

# Federal Reserve Bank of Chicago

## Segmenting the Markets for Risk Management



October 9, 2012

R A D A R L O G I C  
I N C O R P O R A T E D  
Making property derivatives real  
[www.radarlogic.com](http://www.radarlogic.com)

# Introduction and Agenda

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- We are pleased to meet with the Federal Reserve Bank to discuss the application of RPX technology to risk assessment and management for exposure to housing and housing finance assets.
- Our Agenda for Discussion:
  - What has changed that makes a new approach to valuations appropriate
  - How we look at housing markets, and why it's different from others
  - What we see in the markets now
  - Redefining housing and housing finance risk
  - Applying RPX to assess risk
    - Segment analytics
    - Moving Loan to Value assessment
    - RPX v. CSI
  - Using RPX to manage risk
    - Bespoke Index Analysis: RPX correlations with bond pools

# Background

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- Immediately following the “bust”, the housing markets began to change in ways never before seen
- Initially in California, brokers began busing prospective home buyers on what they called ‘foreclosure tours’ looking at properties that could be purchased at significant discounts due to their financial distress
- In 2009, Radar Logic was the first to begin segregating and analyzing what we call ‘motivated’ sales, that is, transactions where sellers were seeking simply to recover capital
- Then about a year ago, the idea of buying distressed homes and converting them to rentals became vogue and that has started a new trend in housing markets
- Housing can no longer be forecast based on simple supply/demand/demographics....
- Now it is really about accurate and timely segment analysis

# What is RPX and Why You Need It

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- RPX is a proprietary value metric for residential property based on point of sale valuations determined by analyzing actual closing records
- Valuations are based on the distribution of actual prices paid in home sales
- Unlike other major Indices, we do not use moving averages, nor do we adjust for seasonality
  - RPX is designed to reflect as close to a cash market equivalent as possible
  - Seasonality matters and managers should be able to see it
  - Our valuations reflect market volatility rather than correct for it
- With the emergence of a distressed property subset and the recent increase in activity by investment buyers, market segmentation for the purpose of risk management is more important than ever before
- These new market dynamics need to be isolated and examined carefully to assess the impact of market trends on various types of housing finance assets: performing, non-performing and default (including REO)
- The use of broad-based indexes in evaluating risk is no longer effective as aggregate metrics are now often misleading relative to their specific components.

