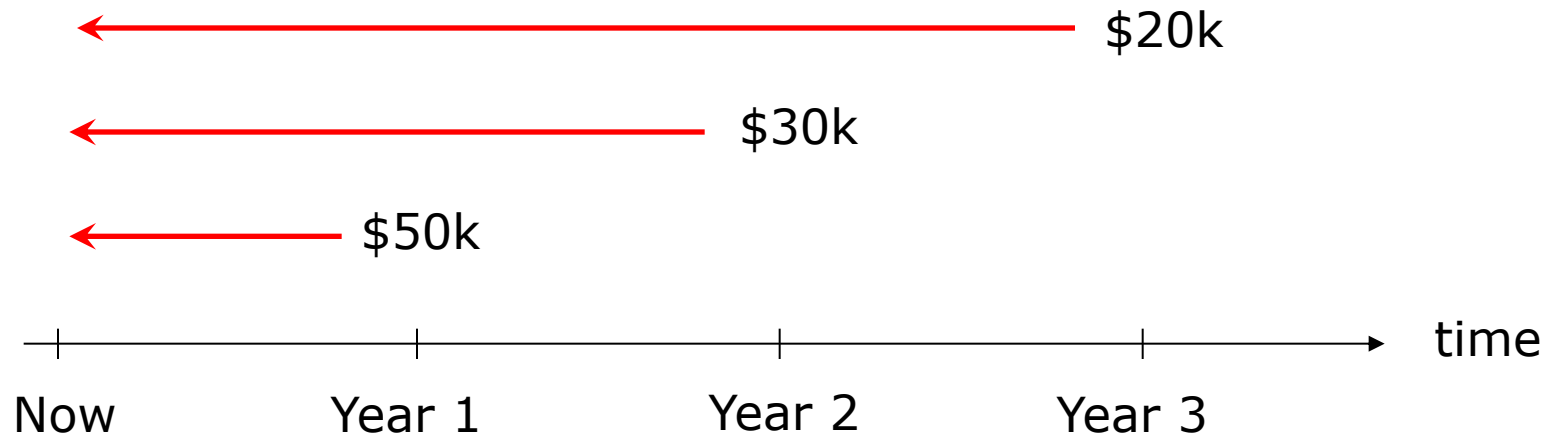
# Income Approach of Housing Value

- The Discounted Cash Flow (DCF) Model:
  - $P_0$  is the present value
  - $a_t$  is the cash flow at time  $t$
  - $r$  is the cost of capital (discount rate)
  - $T$  is the time of the last cash flow

$$P_0 = \frac{a_1}{(1+r)^1} + \frac{a_2}{(1+r)^2} + \dots + \frac{a_T}{(1+r)^T}$$
$$= \sum_{t=1}^T \frac{a_t}{(1+r)^t}$$

# Future Value to Present Value

Year	Cash Flow	Discount Factor (10%)	Present Value
1	\$50000	0.9091	\$45450
2	\$30000	0.8264	\$24790
3	\$20000	0.7513	\$15030
			<b>\$85270</b>



# Annuity

- Annuity is a special case where each future cash flow is fixed
  - i.e.  $a_t = a_1 = \text{constant}$
  - e.g. Fixed lease
- The DCF model becomes a Geometric Progression (GP)

$$P_0 = \sum_{t=1}^T \frac{a}{(1+r)^t}$$
$$= \frac{a \left[ 1 - (1+r)^{-T} \right]}{r}$$



# Annuity in Perpetuity

- Land cannot be destroyed nor depreciate.
- Annuity in perpetuity is a special case where future cash flow is not only fixed but is infinitely long
  - i.e.  $T \rightarrow \infty$
  - e.g. freehold properties
- The formula is reduced to:

$$P_0 = \lim_{T \rightarrow \infty} \sum_{t=1}^T \frac{a}{(1+r)^t}$$
$$= \frac{a}{r}$$

# Gordon Growth Model

- Cash flows are not fixed, but have a constant growth ( $g$ ) pattern at each period

$$\begin{aligned} P_0 &= \frac{a}{(1+r)^1} + \frac{a(1+g)}{(1+r)^2} + \frac{a(1+g)^2}{(1+r)^3} + \dots + \frac{a(1+g)^{T-1}}{(1+r)^T} \\ &= \sum_{t=1}^T \frac{a(1+g)^{t-1}}{(1+r)^t} \\ &= \frac{a}{r-g} \text{ if } T \rightarrow \infty \text{ and } r > g \end{aligned}$$

Further details, see  
Brown and Matysiak (2000)  
Yiu and Hui (2005)

# An Example of Gordon Growth Model

- If a 500 sf housing unit, at Ma On Shan
- Let out at a monthly net rent \$15,000 (i.e.  $a = \$180,000$  pa)
- If assuming  $g =$  inflation rate (about 4% pa)
- If the required rate of return is 6% (about long term low-risk corporate bond rate)
- i.e.  $r - g = 6\% - 4\% = 2\%$
- The current housing yield rate is also about 2%
- Then by Gordon Growth Model, the price of the housing unit,  $P = 180,000 / (0.06 - 0.04) = \$9,000,000$

# But How About When Housing is NOT only for USE?

- It works like gold, which can hedge inflation, and everyone trust it for **exchange value**;
- Then, how to estimate its value?

