Welcome

- Laurie Goodman – Director, Housing Finance Policy Center, Urban Institute

- Faith Schwartz – Principal, Housing Finance Strategies, representing CoreLogic

Join The Conversation
#HousingData
Urban Challenges and Opportunities
Policies of Permitting, Preserving, and Advancing our Cities

- **Ed Glaeser** – Fred and Eleanor Glimp Professor of Economics, Harvard University

Join The Conversation
#HousingData
New (and Old) Directions in Housing Market Research

Edward L. Glaeser
Harvard University
Is the Bubble Back? (S+P, C-S, Corelogic)
Three Themes

• The Rise of Sub-City Data and Neighborhood Measurement Tools (with Cesar Hidalgo, Nikhil Naik, Scott Kominers)

• The Growing Academic Consensus on Real Estate Bubbles (with Charles Nathanson)

• The Underappreciated Power of Supply (with Joe Gyourko, also Chinese material joint with Andrei Shleifer, Yueran Ma, Wei Huang)
Figure 3: Annual Average Real Appreciation in Select Cities, 1990 to 2015

In instances when ZIP code coverage begins after 1990, we calculate annual average appreciation over a shorter period. Maps only include ZIP codes within 20 miles of the CBD.
The Promise of Google Street View + Computer Vision
(with C. Hidalgo, N. Naik and S. Kominers)

- Google Street View has covered more than 3,000 cities from 100 countries across the world
- High resolution imagery at street-level: amenable for analysis by both humans and computers
- Time series: 2008 - Present
- Data from India and China should be available soon (from various providers), already available for Brazil, Indonesia etc.
The Promise of Google Street View + Computer Vision

• Availability of Street View paralleled by impressive gains in computer vision technology, fuelled by deep learning.
• Opportunity to develop **automated surveys of the built environment at unprecedented resolution and scale**
Streetscore (Cesar Hidalgo): How safe does this place look to humans?

Goal: Train a computer to assign a score to a street view image for “perceived safety” from image pixels

Can be extended to “perceived” wealth, liveliness, cleanliness etc.
Train A Computer Vision Model to Predict Streetscore (Perceived Safety FROM Naik)

Training Examples

8/10

5/10

3/10

Computer Vision

Predicted Streetscore

Image Features Derived from Pixels

6.4/10
Computing Urban Change

- **Urban Change Coefficient (UCC)**: Change in Streetscore of images of the same location between 2007 and 2014

1.8/10 9.2/10

\[ \text{UCC} = +7.4 \text{ (positive change)} \]

Naik et.al., NBER Working Paper, 2015
Urban Change Coefficient
Significant decay

Detroit (UCC = -6.54)

2007

2014
Urban Growth in New York City
2007 - 2014
Which demographic factors precede physical urban change?
With Hidalgo, Kominers, Naik and Raskar (2015)

- 5 cities – 2,514 census tracts
- Socioeconomic data from Census
- Multivariate spatial regressions
Table 2: *Do social characteristics predict changes in Streetscore?*

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficients for Streetscore 07</th>
<th>Coefficients for Streetscore Change</th>
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<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Share College Education</td>
<td>2.547*** (0.740)</td>
<td>2.657*** (0.668)</td>
</tr>
<tr>
<td>Log Population Density</td>
<td>0.740*** (0.095)</td>
<td>0.832*** (0.107)</td>
</tr>
<tr>
<td>Streetscore 07</td>
<td>(0.027*** (0.010))</td>
<td>(0.033** (0.014))</td>
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</table>
### Table 3: Is there evidence of Invasion?

<table>
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<th>Independent Variables</th>
<th>Coefficients for Streetscore Change</th>
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<tr>
<td></td>
<td>(1)</td>
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<tr>
<td>Distance to CBD</td>
<td>-0.042***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
</tr>
<tr>
<td>Adjacent Streetscore 07</td>
<td>0.063***</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
</tr>
<tr>
<td>Adjacent Log Density</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent Share College Education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
High Frequency Momentum, Low Frequency Mean Reversion

Source: Davis, Lehnert, and Martin (2008); Lincoln Institute of Land Policy

Fact 2: Price Change Momentum over Annual Horizon
Beliefs follow Past Price Growth

Fact 4: Comovement of Growth Expectations and Price Changes

Irrationality Just Fits the Data Better
Figure 13: Mean Reversion across Zip Codes (Mean Residuals from Hedonic Regression)

Source: Data from Nicholas and Scherbina (2011)
Change in Housing Prices, 2001-2006 vs. 2006-2011
Single Family and Multi-Family Permits Over Time

Multi Family Permits

Single Family Permits
Table 6: Distribution of Real Price Growth in the 1996-2006 Boom by Degree of Supply Constraint

<table>
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<th>n=26</th>
<th>n=25</th>
<th>n=28</th>
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<tbody>
<tr>
<td></td>
<td>Most Inelastic</td>
<td>Middle Third</td>
<td>Most Elastic</td>
</tr>
<tr>
<td>Mean</td>
<td>93.9%</td>
<td>53.8%</td>
<td>28.2%</td>
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<tr>
<td>Std. Dev.</td>
<td>50.4%</td>
<td>39.7%</td>
<td>26.3%</td>
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<tr>
<td>10^{th}</td>
<td>13.5%</td>
<td>15.3%</td>
<td>6.2%</td>
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<tr>
<td>25^{th}</td>
<td>49.4%</td>
<td>24.7%</td>
<td>12.6%</td>
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<tr>
<td>50^{th}</td>
<td>98.6%</td>
<td>36.2%</td>
<td>18.4%</td>
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<tr>
<td>75^{th}</td>
<td>140.2%</td>
<td>86.6%</td>
<td>30.1%</td>
</tr>
<tr>
<td>90^{th}</td>
<td>146.5%</td>
<td>115.1%</td>
<td>67.0%</td>
</tr>
</tbody>
</table>
San Francisco-Oakland-Hayward, CA

House price are AHS micro data
MPPC are for 1800 sf, economy class, 20% land share and 17% gross margin homes
Atlanta-Sandy Springs-Roswell, GA

Annual Permits/2000 Housing Stock

House price are AHS micro data
MPPC are for 1800 sf, economy class, 20% land share and 17% gross margin homes
Detroit-Warren-Dearborn, MI

House price are AHS micro data
MPPC are for 1800 sf, economy class, 20% land share and 17% gross margin homes
Figure 3a: Construction and Income across US Cities

\[ \text{Log housing stock per capita 2010/1990 in US} \]

\[ \text{Log income per capita 1990} \]

Corr = -.29.
Figure 3b: Construction and Income across Chinese Cities

Log housing stock per capita 2010/2000 in China

Log GDP per capita 2000

Corr = .45
The Great Chinese Housing Boom

People lining up outside a residential project before sales start. Hefei, Anhui Province.
Figure 1: Price Growth by Tier: China and U.S.