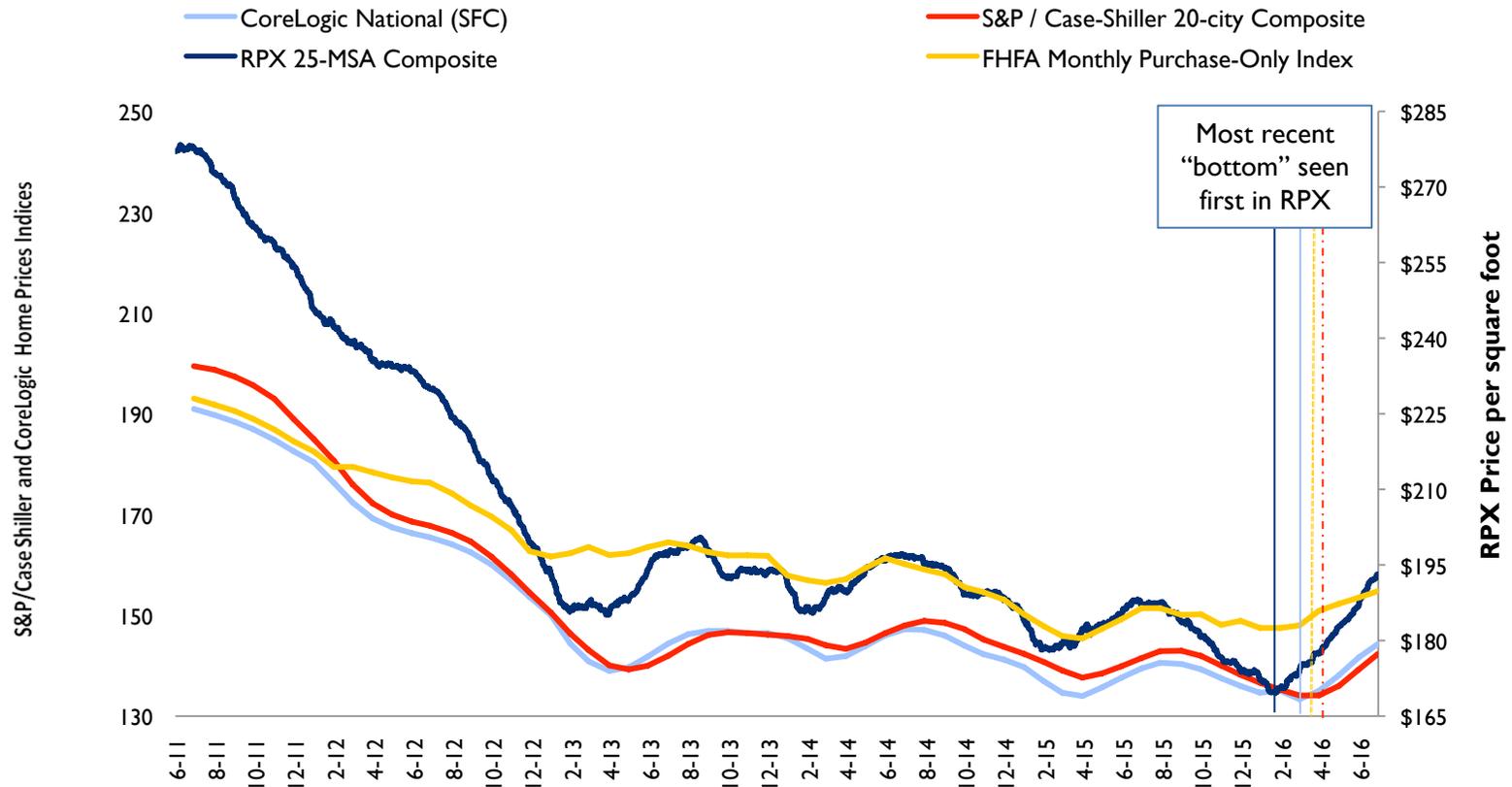
# RPX Methodology

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- RPX is a proprietary value metric for residential property based on point of sale valuations determined by analyzing actual closing records
- Records are organized by available data to include buyer, seller, price, date and square feet
- All eligible records are then analyzed by our proprietary pattern density recognition algorithm and a single maximum likely value per square foot is produced.
- RPX is broadly applied using 28 days of historical observations (allowing a statistically strong cross section of geographic markets) and updated on a daily basis
- While lagged 63 days from transaction date (allowing for data gathering and processing), daily updates capture market movements and trends faster than quarterly averages (all indexes are lagged, most more than RPX)
- We do not rely on repeat sales, outliers are considered, not filtered and no human adjustments are made.
- RPX is the result of a mathematical analysis of what actually happened at point of sale

# RPX Index Comparisons

Directional changes in home price trends appear in the RPX before the S&P/Case Shiller, CoreLogic National (SFC) and FHFA Monthly Purchase-Only Index



## Issue Defined

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- It used to be that the housing and housing finance markets were fairly predictable
  - Houses turned over roughly every seven years
  - Housing inflated at between 2 and 3% annually
  - Defaults averaged between 1 and 1.5% of total outstanding mortgages, and
  - Mortgage yields more than made up for losses.
  - Mortgages were conforming v. non-conforming and prime v. sub-prime
- Not any more.
- Housing peaked in June of 2007 at an RPX value of \$278.32 per foot
- Then it collapsed, falling to \$183.99 by the end of 2010 and hitting a low (so far) of \$169.62 in January 2012
- Now the housing and housing finance markets are segmented differently and appear to be performing in new ways

# Segment Definitions

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- In the new world of housing and housing finance, a new set of segment definitions seems appropriate
- On the physical asset side:
  - Normal Inventory: Those assets for sale by sellers who are looking to participate in a normal housing transaction
  - Radar Logic calls these “*Other Sales*”
  - Distressed Inventory: Those assets for sale by financial institutions or their agents and those assets for sale by underwater homeowners, though these are far harder to identify
  - Radar Logic calls these “*Motivated Sales*” as the sellers are motivated by a desire to recapture risk based capital
- On the buyer side
  - Homebuyers: those purchasers buying a house they want to live in
  - Investors: Both institutional and individual, those buyers whose motive is to generate a return and are not buying a house to live in
- On the seller Side
  - Homeowners: Trying to trade up, trade down or move
  - Institutions: Banks, Agents, Investors trying to recoup capital

## Portfolio Definitions

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- Against this backdrop in the physical housing market are the related finance assets that still represent large fund allocations and have been increasing in investor popularity recently as yield has become important
  - Performing Loans: Loans that are current in payment history and against which the current LTV is still  $<1:1$
  - Delinquent Loans: Loans that are behind in payments and probably should include performing loans where the current LTV is  $>1:1$ , though these can be hard to identify
  - Defaulted Loans: Loans that have gone into default, are already foreclosed and in REO balances or are in the foreclosure process and likely to become REO (including loans with dangerously high LTV)
- To best understand portfolio opportunity and risk, segments need to be analyzed on a segment based perspective
- By segmenting the physical market in line with the finance assets, risk managers and regulators avoid the dangers inherent in broad index analysis

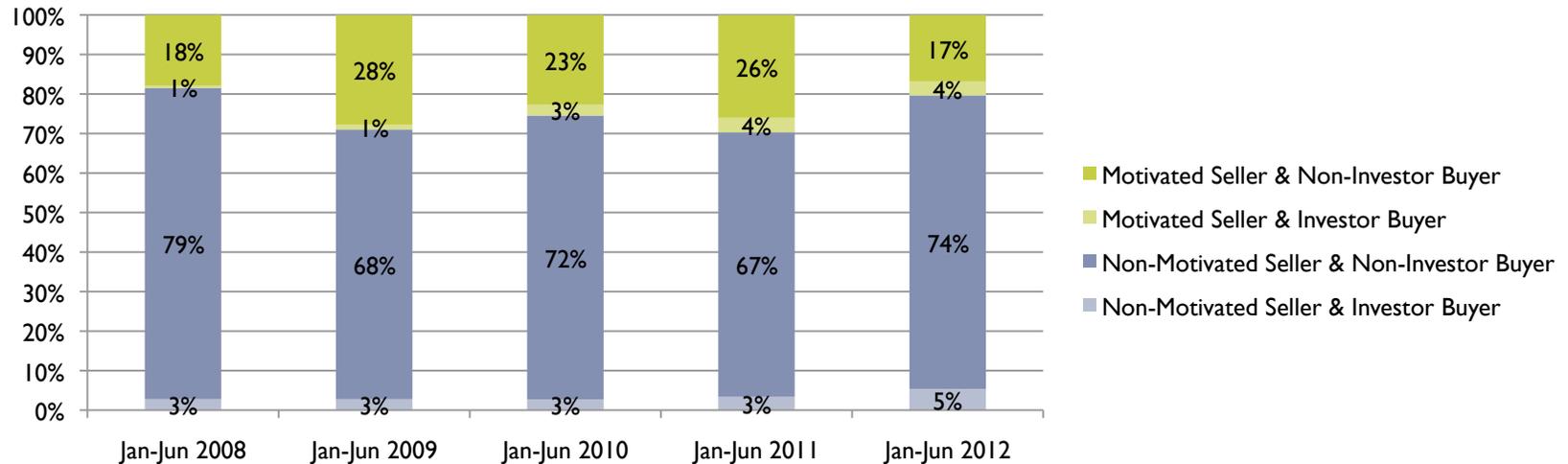
# What's Changed and Why

The chart below shows home sales in four mutually exclusive and collectively exhaustive submarkets, expressed as shares of total home sales.

