Real Estate Investing ...

... making use of some of the data
Summary of data that are revealing ...

1. Median prices
2. Days inventory
3. Housing starts
4. Owner-equivalent rent
5. Affordability indexes (regional)
The Median and Average Prices for New Homes, U.S. all regions, 1963-2012

Even if not leveraged, this is a strong investment return, except for the tail end. If leveraged ...

5.22% compounded annual percentage growth rate (In) (median) *unleveraged*!

... but city data matters more

Seattle, Washington Metropolitan Area House Prices

Los Angeles, California Metropolitan Area House Prices

New York City Metropolitan Area House Prices

Miami, Florida Metropolitan Area House Prices

http://www.jparsons.net/housingbubble/miami.html
National Days Inventory – 11/85 to 10/13

A condition that must return to normal before a recovery

Trend line is 12-month moving average

Average: 6.2%

Looking much better now!

I identified this as evidence of “bottom” in 2010 – half right.

Source: U.S. Census Bureau, Houses for Sale by Region and Month’s Supply at Current Sales Rate
... and this is now improving with price stability, days inventory lower, and low mortgage rates, **but** still way below historical average (341).

... with 6-mo moving average.

Source: Department of Commerce, seasonally adjusted
Another Key Statistic to monitor: Owner-Equivalent Rent

This matters a great deal regionally and was brought to my attention by a Mudd alumnus, Singer Ma ‘11 seeking to buy a home in the Santa Cruz area after graduation. He cited this statistic as high for his area and also made an estimate of his Price-to-Rent ratio of 35, which he felt was very high. He also gave me a link to a Kiplinger article that included the slide on the next page. How is the OER calculated?: See http://www.bls.gov/cpi/cpifacnewrent.pdf

Source: JP’s Real Estate Charts (online), in 2013, http://www.jparsons.net/housingbubble/
Importantly, the price-rent ratio

**Table: Most Stable**

<table>
<thead>
<tr>
<th>Metro area</th>
<th>Price-rent ratio</th>
<th>Monthly mortgage payment</th>
<th>Apartment rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland, Ohio</td>
<td>12</td>
<td>$788</td>
<td>$696</td>
</tr>
<tr>
<td>Detroit, Mich.</td>
<td>13</td>
<td>762</td>
<td>757</td>
</tr>
<tr>
<td>Tampa, Fla.</td>
<td>14</td>
<td>909</td>
<td>776</td>
</tr>
<tr>
<td>Indianapolis, Ind.</td>
<td>14</td>
<td>828</td>
<td>628</td>
</tr>
<tr>
<td>Atlanta, Ga.</td>
<td>14</td>
<td>823</td>
<td>756</td>
</tr>
<tr>
<td>Inland Empire, Cal.</td>
<td>15</td>
<td>1,057</td>
<td>996</td>
</tr>
<tr>
<td>Las Vegas, Nev.</td>
<td>15</td>
<td>916</td>
<td>795</td>
</tr>
<tr>
<td>St. Louis, Mo.</td>
<td>15</td>
<td>891</td>
<td>682</td>
</tr>
<tr>
<td>Cincinnati, Ohio</td>
<td>15</td>
<td>892</td>
<td>667</td>
</tr>
<tr>
<td>Jacksonville, Fla.</td>
<td>15</td>
<td>1,028</td>
<td>758</td>
</tr>
</tbody>
</table>