Note: Housing price index data for China are from Fang et al. (2015). Housing price index data for MSAs in the US are from the Federal Housing Finance Agency. We construct tiers in the US by ranking US MSAs based on 1990 income per capita, and assign tiers so that each tier has the same population share as that in China; the richest MSAs are assigned to 1st tier and so on so forth. Price indices in each tier are equal weighted averages of city level price indices.
Figure 2a: Construction (square footage) China and US
Figure 4: Inventory Estimates by Tier

Note: Developer inventory data is from local housing bureau (Fangguanjue) and compiled by Soufun. Because the data does not cover all the cities, our estimates of inventory in each tier is based on inventory per capita by tier multiplied by urban population in each tier. We also assume the 4th tier cities have the same inventory per capita as the 3rd tier cities. In total, the estimates are based on 262 prefecture level cities: 4 cities in the first tier, 34 in the second tier and 84 in the third and 140 in the fourth.
Figure 6a: First Tier

[Heatmap diagram showing the relationship between income growth rate and new construction, with lines indicating annual return and average annual supply.]
Figure 6b: Second Tier
Data, Demand, and Demographics: 
A Symposium on Housing Finance 
Co-presented by the Urban Institute and CoreLogic 
November 2, 2016
Housing and Economic Outlook
2016 and Beyond

- Frank Nothaft – Senior Vice President and Chief Economist, CoreLogic

Join The Conversation
#HousingData
Housing and Economic Update: 2016 and Beyond

Data, Demand, and Demographics: A Symposium on Housing Finance

Frank Nothaft, CoreLogic SVP & Chief Economist
November 2, 2016
The ‘New Normal’

1. Low mortgage rates are the norm
2. Household composition increasingly diverse
3. Sales rise but turnover remains below ‘average’
4. Originations: Purchase & HELOC up, Refi down
5. Loan performance excellent (new credit ‘lower risk’)

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When Will the Fed Raise Target Rates? (Soon)

Federal Funds Target (interest rate, in percent)

Source: Federal Open Market Committee Meeting on September 21, 2016. In the plot each circle indicates the value (rounded to the nearest 1/8 percentage point) of an individual FOMC participant’s judgment of the appropriate level of the target federal funds rate at the end of the specified calendar year or over the longer run.
Low Mortgage Rates Are the New Norm

Source: Freddie Mac Primary Mortgage Market Survey®, IHS Global Insight October 2016 projection.

Interest Rate on 30-Year Fixed-Rate Mortgages (percent)

Great Recession

Forecast

Dec. 2017: 4.2%
Large Demographic Tailwind Has Arrived

Source: U.S. Census Bureau, Population as of July 1, 2015
Household Composition More Diverse

Three-fourths of New Households Will Be Minority-Headed

2015 Share of All Households

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>White</td>
<td>68%</td>
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<tr>
<td>Black</td>
<td>12%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13%</td>
</tr>
<tr>
<td>Asian &amp; Other</td>
<td>7%</td>
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2015-25 Share of Household Growth

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<th>Ethnicity</th>
<th>Percentage</th>
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<td>Hispanic</td>
<td>40%</td>
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<tr>
<td>Asian &amp; Other</td>
<td>18%</td>
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</table>

117 Million Households in 2015

12 Million Increase by 2025

Source: Census Bureau Housing Vacancy Survey (2015 household count), Harvard University Joint Center for Housing Studies (Baseline Household Projections for the Next Decade and Beyond, Working Paper w14-1)
Sales Rise but Home “Turnover” Remains Low

Does ‘New Normal’ Have Lower Turnover?

Home Sales as a Percent of Housing Stock

Source: CoreLogic REAS MarketTrends through June 2016, Census Bureau HVS, Forecast averages projections of FNMA, FHLMC, Zelman and Associates, MBA, NAR and NAHB.
Americans Are Keeping Their Homes Longer

Number of Years A Home Is Owned (Median)

Source: American Housing Survey for the United States, various years (difference between survey year and median year owner-occupant moved into unit), CoreLogic public records for United States (length of time between recorded sales on same home).
Low For-Sale Inventory: Part of a ‘New Normal’?

Sources: National Association of Realtors, U.S. Census Bureau (New Residential Sales and Housing Vacancy Survey).
Note: Existing home inventory excludes Condo & Co-op Inventory before 1999.
U.S. Home Prices: 5% Below 2006 Peak
Projected to Return to Peak by Early 2018

CoreLogic Home Price Index (January 2000 = 100)

Source: CoreLogic Home Price Index (November 1, 2016 release)
Price Growth Faster For Lower-Priced Houses

Cumulative Price Growth Through July 2016 (percent)

Since July 2015

<table>
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<tr>
<th>Price Growth Since:</th>
<th>One Year Ago</th>
<th>Price Trough</th>
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<tr>
<td>More Than 25% Below Median</td>
<td>8%</td>
<td>6%</td>
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<tr>
<td>25% or Less Below Median</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Up to 25% Above Median</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>More Than 25% Above Median</td>
<td>2%</td>
<td>0%</td>
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</table>

Since March 2011

<table>
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<tr>
<th>Price Growth Since:</th>
<th>One Year Ago</th>
<th>Price Trough</th>
</tr>
</thead>
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<tr>
<td>More Than 25% Below Median</td>
<td>60%</td>
<td>45%</td>
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<tr>
<td>25% or Less Below Median</td>
<td>45%</td>
<td>30%</td>
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<tr>
<td>Up to 25% Above Median</td>
<td>30%</td>
<td>15%</td>
</tr>
<tr>
<td>More Than 25% Above Median</td>
<td>15%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: CoreLogic HPI, Single-family Detached (November 1, 2016 release); March 2011 is “Post-Great Recession” price trough.
Originations: More Purchase, Less Refi in 2017

Single-family Mortgage Originations (Billions of dollars)

Source: Originations are an average of the latest projections released by Mortgage Bankers Association, Fannie Mae, Freddie Mac and Zelman & Associates. Fannie Mae as of October 2016. Zelman, Freddie Mac and MBA forecast as of September 2016. 2009-2014 are benchmarked to HMDA. Numbers do not include HELOCs.
HELOC Volume Up in 2016

Approved HELOCs (Billions of Dollars)

Source: CoreLogic public records, second-lien HELOCs placed more than 60 days after first lien.
Mortgage Credit Risk Along Six Dimensions
First-Lien Purchase Money Originations

- Credit Score Less Than 640
- LTV Share 95 And Above
- DTI Share 43 And Above
- Non-Owner Occupancy Share
- Condo Co-op Share
- Low & No Doc Share

Benchmark (2001 and 2002 Originations)
Current (2016:Q2)

Source: CoreLogic
Excellent Loan Performance: Part of a ‘New Normal’?