- Sales by motivated sellers to investor and non-investor buyers are shown in green (light and dark, respectively)
- Sales by non-motivated sellers to investor and non-investor buyers are shown in blue (light and dark, respectively)

Since 2008, investors have made up an increasing percentage of both motivated and other sales

**Thus far in 2012, motivated sales have made up a smaller percentage of total sales than they have in any year since 2008.**



## What's Changed and Why

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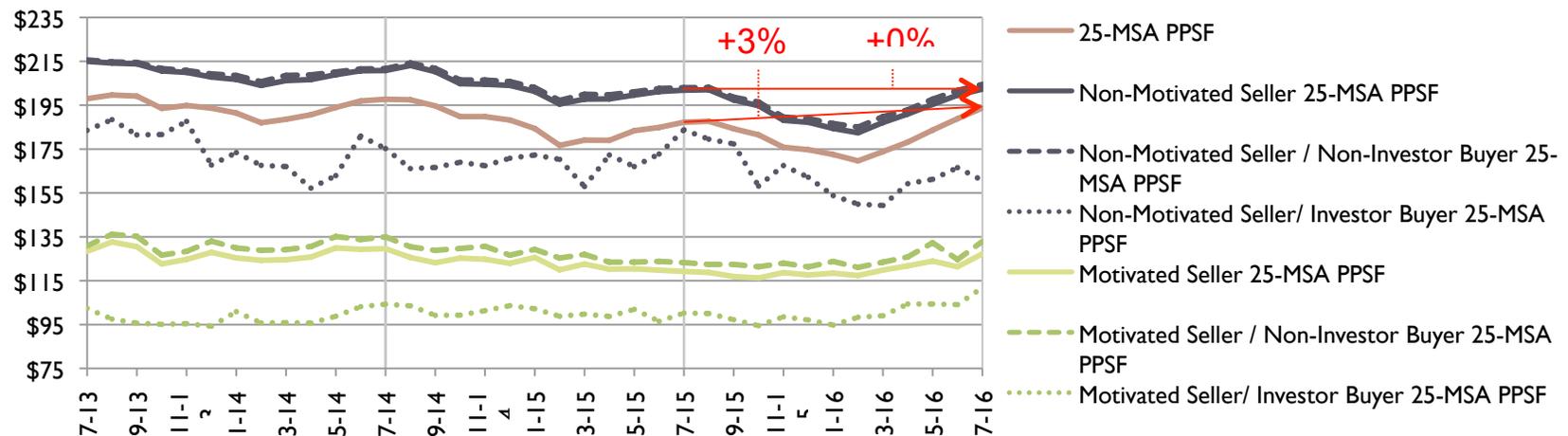
- The important observation from the prior chart is that the existence of established price differential (motivated at a 35% discount to non-motivated) and the shift in the distribution of observations as buying patterns have changed causes median or average based indexes to, in effect, misrepresent what is really happening.
- Broad indexes appear to be improving while the fact is that prices are generally flat and it's the mix of observations that is changing.

# Effect of Changing Mix

The chart below shows monthly composite prices per square foot for the 25 metros tracked by Radar Logic (in rose) and six constituent submarkets.

- The composite prices for homes sold by motivated sellers are shown in green. The solid line is the price for all motivated sales, the dotted line is the price for sales to investor buyers and the dashed line is the price for sales to non-investor buyers.
- The composite prices for homes sold by non-motivated sellers are shown in blue. The solid line is the price for all non-motivated sales, the dotted line is the price for sales to investor buyers and the dashed line is the price for sales to non-investor buyers.

**While the overall composite price has increased since last June, the composite prices for non-motivated sellers (who make up the large majority) have not.**



# A Detailed Look

While the overall 25-MSA composite price appears to be increasing, the composite price for the largest subset by far, non-motivated sales to non-investors, is not.

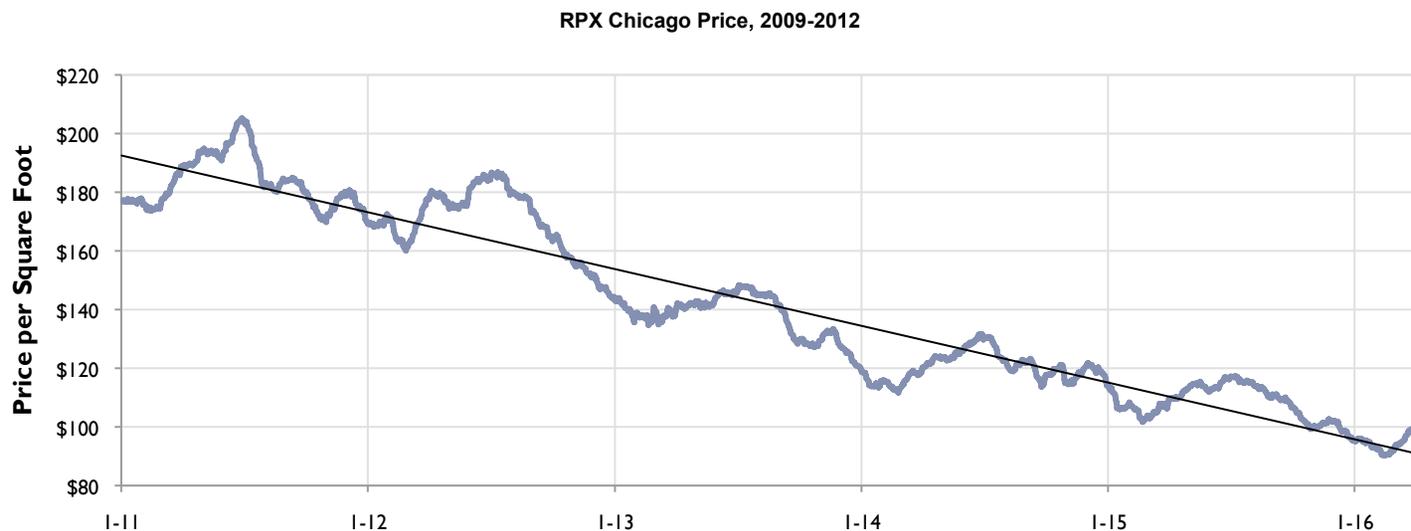
So why is the overall composite increasing? Distressed sales with low prices are making up a smaller percentage of total sales and non-distressed sales with relatively high prices are making up a larger share.