**Table: Least Stable**

<table>
<thead>
<tr>
<th>Metro area</th>
<th>Price-rent ratio</th>
<th>Monthly mortgage payment</th>
<th>Apartment rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland, Cal.</td>
<td>34</td>
<td>$2,934</td>
<td>$1,233</td>
</tr>
<tr>
<td>San Jose, Cal.</td>
<td>34</td>
<td>3,428</td>
<td>1,449</td>
</tr>
<tr>
<td>San Francisco, Cal.</td>
<td>30</td>
<td>3,736</td>
<td>1,732</td>
</tr>
<tr>
<td>Orange County, Cal.</td>
<td>30</td>
<td>3,128</td>
<td>1,444</td>
</tr>
<tr>
<td>Seattle, Wash.</td>
<td>29</td>
<td>2,147</td>
<td>926</td>
</tr>
<tr>
<td>Salt Lake City, Utah</td>
<td>27</td>
<td>1,296</td>
<td>694</td>
</tr>
<tr>
<td>New York, N.Y.</td>
<td>27</td>
<td>7,083</td>
<td>3,327</td>
</tr>
<tr>
<td>Portland, Ore.</td>
<td>26</td>
<td>1,627</td>
<td>762</td>
</tr>
<tr>
<td>San Diego, Cal.</td>
<td>26</td>
<td>2,263</td>
<td>1,278</td>
</tr>
<tr>
<td>Tucson, Ariz.</td>
<td>25</td>
<td>1,122</td>
<td>604</td>
</tr>
</tbody>
</table>

Based on third quarter 2009 data. Includes Riverside–San Bernardino, Cal. SOURCES: Marcus & Millichap Research Services, Federal Housing Finance Board, National Association of Realtors, Reis Inc.

**Thank you to Singer Ma, 2011**

From *Kiplinger Personal Finance*, “Should you buy or rent?” by Pat Mertz Esswein, April 2010.

This is not normally published and must be calculated like Singer did it, taking median home price divided by median annual rent. Anything above 25 is stretching it, but seagull country is going to be high!!
C.A.R.'s First-time Buyer Housing Affordability Index (FTB-HAI) measures the percentage of households that can afford to purchase an entry-level home in California. C.A.R. also reports first-time buyer indexes for regions and select counties within the state. The Index is the most fundamental measure of housing well-being for first-time buyers in the state.


This calculation depends upon entry level price, 1-year ARM mortgage rates, and assumes a 40% income qualifying ratio.
You can’t have floating pyramids in real estate!!

Much of the up-scale $500K+ market is bought by people who use equity from their older $250K home to move up, and they in turn bought that home with equity from their starter home.

Therefore, if this entry level becomes unaffordable for 80% of first-time home buyers, the entire structure is threatened!!

The US warning in 2005, the China warning in 2012.
Memo slides about real estate finance: you are not held responsible for these!

**DWBH:** the *slides that remain* may help you understand more about the financing of real estate that led to the 2007 collapse. You are **not** responsible for knowing any of this and you will be asked nothing about this on the final exam.

2009 foreclosure map from realtytrac.com
Collateralized Debt Securities (CDSs) pass-thru assets where the buyers get the cashflow

Remember these – this is the general case CDO, of which the CMO (next) is a special case.

The CDS
... and sells the pool to a bank or other large lender who may aggregate these into even larger pools (say $1B)

Unlike the CDO, the institutional investors invest directly in the CDS and are (sometimes) given the direct cashflow, which is variable.

Private lender lends $100M in consumer loans*, but typically of same class, rather than mixed as shown here.

*in many cases these large lenders do not resell the loans so the second step is skipped.

Your $8K credit card balance

Your $30K student loan

Your $35K auto loan

investors

investors

investors
Collateralized Mortgage Obligations

- Many (most?) private lenders market a mix of loans, sometimes initially funding them with ABCP and similar short-term debt instruments, often secured with syndicated bank lines of credit.
- The loans are eventually (in a few months) packaged into CMOs with the intention of reselling them to longer term investors.
- "Conforming" loans (with balances below $417,000, raised to $729,500 in 2008, and of high quality) can be sold to government-sponsored mortgage pools Fannie Mae and Freddie Mac.
- Non-conforming loans must be sold to large-scale private investors.
- Most of the non-conforming CMOs are split into "tranches" and sold as pieces (see later slide for explanation)
- Credit derivatives exist that allow holders of the non-conforming CMOs to insure against default risk (see later slide for explanation).
- Non-conforming CMO packages, especially for Subprime loans, became the problem in 2007. ABCP dried up for them and they couldn't be sold.
Case 1: An actual CMO with sub-prime exposure

Citigroup Mortgage Loan
Trust 2007-Amc2
Filed March 29, 2007
Rated BBB 10/07
$2,084,318,056.18 (beginning certificate balance)

Servicing fees: $868,465.86

Go to http://www.secinfo.com/dqTm6.uT3.htm and peruse the individual mortgages in this portfolio.