Serious Delinquency Rate by Origination Cohort

1999-2003

2004-2008

2009-2014

Source: CoreLogic: March 2016
The ‘New Normal’

1. Low mortgage rates: Below 5% next two years
2. Household composition increasingly diverse
3. Sales rise but turnover remains below ‘average’
4. Originations: Purchase & HELOC up, Refi down
5. Loan performance excellent (new credit ‘lower risk’)
Where to find more information

Look for regular updates to our housing forecast, commentary and data at

http://www.corelogic.com/blog

@CoreLogicEcon

@DrFrankNothaft

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Data, Demand, and Demographics: A Symposium on Housing Finance

Co-presented by the Urban Institute and CoreLogic
Panel One
Integrated Services and Inclusionary Housing for Changing Demographics

- Ellen Seidman – Senior Fellow, Urban Institute (Moderator)
- Nela Richards – Chief Economist, Redfin
- Rolf Pendall – Director, Metropolitan Housing & Communities, Urban Institute
- Jim Carr – Visiting Fellow, Roosevelt Institute
- Susanne Slater – President and CEO, Habitat for Humanity of Washington, D.C.
- Judi Kende* – Vice President, Enterprise Community Partners

Join The Conversation
#HousingData
Integrated Services and Inclusionary Housing for Changing Demographics: Can we build our way out of this?

Urban Institute/Core Logic Demand, Data and Demographics Symposium

November 2, 2016

Nela Richardson, PhD
Chief Economist, Redfin Corp.
Five key research findings

1. The housing market is chronically undersupplied (and the rent is too darn high!)

2. Economic mobility depends on geography

3. Economically integrated neighborhoods are rare

4. Land-use regulation affects economic inequality

5. Zoning threatens U.S. productivity and economic growth
Where Tech Workers Cluster

Source: Bureau of Labor Statistics: Computer and Mathematical Occupations
Integrated cities are rare

<table>
<thead>
<tr>
<th>City</th>
<th>Balanced Mix Area</th>
<th>High-end Area</th>
<th>Affordable Area</th>
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<tr>
<td>Boston</td>
<td>51%</td>
<td>35%</td>
<td>15%</td>
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<tr>
<td>Seattle</td>
<td>31%</td>
<td>10%</td>
<td>59%</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>30%</td>
<td>25%</td>
<td>45%</td>
</tr>
<tr>
<td>San Jose</td>
<td>24%</td>
<td>53%</td>
<td>24%</td>
</tr>
<tr>
<td>Denver</td>
<td>24%</td>
<td>7%</td>
<td>69%</td>
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<td>San Diego</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
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<tr>
<td>Los Angeles</td>
<td>19%</td>
<td>74%</td>
<td>7%</td>
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<td>Chicago</td>
<td>17%</td>
<td>5%</td>
<td>79%</td>
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<td>Austin</td>
<td>16%</td>
<td>11%</td>
<td>73%</td>
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<tr>
<td>Phoenix</td>
<td>13%</td>
<td>11%</td>
<td>76%</td>
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<td>Houston</td>
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<td>16%</td>
<td>72%</td>
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<td>Philadelphia</td>
<td>11%</td>
<td>6%</td>
<td>82%</td>
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<tr>
<td>Baltimore</td>
<td>11%</td>
<td>3%</td>
<td>86%</td>
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<tr>
<td>San Francisco</td>
<td>10%</td>
<td>88%</td>
<td>2%</td>
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<tr>
<td>San Antonio</td>
<td>8%</td>
<td>5%</td>
<td>88%</td>
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<td>Memphis</td>
<td>8%</td>
<td>4%</td>
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<td>Jacksonville</td>
<td>7%</td>
<td>3%</td>
<td>90%</td>
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<tr>
<td>Detroit</td>
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<td>1%</td>
<td>92%</td>
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<td>Indianapolis</td>
<td>6%</td>
<td>2%</td>
<td>92%</td>
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<tr>
<td>Columbus</td>
<td>4%</td>
<td>1%</td>
<td>95%</td>
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Job accessibility in Chicago
Families want access to highly ranked schools

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<tr>
<th>Metro Area</th>
<th>Median Sale Price</th>
<th>$ Premium of 1 point of GS Rating on Median Home Price</th>
<th>% Premium of 1 point of GS Rating on Median Home Price</th>
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</thead>
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<tr>
<td>Atlanta, GA</td>
<td>$185,000</td>
<td>$5,409</td>
<td>2.92%</td>
</tr>
<tr>
<td>Baltimore, MD</td>
<td>$260,000</td>
<td>$12,158</td>
<td>4.68%</td>
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<td>$335,000</td>
<td>$3,890</td>
<td>1.16%</td>
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<td>Chicago, IL</td>
<td>$208,500</td>
<td>$5,441</td>
<td>2.61%</td>
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<td>Denver, CO</td>
<td>$285,000</td>
<td>$7,480</td>
<td>2.62%</td>
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<td>Los Angeles, CA</td>
<td>$479,000</td>
<td>$19,195</td>
<td>4.01%</td>
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<td>Oakland, CA</td>
<td>$550,000</td>
<td>$16,278</td>
<td>2.96%</td>
</tr>
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<td>$565,000</td>
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<td>1.82%</td>
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<td>Phoenix, AZ</td>
<td>$207,500</td>
<td>$8,038</td>
<td>3.87%</td>
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<td>Portland, OR</td>
<td>$280,000</td>
<td>$5,380</td>
<td>1.92%</td>
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<td>San Diego, CA</td>
<td>$450,000</td>
<td>$16,343</td>
<td>3.63%</td>
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<td>$975,000</td>
<td>$28,587</td>
<td>2.93%</td>
</tr>
<tr>
<td>Seattle, WA</td>
<td>$385,000</td>
<td>$9,150</td>
<td>2.38%</td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>$365,000</td>
<td>$5,135</td>
<td>1.41%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
<td><strong>$10,910</strong></td>
<td><strong>2.78%</strong></td>
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...and walkable communities