It is important to note that such shifts in the mix of sales are highly seasonal. Non-motivated sellers and non-investors tend to slow their transaction activity in the fall and winter while motivated sellers and investor buyers continue unabated. As such, relatively low-priced motivated sales and investor purchases will become a large percentage of total sales in the next six months, and Index values will fall accordingly.

Change in Composite Price per Square Foot (PPSF) as of June 2012	Year-to-Date Change	Year-Over-Year Change	2-Year Change
25-MSA PPSF	12%	3%	-2%
Non-Motivated Seller 25-MSA PPSF	10%	0%	-4%
- Non-Motivated Seller/Non-Investor Buyer 25-MSA PPSF	10%	1%	-3%
- Non-Motivated Seller/Investor Buyer 25-MSA PPSF	4%	-13%	-8%
Motivated Seller 25-MSA PPSF	7%	7%	-2%
- Motivated Seller/Non-Investor Buyer 25-MSA PPSF	7%	8%	-2%
- Motivated Seller/Investor Buyer 25-MSA PPSF	18%	12%	7%
Non-Investor Buyer 25-MSA PPSF	12%	4%	-2%
Investor Buyer 25-MSA PPSF	5%	-12%	-8%

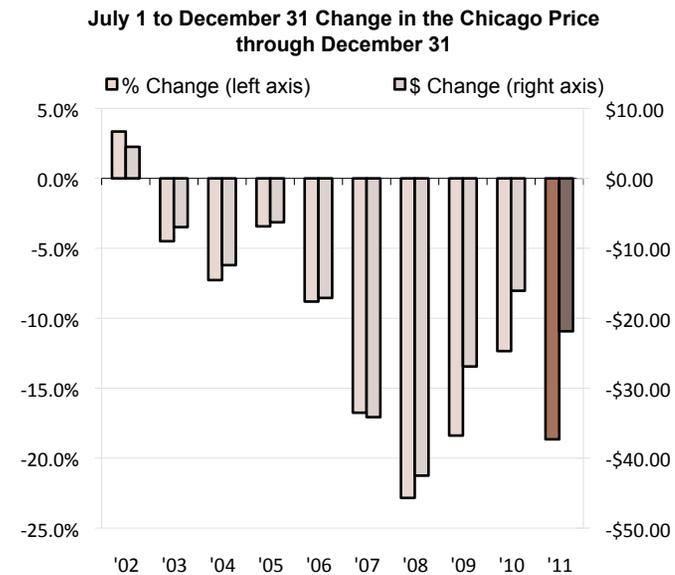
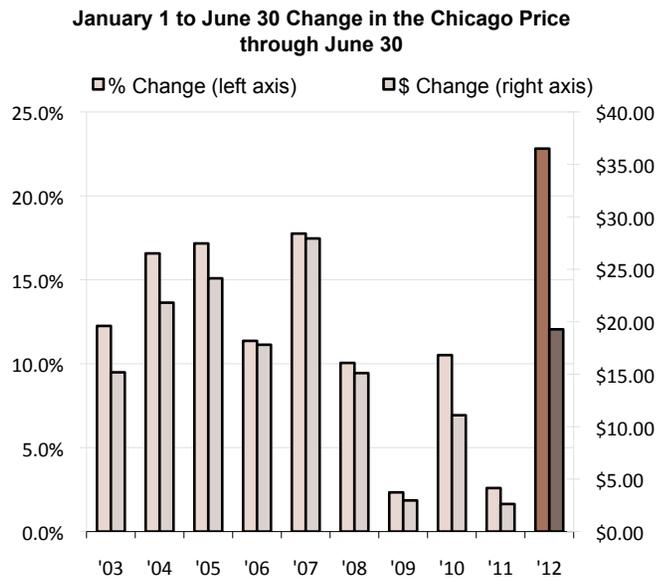
# Seasonality

- Seasonal patterns are helpful in evaluating broad market trends.
  - Historically, housing markets have peaked in late summer and hit bottom in mid winter
  - The range between peak and trough is an important indicator of market patterns
- Many Indexes adjust for seasonality, we do not
- We try to observe the impact of seasonality rather than adjust for it
- Seasonality in the Chicago MSA has declined over the past several years
  - This suggests the following:



# Seasonality and Historical Views

- Another approach to evaluating markets is to observe performance relative to same time in prior years
- This is extremely helpful in developing trend analyses and forecasts



## The Bottom Line...

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- **The bottom line is that while major Index numbers have increased, house values have not, and risk analytics need to be adjusted to measure and manage the resultant impact**
- **Analyses need to be built along segments:**
  - Portfolio Segmentation
  - Valuations based on LTVs, static and trend based
  - BPO supplement, updates or as a cost effective alternative
  - Underlying housing market risk assessment when valuing portfolio bids
  - Existing portfolio risk and stress testing
  - Trend dynamics for use in HPA forecasting
  - Frequent updates and adjustments
- Assets should be evaluated against the right market rather than against market averages