# Diamond Water Paradox

- See Adam Smith's (1776) Water-Diamond Paradox
  - Air is indispensable, very useful, but cannot generate any income;
  - Air is not an asset, though useful.
  - Diamond is useless (to me and to many people), but very valuable;
  - Diamond cannot generate income either;
  - Why diamond is expensive?
- Its Exchange Value!

# Rent v. Buy

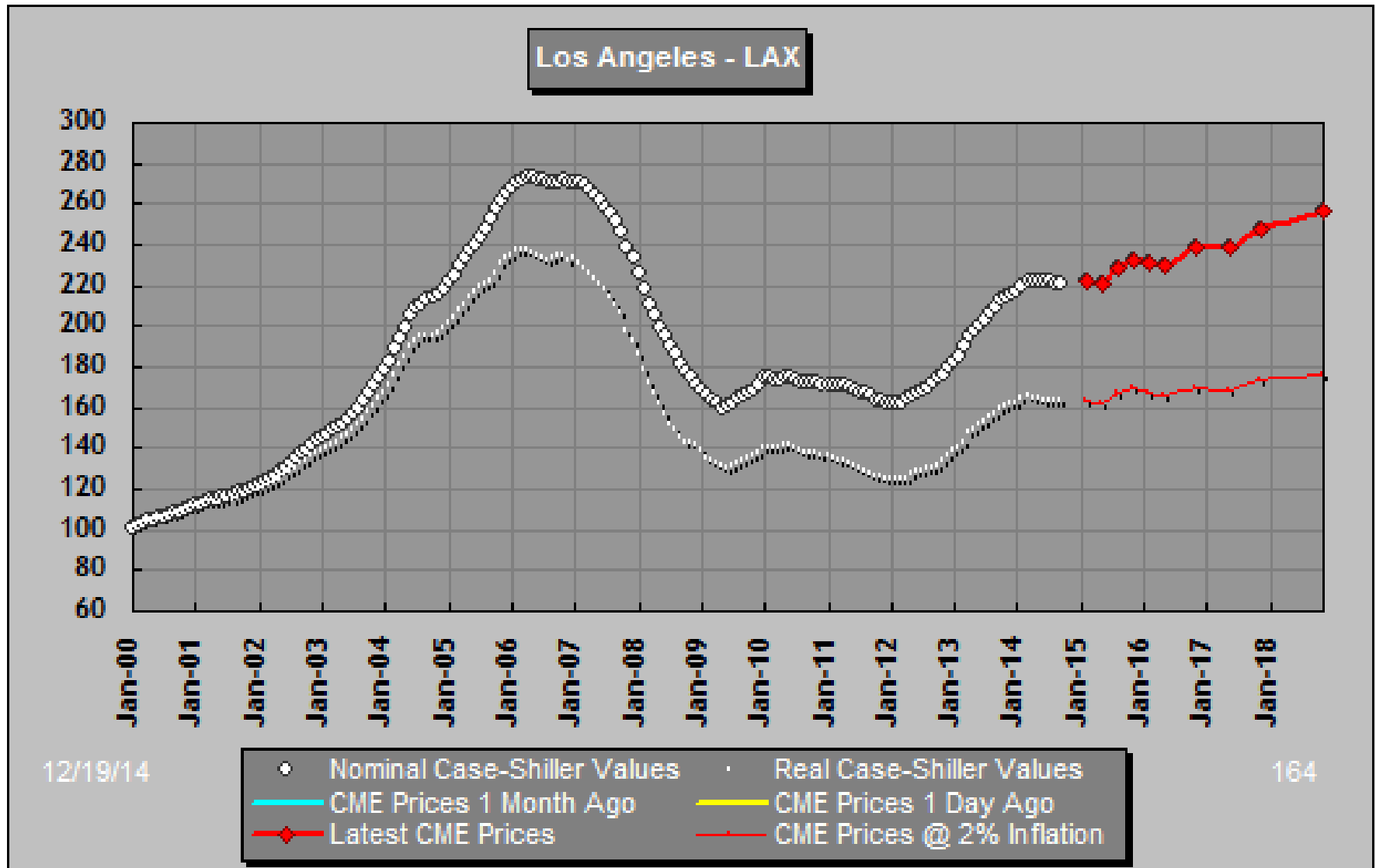
Rent		Buy	
Initial rental payment	<b>\$20,000</b>	Down payment	<b>\$900,000</b>
Total monthly rental payment	<b>\$10,000</b>	Total monthly mortgage payment	<b>\$10,874</b>
		Annual maintenance and other cost	<b>\$2,000</b>
Total payments over 20 years	<b>\$3,065,359</b>	Total payments over 20 years	<b>\$2,649,754</b>
Savings balance at end of 20 years	<b>-\$516,724</b>	Appreciated home value at end of 20 years	<b>\$13,982,871</b>

# Housing Supply is More Than Enough, if its NOT a Commodity

Year	Private Housing	Subsidized Housing	Public Rental Housing	Total	Housing Stock – Households
1983	542,000	36,000	533,000	1,111,000	<b>-239,000</b>
1993	833,000	186,000	677,000	1,696,000	<b>-10,000</b>
2003	1,258,000	395,000	679,000	2,332,000	<b>251,000</b>
2013	1,458,000	391,000	766,000	2,616,000	<b>195,200</b>

Taking into account the existence of 86,000 subdivided units, there can be almost 300,000 housing units owned not for genuine accommodation use.

# Housing Futures – Commodity Pricing





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# The End

comments are welcome.

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