<table>
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<th>Metro Area</th>
<th>Walk Score</th>
<th>Median Sale Price</th>
<th>$ Premium of 1 Walk Score Point on Median Home Price</th>
<th>% Premium of 1 Walk Score Point on Median Home Price</th>
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<td>$168,000</td>
<td>$2,838</td>
<td>1.69%</td>
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<td>Baltimore</td>
<td>68.7</td>
<td>$229,900</td>
<td>$652</td>
<td>0.28%</td>
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<tr>
<td>Boston</td>
<td>80.7</td>
<td>$325,000</td>
<td>$3,927</td>
<td>1.21%</td>
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<td>Chicago</td>
<td>77.5</td>
<td>$220,000</td>
<td>$2,437</td>
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<td>Denver</td>
<td>59.9</td>
<td>$285,000</td>
<td>$2,410</td>
<td>0.85%</td>
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<td>Los Angeles</td>
<td>66.3</td>
<td>$475,000</td>
<td>$3,948</td>
<td>0.83%</td>
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<td>Oakland</td>
<td>71.6</td>
<td>$523,000</td>
<td>$1,735</td>
<td>0.33%</td>
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<td>Orange County</td>
<td>43.5</td>
<td>$580,000</td>
<td>$114</td>
<td>0.02%</td>
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<td>Phoenix</td>
<td>40.3</td>
<td>$204,900</td>
<td>$217</td>
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<td>Portland</td>
<td>63.9</td>
<td>$275,000</td>
<td>$1,210</td>
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<td>$449,000</td>
<td>$2,205</td>
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<td>San Francisco</td>
<td>85.7</td>
<td>$950,000</td>
<td>$3,943</td>
<td>0.42%</td>
</tr>
<tr>
<td>Seattle</td>
<td>72.9</td>
<td>$375,000</td>
<td>$3,603</td>
<td>0.96%</td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>77.0</td>
<td>$360,000</td>
<td>$4,386</td>
<td>1.22%</td>
</tr>
</tbody>
</table>
Walkable communities are highly valued

### Home Price Premiums for Increases in Walk Score from 60 to 80

<table>
<thead>
<tr>
<th>Metro</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix</td>
<td>$16K</td>
</tr>
<tr>
<td>Baltimore</td>
<td>$33K</td>
</tr>
<tr>
<td>Orange Cty</td>
<td>$41K</td>
</tr>
<tr>
<td>Portland</td>
<td>$53K</td>
</tr>
<tr>
<td>San Diego</td>
<td>$68K</td>
</tr>
<tr>
<td>Chicago</td>
<td>$78K</td>
</tr>
<tr>
<td>Atlanta</td>
<td>$84K</td>
</tr>
<tr>
<td>Denver</td>
<td>$84K</td>
</tr>
<tr>
<td>Oakland</td>
<td>$86K</td>
</tr>
<tr>
<td>National</td>
<td>$108K</td>
</tr>
<tr>
<td>Seattle</td>
<td>$116K</td>
</tr>
<tr>
<td>Boston</td>
<td>$129K</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>$129K</td>
</tr>
<tr>
<td>Washington DC</td>
<td>$133K</td>
</tr>
<tr>
<td>San Francisco</td>
<td>$188K</td>
</tr>
</tbody>
</table>
Sale Price Distribution of Condos in Seattle in 2015

Source: Redfin
Families are moving farther from the city center.
Percentage of Homes Affordable to Teachers in 31 California Counties

<table>
<thead>
<tr>
<th>County</th>
<th>Affordability</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Mateo</td>
<td>0.0%</td>
</tr>
<tr>
<td>Santa Clara</td>
<td>0.0%</td>
</tr>
<tr>
<td>San Francisco</td>
<td>0.2%</td>
</tr>
<tr>
<td>Sonoma</td>
<td>0.5%</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>0.7%</td>
</tr>
<tr>
<td>Alameda</td>
<td>1.2%</td>
</tr>
<tr>
<td>Ventura</td>
<td>1.4%</td>
</tr>
<tr>
<td>San Benito</td>
<td>2.2%</td>
</tr>
<tr>
<td>Napa</td>
<td>2.2%</td>
</tr>
<tr>
<td>Marin</td>
<td>2.6%</td>
</tr>
<tr>
<td>San Luis Obispo</td>
<td>2.6%</td>
</tr>
<tr>
<td>Orange</td>
<td>3.2%</td>
</tr>
<tr>
<td>San Diego</td>
<td>3.6%</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>4.2%</td>
</tr>
<tr>
<td>Monterey</td>
<td>4.3%</td>
</tr>
<tr>
<td>Placer</td>
<td>4.3%</td>
</tr>
<tr>
<td>Santa Barbara</td>
<td>5.2%</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>7.1%</td>
</tr>
<tr>
<td>El Dorado</td>
<td>10.8%</td>
</tr>
<tr>
<td>Solano</td>
<td>11.7%</td>
</tr>
<tr>
<td>Yolo</td>
<td>13.7%</td>
</tr>
<tr>
<td>Riverside</td>
<td>24.7%</td>
</tr>
<tr>
<td>San Joaquin</td>
<td>25.6%</td>
</tr>
<tr>
<td>Sacramento</td>
<td>31.7%</td>
</tr>
<tr>
<td>Madera</td>
<td>43.8%</td>
</tr>
<tr>
<td>San Bernardino</td>
<td>46.1%</td>
</tr>
<tr>
<td>Stanislaus</td>
<td>51.6%</td>
</tr>
<tr>
<td>Butte</td>
<td>53.9%</td>
</tr>
<tr>
<td>Kern</td>
<td>56.5%</td>
</tr>
<tr>
<td>Fresno</td>
<td>59.4%</td>
</tr>
<tr>
<td>Merced</td>
<td>60.0%</td>
</tr>
</tbody>
</table>

Total for California: 17.4%

Percentage of homes affordable by county, based on the average teacher’s salary and MLS list prices as of September 6, 2016
Thank you!

Redfin Research

https://www.redfin.com/blog
nela.richardson@redfin.com
@NelaRichardson
Demographics, homeownership, and home equity

Trends and policies for high- and low-cost states

Rolf Pendall, Ph.D.
Co-Director, Metropolitan Housing & Communities Policy Center
November 2, 2016
Homeownership falling, faster in high-cost states

Per capita homeownership rates, observed and projected to 2040

Source: Karen Smith et al., Urban Institute, unpublished tabulations of DYNASIM ID914 and DYNASIM ID938 projections.
Home equity falling in CA, rising in TX

Median home equity per capita, homeowners, projected to 2040 (2015 $000)

Source: Karen Smith et al., Urban Institute, unpublished tabulations of DYNASIM ID914 and DYNASIM ID938 projections. Dollars are wage-adjusted 2015 values.
Seniors’ home equity threatened in high-cost states

Homeownership at age 75

Source: Karen Smith et al., Urban Institute, unpublished tabulations of DYNASIM ID914 and DYNASIM ID938 projections. Dollars are wage-adjusted 2015 values.