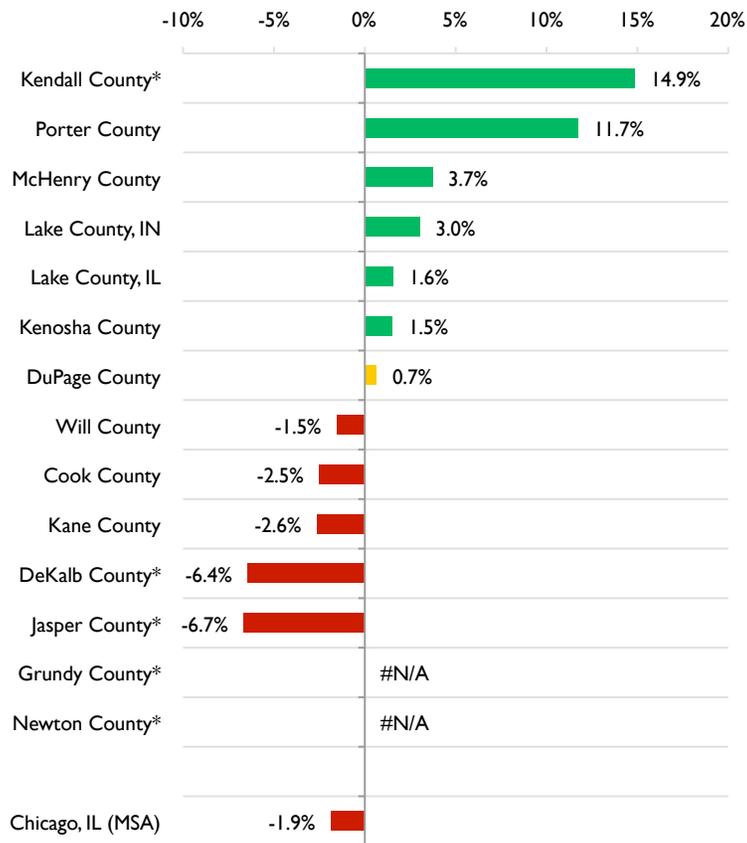
# Applying RPX Tools in Risk Management

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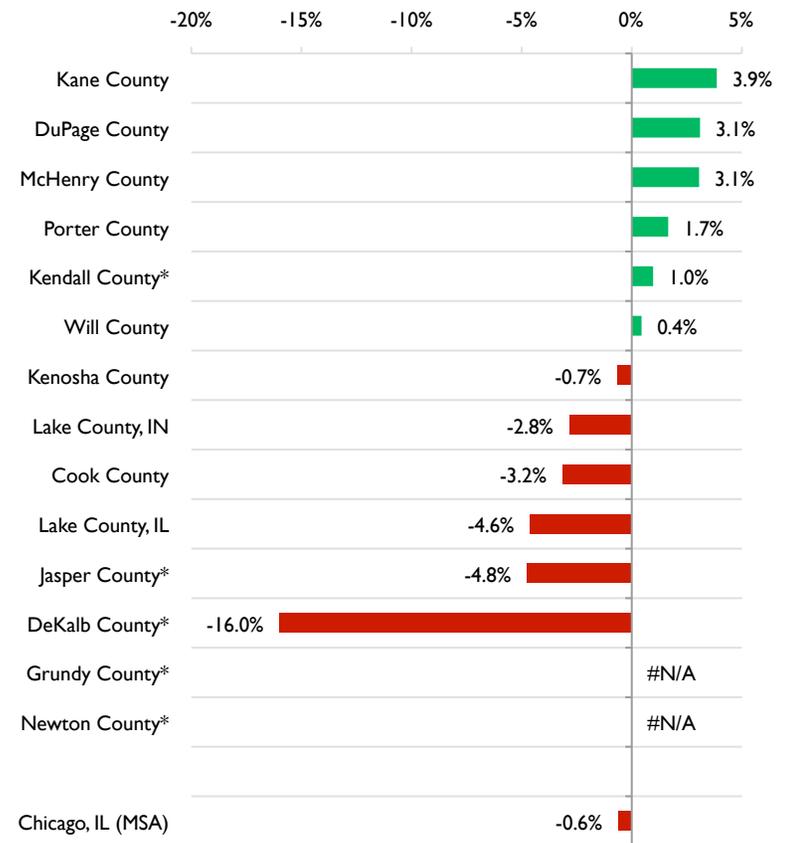
- The first step in strong asset management is to segment the assets into their appropriate market sectors
- Once aligned, risk managers can track trends in asset protection more accurately and on a “live” basis
- We look at markets on a granular and update them frequently
  - Segmentations include geography, distressed v. non-distressed and homeowner v. investor
  - Financial assets need to be aligned with the market that best reflects their fair market value
- By aligning risk assets with the right markets, stronger assessments can be made
- The following charts demonstrate how this would look

# CHICAGO: County Specific Prices

Year-Over-Year Change in PPSF as of 7/26/2012



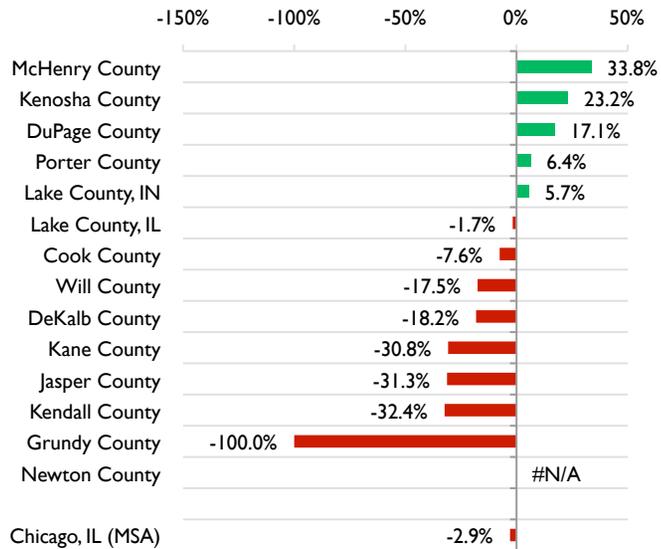
Month-Over-Month Change in PPSF as of 7/26/2012