Sources: This loan is one of the constituents of ABX Index HE-A-07-2 maintained in www.markit.com. Some information from SEC various filings.

Note: $380M (18%) of these loans were delinquent as of Sep 25, 2007.
About the previous slide

• The 20 Distribution Certificates (Tranches) break down the loan portfolio into ratings (from AAA to BBB-), which in turn depend upon loan characteristics in that tranche, fixed versus variable, 1st vs. 2nd trust deeds, FICO scores (?) and so forth.

• About 20% of these loans were interest-only for 5 or 10 years.

• Average FICO score was 618!!

• Weighted LTV was 87%

• Average loan value was $213,000 (a lot of second trust deeds)

• The loans were originated by Argent Mortgage Company
  – One of the largest sub-prime lenders in the U.S.
  – In July 07, State of Florida charges five Argent lenders with racketeering:
    see http://www.fdle.state.fl.us/Press_Releases/20070719_Racketeering_Case.html

• If curious about more detail, see the (huge) prospectus at http://www.secinfo.com/dqTm6.urj.htm
The role of Tranches in CMOs (and CDOs)

CDOs can be divided entirely into segments, called *tranches* in the literature but typically called *pass-through certificates* in the prospectuses that define them. The tranches are conduits for the cashflow generated by the CDO (from the mortgage pool in a CMO or credit card pool in a CDO) and they have rights to that cashflow as defined by the prospectus. Their value, although set by the market, should theoretically approximate the *discounted present value of the estimated cashflow* associated with the tranche.

These pass-through certificates are often classified as super, senior, super senior, and mezzanine certificates, which will be explained in a later slide.

These tranche arrangements are made to segment and allocate risk in the portfolio. They are very complicated derivatives and there is no limit to creative designs for their structure.

They are best learned by example, so let's look at a few.
CMO pass-thru certificate (tranche) structure (simplified)

<table>
<thead>
<tr>
<th>Tranche</th>
<th>Default Losses</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior (or super senior)</td>
<td>any additional default loss</td>
<td>AAA</td>
</tr>
<tr>
<td>Mezzanine 5: 5th 2% default losses</td>
<td>rated AA</td>
<td></td>
</tr>
<tr>
<td>Mezzanine 4: 4th 2% default losses</td>
<td>rated A</td>
<td></td>
</tr>
<tr>
<td>Mezzanine 3: 3rd 2% default losses</td>
<td>rated BB</td>
<td></td>
</tr>
<tr>
<td>Mezzanine 2: 2nd 2% default losses</td>
<td>rated B</td>
<td></td>
</tr>
<tr>
<td>Mezzanine 1: 1st 2% default losses</td>
<td>rated CCC</td>
<td></td>
</tr>
</tbody>
</table>

Default loss is absorbed sequentially by the mezzanine tranches, insulating the larger senior tranche, allowing it to earn a AAA rating, even if a large percentage of the portfolio is subprime.

The intent was to sell off the mezzanines, which seldom happened.

Tranches typically had projected yields based on LIBOR + (see WaMu example).

Default losses on some of these hit 25%+.

10,000 mortgages, $2 billion notional value.
An actual WaMu tranche provision doc... this series failed massively

Modern-day equivalent in China are the shadow-banking Wealth Management Products, see 12/3 twitter post.