Median per capita home equity (2015 $000) at age 75
Policy implications: Federal, state, and local

No silver bullets: we need every solution

For people, we need policies that will

- raise incomes and wages over the life course in all states
- reduce income insecurity in all states

For housing, we need federal, state, and local actions to

- Guarantee stable affordable housing in safe neighborhoods for extremely low income people in all states

- For high-cost states especially:
  - Boost housing supply by reducing regulatory burdens and investing in infrastructure
  - Facilitate access to ownership for younger households
  - Facilitate efficient use of homes and lots by seniors
  - Phase out/redirect mortgage interest and property tax deductions
Homeownership and Household Wealth

James H. Carr
Coleman A. Young Chair and Professor
In Urban Affairs
Wayne State University
And
Visiting Fellow, The Roosevelt Institute

At the
Urban Institute
Annual Urban/CoreLogic Symposium
Washington, DC
November 2, 2016
Homeownership and Net Worth, 2000–14

Applications and Originations of First-Lien Loans for the Purchase of Owner-Occupied One- to Four-Family Homes, Black Applicants

Source: Author’s calculations of HMDA data, 2000–14.
Default Risk Taken by the Government-Sponsored Enterprise Channel, 1998Q1–2016Q1

## Missing Loans by FICO Score

### Missing Loans by FICO Score and Race and Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>2001 total</th>
<th>2013 total</th>
<th>Missing loans</th>
<th>Decline</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>3,144,779</td>
<td>2,174,870</td>
<td>690,018</td>
<td>30.8</td>
</tr>
<tr>
<td>Hispanic</td>
<td>400,235</td>
<td>248,514</td>
<td>116,100</td>
<td>37.9</td>
</tr>
<tr>
<td>Black</td>
<td>277,409</td>
<td>137,627</td>
<td>115,093</td>
<td>50.4</td>
</tr>
<tr>
<td>Asian</td>
<td>172,818</td>
<td>186,506</td>
<td>-29,069</td>
<td>-7.9</td>
</tr>
<tr>
<td>Missing/other</td>
<td>656,076</td>
<td>244,595</td>
<td>353,089</td>
<td>62.7</td>
</tr>
<tr>
<td>All races</td>
<td>4,651,317</td>
<td>2,992,112</td>
<td>1,245,229</td>
<td>35.7</td>
</tr>
</tbody>
</table>

Source: Urban Institute calculations from HMDA and CoreLogic data.

Note: Shares are computed within each race and ethnicity. Declines are the percent decline in loans from 2001 to 2013.
Does Automation Eliminate Bias?
The Racial Wealth Divide

Source: CFED, Institute for Policy Studies; Wall Street Journal.
Figure 3. Reduction of the Wealth Gap After Equalizing Homeownership Rates

- **Latino families (any race)**
  - Median Wealth Before Equalizing Returns: $37,561
  - Reduction of Wealth Gap: $37,561

- **Black families**
  - Median Wealth Before Equalizing Returns: $39,226
  - Reduction of Wealth Gap: $39,226

- **White families**
  - Median Wealth Before Equalizing Returns: $120,000

Source: Survey of Income and Program Participation (SIPP), 2008 Panel Wave 10, 2011

Figure 9. Reduction of the Wealth Gap After Equalizing College Graduation Rates

<table>
<thead>
<tr>
<th>Family Type</th>
<th>Median Wealth Before Equalizing Returns</th>
<th>Reduction of Wealth Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latino families (any race)</td>
<td>$3,528</td>
<td>$1,313</td>
</tr>
<tr>
<td>Black families</td>
<td>$1,313</td>
<td></td>
</tr>
<tr>
<td>White families</td>
<td>$120k</td>
<td></td>
</tr>
</tbody>
</table>

Source: Survey of Income and Program Participation (SIPP), 2008 Panel Wave 10, 2011

Fix The Basics

- Require all federal mortgage agencies to use the most current and predictive credit scoring models on the market
- Eliminate GSE loan level (risk-based) pricing
- Return GSE g-fees and FHA MMPs to levels that reflect future projected losses
- Leverage distressed property sales by all federal housing agencies to better promote affordable homeownership opportunities
- Hold private lenders accountable for exclusionary lending practices
- Allow the GSEs to reserve for future losses or establish a Treasury fund (within the conservatorship framework) for losses GSE losses
- Reform the housing finance system to address the multifaceted housing and community investment needs of America’s distressed communities into the 21st Century
James H. Carr

Coleman A. Young Endowed Chair and Professor in Urban Affairs
Wayne State University
Detroit, Michigan

Visiting Fellow
Roosevelt Institute
New York, New York

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jameshcarr.com
jim@jameshcarr.com
Susanne V. Slater, President & CEO
Habitat for Humanity of Washington, D.C.

WHY HOUSING EQUITY MATTERS
What Is DC’s problem?

• As in other U.S. cities, market forces are driving in-migration of younger, white, and more highly-educated populations and forcing out-migration of low- to moderate-income people of color

• Very limited land boundaries accelerate problem because moving further out means moving out of the city altogether

The Funding Gap

DC's $100 Million Housing Production Trust Fund
Compared to National Totals, FY15

- DC: 21% - DC: 79%
- All Other Cities: 13% - All Other Cities: 87%

Current Housing Production Trust Fund Value
as a Percent of Total Need

- $5 Billion
- $100 Million

Source: The 2016 Housing Trust Fund Survey Report, Housing Trust Fund Project, Center For Community Change

Source: "Will D.C.'s Housing Ever Be Affordable Again?" The Atlantic, August 19, 2016 via D.C. Fiscal Policy Institute
Goal: Preserve Diversity & Inclusion

1. Maximize cost-effectiveness of solutions by anchoring affordable housing in neighborhoods prior to gentrification

2. Substantially increase low-income homeownership to address wealth gap

3. Allow low-income homeowners to reap expected gains

4. Balance homeownership with permanently-affordable rentals
What does Habitat do?

- 15th largest homebuilder in the U.S.
- Provides affordable homeownership opportunities to low- to moderate-income families
- Utilizes private, government, and philanthropic funding
- Builds in pre-gentrified neighborhoods
- Utilizes innovative, cost-effective approaches including Inclusionary Zoning projects, green building, and voluntourism

www.dchabitat.org
Case Study: Ivy City

- Worked with a coalition of nonprofits (DC Habitat, Manna Inc., Mi Casa), to build in the most-distressed census tract in the city
- In a neighborhood with a population of <1,000, we put in 72 units of affordable homeownership for primarily people of color
- These homes served 288 people, or almost a third of the population
- In just five years, homes have doubled in value from mid-$200K to over $500K due to gentrification market forces
How can we replicate success?