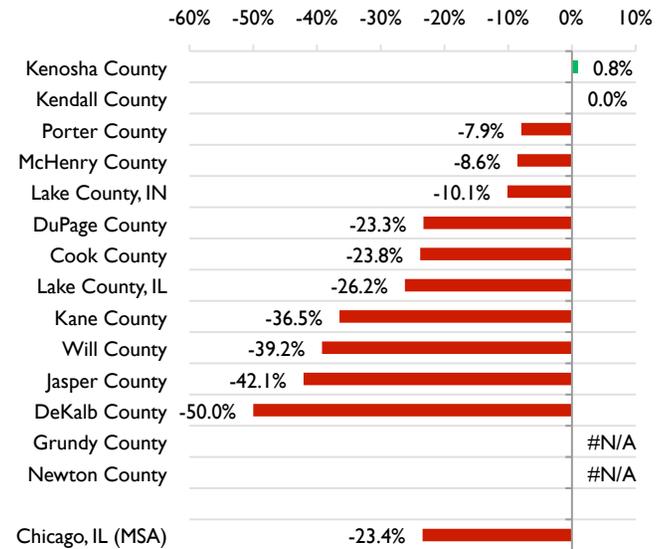
\* Sample size for county PPSF estimate is less than 30 transactions. Small sample size can create significant error in price estimates.

# CHICAGO: County Specific Volumes

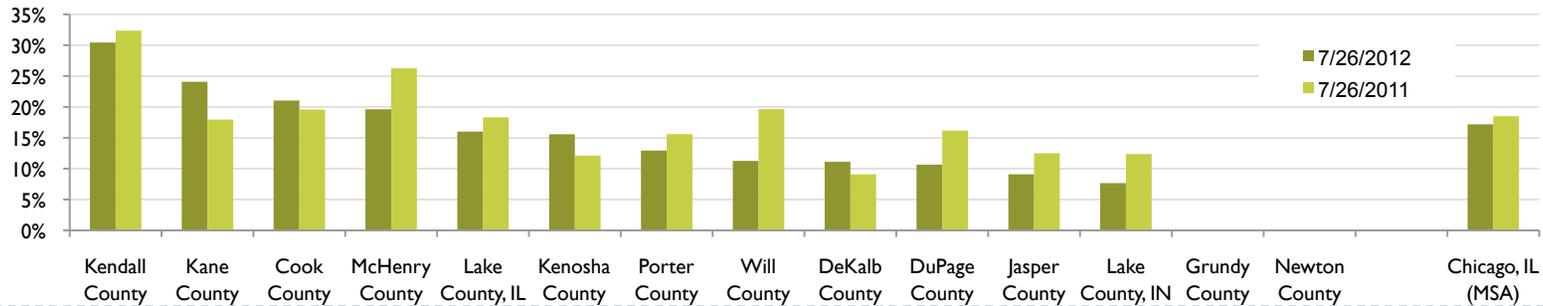
Year-Over-Year Change in Transaction Counts as of 7/26/2012