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**WaMu Asset-Backed Pass-Through Certificates (Tranches) Series 2007 HE2 Trust**

<table>
<thead>
<tr>
<th>Certificate Type (1)</th>
<th>S&amp;P original ratings</th>
<th>Certificate Class</th>
<th>Approximate original certificate principal balance, thousands $ (2)</th>
<th>Pass-through rates equal one-month Libor plus: (3)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior</td>
<td>AAA</td>
<td>I-A</td>
<td>491,550</td>
<td>0.260</td>
<td>The Senior Certificates are substantially protected from defaulting mortgages by the Mezzanine Certificates. They will generally earn the pass-through rates.</td>
</tr>
<tr>
<td>Senior</td>
<td>AAA</td>
<td>II-A1</td>
<td>357,425</td>
<td>0.110</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>AAA</td>
<td>II-A2</td>
<td>125,322</td>
<td>0.190</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>AAA</td>
<td>II-A3</td>
<td>199,414</td>
<td>0.250</td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>AAA</td>
<td>II-A4</td>
<td>117,955</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>AA+</td>
<td>M1</td>
<td>50,997</td>
<td>0.470</td>
<td>Excess interest from mortgages beyond the pass-thru rates go to the Mezzanine Certificates. Losses in excess of amounts covered by default swaps are allocated to the Mezzanine Certificates, starting with M9 first, then working down. M9 goes to zero principal balance, then M8, and so forth. (4)</td>
</tr>
<tr>
<td>Mezzanine</td>
<td>AA</td>
<td>M2</td>
<td>44,623</td>
<td>0.550</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>AA-</td>
<td>M3</td>
<td>27,092</td>
<td>0.750</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>A+</td>
<td>M4</td>
<td>23,905</td>
<td>1.350</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>A</td>
<td>M5</td>
<td>23,108</td>
<td>1.700</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>A-</td>
<td>M6</td>
<td>21,514</td>
<td>2.250</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>BBB+</td>
<td>M7</td>
<td>20,718</td>
<td>2.250</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>BBB</td>
<td>M8</td>
<td>12,749</td>
<td>2.250</td>
<td></td>
</tr>
<tr>
<td>Mezzanine</td>
<td>BBB-</td>
<td>M9</td>
<td>17,531</td>
<td>2.250</td>
<td></td>
</tr>
</tbody>
</table>

(1) All certificates in this CMO earn both interest and principal pass-through. A small number of non-offered certificates were part of this offering as well (mostly for taking care of the slop at the end when most mortgages have expired).

(2) Offered in minimum denominations of $25,000 and any amount above that divisible by $1,000.

(3) The actual rate earned includes these rates shown plus mortgage prepayments, including liquidations. Excess interest earned by the pool because of mortgage rates being higher than the pass-thru rates are paid to the Mezzanine Certificates. Default losses if applicable to the certificate type would reduce these of course. These rates are protected by LIBOR swaps. These rates increase when only 10% of the mortgage pool remains.

(4) The prospectus states that expected interest earned from mortgages will exceed the pass-through rates shown. This excess is paid to the Mezzanine Certificates, which makes them more valuable so long as there are not high default rates.

Source: Information was extracted from the prospectus for the CMO identified in the title, SEC form 424B5 filed April 6, 2007
CMO tranches and "mark to market"

CMO and CDO tranches can get very complicated. Not only are they typically divided according to risk classification, as shown on the earlier slide labeled Credit Risk Tranches, but also can be divided into "principal only" and "interest only" tranches, and also, effectively, restricted to time periods, as shown on the later slide labeled Duration Tranches.

Although tranche values are determined by the market, they will approximate the present discounted value of the estimated cashflow streams of the tranche. If loan defaults are higher than first estimated for the tranche, their value must decline must the estimated cashflow stream declines.

When the value of the CMO or CMO tranches decline because of rising default rates, publicly traded companies must "mark to market" (revalue) these securities and announce that. That became the economy-killing problem in 2007 and 2008. The disappearance of Countrywide, Bear-Sterns, Lehman Brothers, Washington Mutual, etc. had this as the root cause.