1. Generate public and political will
2. Allocate affordable housing subsidies to full continuum of housing, especially home ownership
3. Get ahead of gentrification!
4. Engage private sector effectively, especially through Inclusionary Zoning and by allowing nonprofits to produce off-site units that better meet the needs of low-income families
Judi Kende
Vice President and New York Market Leader
Enterprise Community Partners
Housing New York

Mayor Bill de Blasio’s comprehensive plan to build and preserve 200,000 affordable units over ten years by:

• Fostering diverse, livable neighborhoods
• Preserving the affordability and quality of the existing housing stock
• Building new affordable housing for all New Yorkers
• Promoting homeless, senior, supportive and accessible housing
• Refining City financing tools and expanding funding sources for affordable housing

Enterprise
Segregation in NYC

CHOOSE A LINE, TAKE A RIDE

MEDIAN HOUSEHOLD INCOME

BRK

$200,000

$150,000

$100,000

$50,000

$0

MAN

BRX

Enterprise
The Need for More Affordable Housing

Affordability at Each Income Level

- **0-30 AMI**
  - Renter Households: 170,857
  - Affordable Rental Units at that Income Level: 575,964

- **0-50 AMI**
  - Renter Households: 369,156
  - Affordable Rental Units at that Income Level: 920,654

- **0-80 AMI**
  - Renter Households: 1,202,807
  - Affordable Rental Units at that Income Level: 1,288,186
Mapping Health Disparities in NYC

Asthma Hospitalizations per 1,000 Children*
(2010, United Health Fund Districts)

- 0.0 - 2.4
- 2.5 - 4.9
- 5.0 - 7.3
- 7.4 - 9.8
- 9.9 - 12.2

Enterprise®
Where is Affordable Housing Being Built?
Questions?

Judi Kende
jkende@enterprisecommunity.org
Data, Demand, and Demographics: A Symposium on Housing Finance

Co-presented by the Urban Institute and CoreLogic

November 2, 2016
Investor Perspectives
Differences in Portfolios and Pricing for Housing Investors

- Sarah Rosen Wartell – President, Urban Institute (Moderator)
- Chris Hentemann – Chief Investment Officer, 400 Capital Management
- John Vibert – Managing Director and Co-Head of Structured Products, Prudential

Join The Conversation
#HousingData
CAPTURING VALUE IN STRUCTURED CREDIT

400 Capital Management is a structured credit asset management firm offering qualified investors access to a broad range of investment opportunities and innovative solutions across global structured credit markets.
Residential Mortgage Credit – Changing Credit Origination

Continued but Changing Composition to Residential Mortgage Credit

Source: Inside Mortgage Finance, Urban Institute, 400CM.
* GSE risk transfer activities are completed on a 1-year lag. 2015/16 risk transfer volume is an estimate by 400CM based on CRT issuance
"The Technical Market Crash"
Trading Inventories have been reduced by 50%

Source: FRB New York, 400 Capital Management
U.S. Property Price Changes – Residential v. Commercial

U.S. Commercial and Residential Property Price Indices
(Moody's CPPI, S&P/Case-Shiller)

<table>
<thead>
<tr>
<th></th>
<th>US All Commercial Property</th>
<th>US Multifamily</th>
<th>US Residential Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>177.77</td>
<td>182.10</td>
<td>184.80</td>
</tr>
<tr>
<td>Low</td>
<td>106.87</td>
<td>113.81</td>
<td>122.63</td>
</tr>
<tr>
<td>Hi-Low</td>
<td>(70.90)</td>
<td>(68.29)</td>
<td>(62.18)</td>
</tr>
<tr>
<td>% Hi-Low</td>
<td>(39.9%)</td>
<td>(37.5%)</td>
<td>(33.6%)</td>
</tr>
<tr>
<td>Current</td>
<td>211.55</td>
<td>267.07</td>
<td>167.96</td>
</tr>
<tr>
<td>Current % Hi-Lo</td>
<td>147.6%</td>
<td>224.4%</td>
<td>72.9%</td>
</tr>
</tbody>
</table>

Source: Moody's, Real Capital Analytics; S&P/Case-Shiller/Bloomberg. As of June 30, 2016.
The Urban Institute Symposium on Housing Finance

Commercial Mortgage Credit – The Value of Seasoning

<table>
<thead>
<tr>
<th>Prvt Lbl Iss</th>
<th>Prvt Lbl LTV</th>
<th>Freddie K LTV</th>
<th>Agency Iss</th>
<th>Prvt Lbl Adj LTV</th>
<th>Freddie K Adj LTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moody’s/RCA CPPI - All Properties (RHS)</td>
<td>Moody’s/RCA CPPI - Apartment (RHS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: J.P. Morgan, Morgan Stanley, Markit, Moody’s/RCA, Bloomberg, 400 Capital Management
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Data, Demand, and Demographics:
A Symposium on Housing Finance

Co-presented by the Urban Institute and CoreLogic

November 2, 2016
Panel Two
The Post-Crisis Evolution of Mortgage Markets

- **Laurie Goodman** – Director, Housing Policy Finance Center, Urban Institute (Moderator)
- **Ted Tozer** – President, Ginnie Mae
- **Satish Mansukhani** – Mortgage-Backed Securities Strategist, Bank of America
- **Debra Still** – President and CEO, Pulte Mortgage
  Chair, Mortgage Bankers Association
- **Bob Ryan** – Acting Deputy Director, Division of Conservatorship, FHFA

Join The Conversation
#HousingData
Ginnie Mae MBS Outstanding Surges, Post Financial Crisis
42 Years to Reach $1 Trillion then to $1.73 Trillion in Six Years

$ (Billion)

Historic trend of growth
2007-2016

Unpaid Principal Balance (UPB)

Sep-90 Sep-91 Sep-92 Sep-93 Sep-94 Sep-95 Sep-96 Sep-97 Sep-98 Sep-99 Sep-00 Sep-01 Sep-02 Sep-03 Sep-04 Sep-05 Sep-06 Sep-07 Sep-08 Sep-09 Sep-10 Sep-11 Sep-12 Sep-13 Sep-14 Sep-15 Sep-16

$0 $200 $400 $600 $800 $1,000 $1,200 $1,400 $1,600 $1,800 $1,73 trillion

Sep-16
Ginnie Mae's MBS issuance market share continues to grow, surpassing Freddie Mac, and approaching the same level as Fannie Mae

*Ginnie Mae includes Single Family and HECM
Ginnie Mae MBS Outstanding Volume Continues to Grow

Agency MBS Outstanding in Billions*

Sources: Fannie Mae and Freddie Mac monthly reports; Ginnie Mae data includes HECMs
*Data for Fannie and Freddie are available up to January 2016. Data for Ginnie Mae is available up to February 2016.
## Top 5 Issuers Comparison by Issuance, 2011 & 2016* (Single Family)