Month-Over-Month Change in Transaction Counts as of 7/26/2012

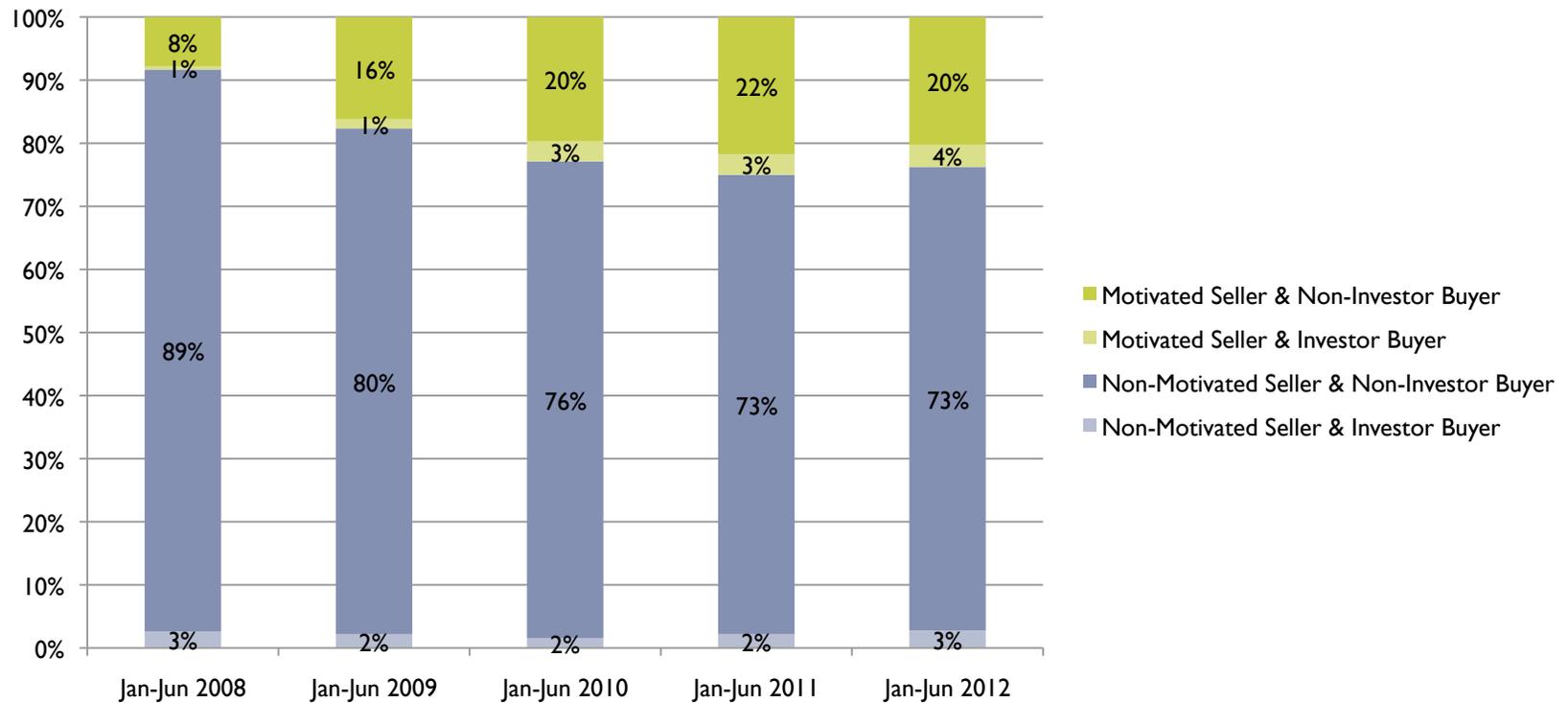


Motivated Sales as a Percent of Total Sales



# CHICAGO: County Specific Volumes

Sales Distribution: Motivated Seller/Non-Motivated Seller, Investor/Non-Investor



# CHICAGO Counties: The Motivated Discount

County	Median PPSF Aug 2011 - July 2012	Median Non- Motivated PPSF Aug 2011 - July 2012	Non-Motivated Premium	Median Motivated PPSF Aug 2011 - July 2012	Motivated Discount	Motivated Discount v. Non- Motivated
Cook County	\$122.83	\$143.49	+17%	\$56.92	-54%	-60%
DeKalb County	\$75.07	\$84.09	+12%	\$68.65	-9%	-18%
DuPage County	\$120.93	\$128.21	+6%	\$76.72	-37%	-40%
Grundy County	\$130.00	\$130.00	+0%	#N/A	#N/A	#N/A
Kane County	\$92.42	\$103.68	+12%	\$58.14	-37%	-44%
Kendall County	\$86.40	\$91.45	+6%	\$63.76	-26%	-30%
Lake County, IL	\$104.26	\$120.97	+16%	\$55.15	-47%	-54%
McHenry County	\$84.43	\$92.16	+9%	\$65.97	-22%	-28%
Will County	\$80.94	\$89.58	+11%	\$54.21	-33%	-39%
Jasper County	\$83.25	\$85.83	+3%	\$50.20	-40%	-42%
Lake County, IN	\$70.27	\$71.91	+2%	\$46.40	-34%	-35%
Porter County	\$90.77	\$94.40	+4%	\$70.04	-23%	-26%
Kenosha County	\$89.72	\$95.18	+6%	\$55.49	-38%	-42%

# USING RPX TO TRACK LTVs

ID Number	Origination Date of the loan	Postal Code	RPX Value at Origination	Original Balance	Orig LTV	Est. Original Value*	Est. Square Footage**	Current Balance	Current RPX Value	Curent RPX Value	Current RPX LTV
0001061598	3/16/2006	30175	\$92.44	498,000.00	80.00%	\$622,500	6,734	\$497,594.56	\$73.49	\$494,888.85	100.55%
0001097866	3/28/2006	91304	\$363.64	500,000.00	69.90%	\$715,308	1,967	\$456,122.52	\$198.41	\$390,287.58	116.87%
0001110733	4/11/2006	92708	\$391.42	577,500.00	70.00%	\$825,000	2,108	\$577,019.08	\$267.77	\$564,381.61	102.24%
0001111439	3/24/2006	30012	\$69.84	139,950.00	75.00%	\$186,600	2,672	\$130,258.32	\$35.30	\$94,315.29	138.11%
0001122882	4/17/2006	95037	\$405.93	753,000.00	56.00%	\$1,344,643	3,312	\$753,000.00	\$233.05	\$771,977.97	97.54%
0001122943	4/11/2006	92692	\$390.81	525,000.00	70.00%	\$750,000	1,919	\$524,887.20	\$255.93	\$491,152.99	106.87%
0001172473	4/13/2006	33486	\$260.14	159,920.00	80.00%	\$199,900	768	\$156,195.79	\$156.87	\$120,543.99	129.58%
0001174321	5/12/2006	30185	\$72.07	92,700.00	90.00%	\$103,000	1,429	\$86,547.97	\$16.37	\$23,395.45	369.94%
0001194016	3/23/2006	33764	\$165.42	815,000.00	74.10%	\$1,099,865	6,649	\$751,816.50	\$83.27	\$553,655.92	135.79%
0001206379	4/24/2006	11230	\$377.91	975,000.00	65.00%	\$1,500,000	3,969	\$903,481.86	\$298.24	\$1,183,773.91	76.32%

\*Est. Original Value was calculated with original LTV & original balance (provided in LLD)

\*\*Est. Square Footage was calculated using Est. Original Value & dividing by RPX value at origination.

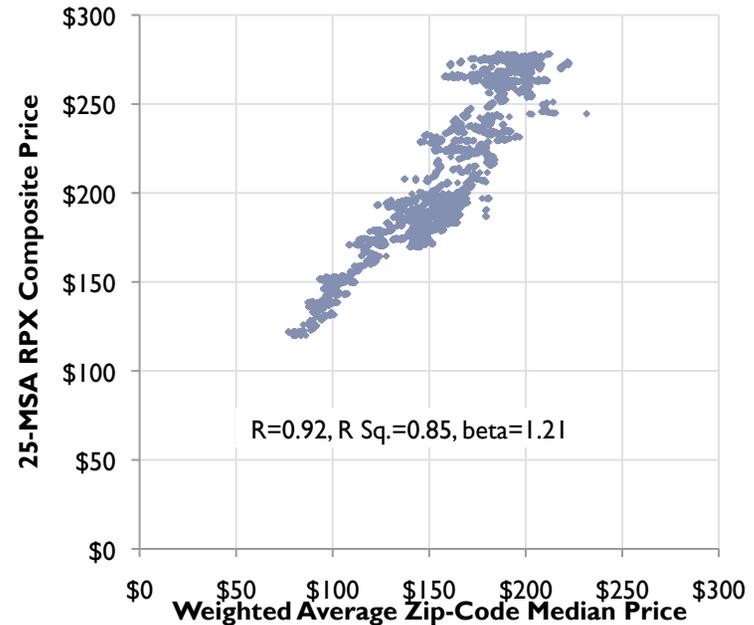
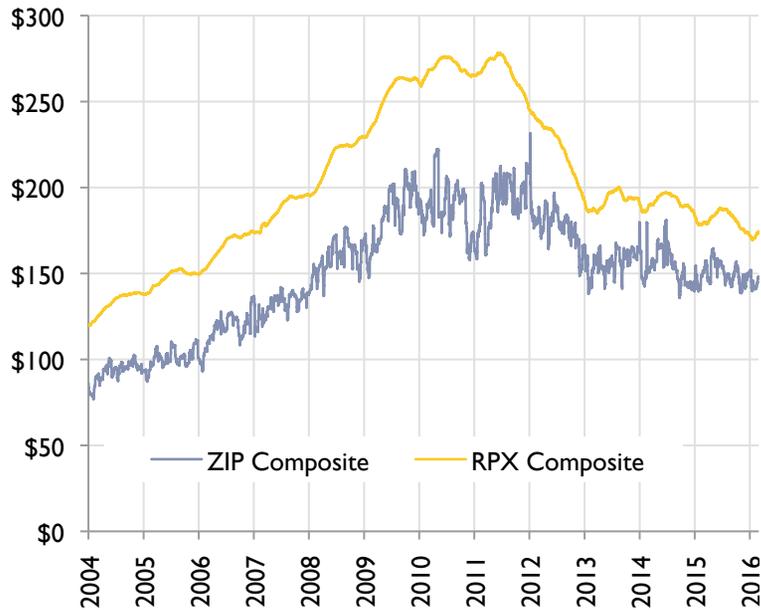
# Portfolio Hedging

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- Another approach to risk management involves the use of the existing RPX Futures market to protect the value of current holdings
- This approach has been applied to loan pools and RMBS bonds
- How does this work:
  - A dollar weighted distribution of a pool or a bond is developed on a geographic basis
  - The geographic distribution is then run as if it were an RPX Index
  - The custom index is then compared to the RPX Composite for correlation
  - To the extent they match, the Futures can be used to hedge the real estate underlying the pool
- It is important to keep in mind that what this technique hedges is the real estate underlying the pool or bond, not the pool or bond itself
  - The closer bond values reflect the underlying real estate, the closer the hedge correlates to the bond
  - However, to the extent that a form of 'deep loss' coverage is deemed appropriate, RPX Futures will provide this
  - The best example is how they hedge the risk of asset value loss in default or foreclosure

# Portfolio Hedging, continued

25-MSA RPX Composite Price vs. Weighted Average Zip-Code Median Price



Weights for the Weighted Average Zip-Code Median Price, or “Zip Composite,” are based on the geographic distribution, by value, of properties securing a whole loan pool.

Customized RPX Indexes, reflecting geographic distribution of whole loan pool or bond collateral, can be used to calculate hedge ratios when hedging with RPX Futures

## Portfolio Hedging, continued

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- It has been demonstrated that houses lose roughly a third of their value if and when they go into foreclosure
- The associated pool risk is that if loans begin to default and homes are foreclosed, the related loan to value ratios will increase by this third
- By going short the correlated RPX Futures even deep out of the money, managers can protect themselves from this cliff event

# A Suggested Approach to Risk Management

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- One approach we suggest is to provide member institutions with a matrix in which to position their assets
- The matrix can then be analyzed against active market segment data to develop the equivalent of 'live risk' models
- The matrix need not be very complex to achieve good results, and can be sorted by loan aging as well
- This approach would give monitors a far more accurate and timely view of the exposure of members to movements in the actual housing markets

# What This Approach Shows

ID Number	Origination Date of the loan	Postal Code	RPX Value at Origination	Original Balance	Orig LTV	Est. Original Value*	Est. Square Footage**	Current Balance	Current RPX Value	Curent RPX Value	Current RPX LTV
0001061598	3/16/2006	30175	\$92.44	498,000.00	80.00%	\$622,500	6,734	\$497,594.56	\$73.49	\$494,888.85	100.55%
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0001110733	4/11/2006	92708	\$391.42	577,500.00	70.00%	\$825,000	2,108	\$577,019.08	\$267.77	\$564,381.61	102.24%
0001111439	3/24/2006	30012	\$69.84	139,950.00	75.00%	\$186,600	2,672	\$130,258.32	\$35.30	\$94,315.29	138.11%
0001122882	4/17/2006	95037	\$405.93	753,000.00	56.00%	\$1,344,643	3,312	\$753,000.00	\$233.05	\$771,977.97	97.54%
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\*\*Est. Square Footage was calculated using Est. Original Value & dividing by RPX value at origination.

# Radars Logic Will Be Glad To Help

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- In addition to assisting in the design of risk analyses, RPX and Radar Logic is glad to assist in the development of hedging techniques utilizing RPX Futures
  - RPX Futures are trading on CBOE's Futures Exchange
  - Settlements are at March and September and contracts extend out five years
  - Futures have been approved by CFTC and are eligible for clearing through OCC
  - Barclays Capital is acting as a primary market maker
  - FRB Chicago may already be long risk and RPX Futures may provide an efficient offset

# Contact Information

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