### Top 5 Issuers of SF MBS Issuance in 2011

<table>
<thead>
<tr>
<th>Rank</th>
<th>Issuer Name</th>
<th>% Of Total Issuance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WELLS FARGO BANK, NA.</td>
<td>34%</td>
</tr>
<tr>
<td>2</td>
<td>BANK OF AMERICA</td>
<td>27%</td>
</tr>
<tr>
<td>3</td>
<td>JP MORGAN CHASE BANK</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>PHH MORTGAGE CORP</td>
<td>4%</td>
</tr>
<tr>
<td>5</td>
<td>U. S. BANK</td>
<td>4%</td>
</tr>
</tbody>
</table>

Total Top 5 Issuers: 76%

Total Issuance 2011: $328.7 billion

### Top 5 Issuers of SF MBS Issuance in 2016

<table>
<thead>
<tr>
<th>Rank</th>
<th>Issuer Name</th>
<th>% Of Total Issuance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WELLS FARGO BANK, NA.</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>PENNYMAC LOAN SERVICES, LLC</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>FREEDOM MORTGAGE CORPORATION</td>
<td>7%</td>
</tr>
<tr>
<td>4</td>
<td>QUICKEN LOANS INC.</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>LAKEVIEW LOAN SERVICING, LLC</td>
<td>5%</td>
</tr>
</tbody>
</table>

Total Top 5 Issuers: 40%

Total Issuance 2016: $448.7 billion

---

Green = Issuers who have risen into the top 5 since 2011
Red = Issuers who have fallen out of the top 5 since 2011

* September 2010 through August of 2011, September 2015 through August 2016
Non-Depository vs. Depository Outstanding Portfolio (Single Family)

<table>
<thead>
<tr>
<th></th>
<th>Depositories</th>
<th>Non-Depositories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep 2010</td>
<td>$866</td>
<td>$113</td>
</tr>
<tr>
<td>Sep 2011</td>
<td>$999</td>
<td>$137</td>
</tr>
<tr>
<td>Sep 2012</td>
<td>$1,047</td>
<td>$191</td>
</tr>
<tr>
<td>Sep 2013</td>
<td>$972</td>
<td>$362</td>
</tr>
<tr>
<td>Sep 2014</td>
<td>$928</td>
<td>$464</td>
</tr>
<tr>
<td>Sep 2015</td>
<td>$817</td>
<td>$649</td>
</tr>
<tr>
<td>Aug 2016</td>
<td>$772</td>
<td>$792</td>
</tr>
</tbody>
</table>

Billions

Sep 2010: 88% Depositories, 12% Non-Depositories
Sep 2015: 67% Depositories, 33% Non-Depositories
Aug 2016: 49% Depositories, 51% Non-Depositories
The Big 3 Banks’ Share of Monthly SF Issuances has Declined Substantially Over the Past 6 Years

Note: The big 3 banks are comprised of Wells Fargo, JP Morgan Chase, and Bank of America
As The Big 3 Banks’ Market Share Has Decreased the Average FICO Score Has Dropped Significantly

Note: The big 3 banks are comprised of Wells Fargo, JP Morgan Chase, and Bank of America
Avg FICO Score for Single Family FHA Issuances Drops as Non-Depositories Share Grows
Data, Demographics and Demand

Post-crises evolution of the mortgage markets

Urban Institute & CoreLogic

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BoFA Merrill Lynch does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.
MBS liquidity rises as holdings structure shifts

MBS held in more stable versus opportunistic hands today, led by domestic banks, the Fed and overseas investors

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Total</th>
<th>Bank</th>
<th>Fed</th>
<th>GSE</th>
<th>Insurance</th>
<th>MM</th>
<th>Overseas</th>
<th>REIT</th>
<th>Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014Q1</td>
<td>5480</td>
<td>1700</td>
<td>1603</td>
<td>297</td>
<td>252</td>
<td>627</td>
<td>654</td>
<td>260</td>
<td>86</td>
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<tr>
<td>2014Q2</td>
<td>5490</td>
<td>1702</td>
<td>1664</td>
<td>293</td>
<td>248</td>
<td>566</td>
<td>669</td>
<td>271</td>
<td>77</td>
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<tr>
<td>2014Q3</td>
<td>5525</td>
<td>1713</td>
<td>1696</td>
<td>293</td>
<td>244</td>
<td>544</td>
<td>689</td>
<td>266</td>
<td>79</td>
</tr>
<tr>
<td>2014Q4</td>
<td>5561</td>
<td>1710</td>
<td>1737</td>
<td>278</td>
<td>236</td>
<td>518</td>
<td>705</td>
<td>278</td>
<td>100</td>
</tr>
<tr>
<td>2015Q1</td>
<td>5579</td>
<td>1769</td>
<td>1732</td>
<td>286</td>
<td>227</td>
<td>498</td>
<td>704</td>
<td>269</td>
<td>95</td>
</tr>
<tr>
<td>2015Q2</td>
<td>5612</td>
<td>1805</td>
<td>1732</td>
<td>269</td>
<td>216</td>
<td>489</td>
<td>746</td>
<td>248</td>
<td>106</td>
</tr>
<tr>
<td>2015Q3</td>
<td>5681</td>
<td>1827</td>
<td>1741</td>
<td>261</td>
<td>202</td>
<td>549</td>
<td>749</td>
<td>241</td>
<td>110</td>
</tr>
<tr>
<td>2015Q4</td>
<td>5722</td>
<td>1899</td>
<td>1747</td>
<td>235</td>
<td>195</td>
<td>591</td>
<td>729</td>
<td>228</td>
<td>98</td>
</tr>
<tr>
<td>2016Q1</td>
<td>5767</td>
<td>1890</td>
<td>1753</td>
<td>231</td>
<td>201</td>
<td>623</td>
<td>753</td>
<td>228</td>
<td>87</td>
</tr>
<tr>
<td>2016Q2</td>
<td>5811</td>
<td>1922</td>
<td>1744</td>
<td>217</td>
<td>209</td>
<td>611</td>
<td>780</td>
<td>226</td>
<td>103</td>
</tr>
</tbody>
</table>

Percentage

|       | 100% | 33%  | 30%  | 4%   | 4%   | 11%  | 13%  | 4%   | 2%   |

Boosting the liquidity profile of MBS relative to USTs and corporates

Source: Z1, SNL Financial, HB, BofA Merrill Lynch Global Research
MBS liquidity benefits from regulations such as liquidity capital ratios (LCR) favor agency MBS

Aggregate bank holdings of Ginnie MBS have ballooned from $180bn to over $260bn, since LCR rules were finalized in late 2014

Source: SNL Financial, BofA Merrill Lynch Global Research
Non-banks have benefited from this liquidity with rising shares, especially in GNMA’s since LCR rules took effect

Non-bank originators now account for 85% of Ginnie issuance compared to 70% of conventional issuance

Source: BofA Merrill Lynch Global Research
Non-bank shares of issuance leading across purchase, first-time homebuyers and refi’s in GNMA’s

Non-bank *purchase* issuance share, GN’s versus conventionals

Non-bank *first-time homebuyer* issuance share, GN’s versus conventionals

Non-bank *refi* issuance share, GN’s versus conventionals
Begs the question, is MBS liquidity too good?

VA 4.5s paid near 100 CPR amid August peak speeds, sometimes as soon as at 1 WALA

Source: BofA Merrill Lynch Global Research
MSR multiples lower in Ginnies flag liquidity gaps

MSR pricing shows Ginnies clearing below conventionals, 2.7 vs 3.8

Source: Phoenix Capital, BofA Merrill Lynch Global Research
Urban Institute
Post-Crisis Evolution of the Mortgage Markets
Strategy

Core Purpose
Values
Vision
Areas of Strategic Focus
Balanced Scorecard
Annual Strategic Initiatives
Personal Objectives

Do the right thing
Put customers first
Be accountable
Work as a unified team
Be the best
Listen more
Be respectful
Embrace innovation
Smile daily
Stand proud
Strategy

PulteGroup

PulteMortgage

Value to the customer
Value to PulteGroup
Continually Improve Operating Model
Enable our people to succeed
Protect customers / business
Federal Regulation: Positives

- Compliance management system / formal governance
- Senior management visibility and engagement
- “Duty-of-care” for consumers
- Business expertise required / barrier of entry
- ATR – limits “race to the bottom”
- Competitive edge
Federal Regulation: Impacts

- Technical debt / business development debt
- Process re-engineering needs
- Longer cycle times
- Leakage
- Technology enhancements / complexity
- Redundancy: Federal, state, agencies
- Lower productivity / more infrastructure

Cost to produce = Cost to consumers
# Federal Regulation: Impact

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2012</th>
<th>2016</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost Per Loan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Company</td>
<td>$3,100</td>
<td>$5,700</td>
<td>$6,100</td>
<td>↑ 99%</td>
</tr>
<tr>
<td>Fulfillment</td>
<td>$850</td>
<td>$1,100</td>
<td>$1,250</td>
<td>↑ 46%</td>
</tr>
<tr>
<td><strong>Total Dollars</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal/Compliance</td>
<td>$2.0M</td>
<td>$3.5M</td>
<td>$4.0M</td>
<td>↑ 100%</td>
</tr>
<tr>
<td><strong>Closings Per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All employees</td>
<td>39</td>
<td>18</td>
<td>19</td>
<td>↓ 51%</td>
</tr>
<tr>
<td>Fulfillment</td>
<td>80</td>
<td>64</td>
<td>55</td>
<td>↓ 31%</td>
</tr>
<tr>
<td>Underwriting</td>
<td>1,299</td>
<td>343</td>
<td>253</td>
<td>↓ 81%</td>
</tr>
</tbody>
</table>
The Tight Credit Box

- Manufacturing the perfect loan / documentation
- Guidelines are “rules” / defect rates
- Investor scrutiny of manual underwritings
- Cost: LLPA calibration
- Complexity of the 97% programs
- FHA compare ratio
- Ginnie Mae MSR liquidity
- Outdated credit scoring models
- Enforcement for technical infractions
- Headlines: Reputational risk
## The Tight Credit Box: Impact

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2012</th>
<th>2016</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average FICO</td>
<td>743</td>
<td>743</td>
<td>750</td>
<td>~ 1%</td>
</tr>
<tr>
<td>FICO &lt; 680</td>
<td>14%</td>
<td>17%</td>
<td>12%</td>
<td>~ 14%</td>
</tr>
<tr>
<td>FICO &lt; 650</td>
<td>6%</td>
<td>8%</td>
<td>4%</td>
<td>~ 33%</td>
</tr>
<tr>
<td>Average LTV</td>
<td>77%</td>
<td>86%</td>
<td>83%</td>
<td>~ 8%</td>
</tr>
<tr>
<td>Average CLTV</td>
<td>82%</td>
<td>86%</td>
<td>84%</td>
<td>~ 2%</td>
</tr>
<tr>
<td>GSE 97% LTV</td>
<td>3%</td>
<td>7%</td>
<td>2%</td>
<td>~ 33%</td>
</tr>
<tr>
<td>First Time Homebuyer</td>
<td>16%</td>
<td>32%</td>
<td>25%</td>
<td>~ 56%</td>
</tr>
<tr>
<td>Average Age FTHB</td>
<td>32.4</td>
<td>34.5</td>
<td>35.8</td>
<td>~ 3.4 yr.</td>
</tr>
<tr>
<td>Size of Loan File</td>
<td>302</td>
<td>660</td>
<td>806</td>
<td>~ 167%</td>
</tr>
</tbody>
</table>
Setting Our Own Agenda
2016 Strategic Focus

The Customer Experience

Productivity

Diversity
Panel Three
Technological Advancement: Balancing Practicality with Safety and Soundness

- **Faith Schwartz** – Principal, Housing Finance Strategies, representing CoreLogic
- **Bill Emerson** – CEO, Quicken Loans
- **Jordan Petkovski** – Senior Vice President and Chief Appraiser, CoreLogic
- **Brian Faux** – CEO and Co-Founder, Morty
- **Larry Platt** – Partner, Mayer Brown LLP

Join The Conversation
#HousingData
Technological Advancement: Balancing Practicality with Safety and Soundness

Appraisal Impacts/Opportunity

November 2, 2016
Historically Available Data Sources

- MLS Books
- Public Records on Microfiche
- Paper Flood Maps
- Paper Zoning Maps
Historically Available Analytics Tools

HP 12c Calculator

Mobile Abacus???

Excel Spreadsheets
Presently Available Data Sources

- Mobile MLS
- Electronic Public Record Cards
- Digital Flood Maps
- Digital Zoning
Currently Available Analytics Tools

HP 12c Calculator

Mobile Abacus???

Excel Spreadsheets
In today’s digital environment, why do we continue to spend so much time on...
Integrating data services and analytics tools allows providers to focus on...
Benefits of Integrated Data Services & Analytics

- Reduces time on administrative tasks
- Expands time focused on analysis
- Eliminates keystroke errors
- Ensures data formatting consistency
- Increases transparency and assignment credibility
- Minimizes number of UI interactions
- Facilitates a streamlined process
- Increases overall efficiencies
It’s simple, right?
Technological Advancement: Balancing Practicality with Safety and Soundness

November 2, 2016
Data, Demand, and Demographics: A Symposium on Housing Finance

Co-presented by the Urban Institute and CoreLogic