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# *Defining Daily Value in a Non-Commodity Market*

## Enabling Property Derivatives: The Radar Logic Approach

Presented by

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at Real Estate Derivatives World 2007, New York, NY

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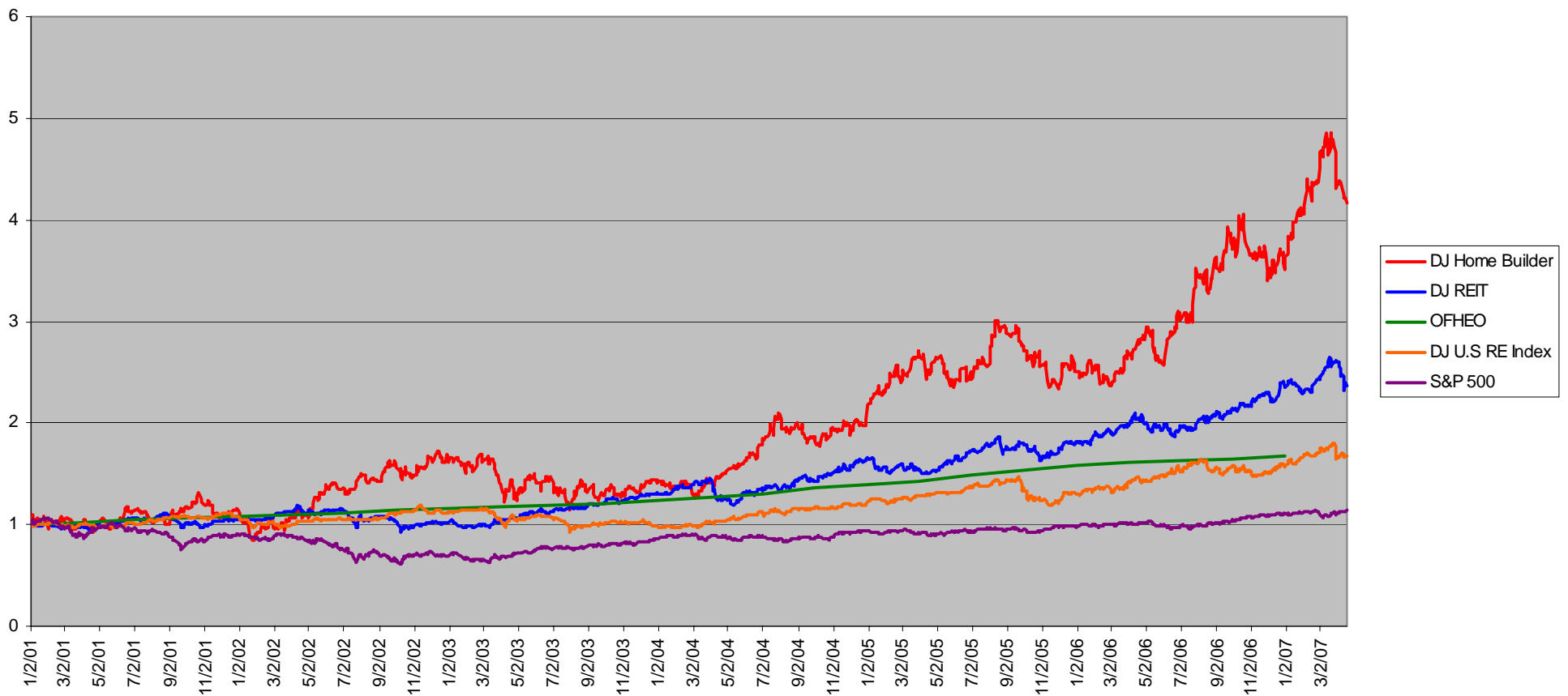
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# Real Estate Is One of The World's Largest Asset Classes ... But You Can't Trade It

- U.S residential housing assets exceed \$20 trillion
- There is no “spot” market, nor a “spot” price
- There is no ticker to watch, nor a stream of data on your Bloomberg
- To date there have been surrogates, but they are several steps removed:
  - REITs: represent equity in trusts invested in real estate; shares trade like equities
  - ETFs: the Dow Jones U.S. Real Estate Index Fund is an ETF that invests wholly in REITs
  - Homebuilder index: diluted by corporate issues not necessarily reflective of the real estate itself
  - Government data: OFHEO includes only conforming product (\$417,000 limit)

# There Is No Good Correlation

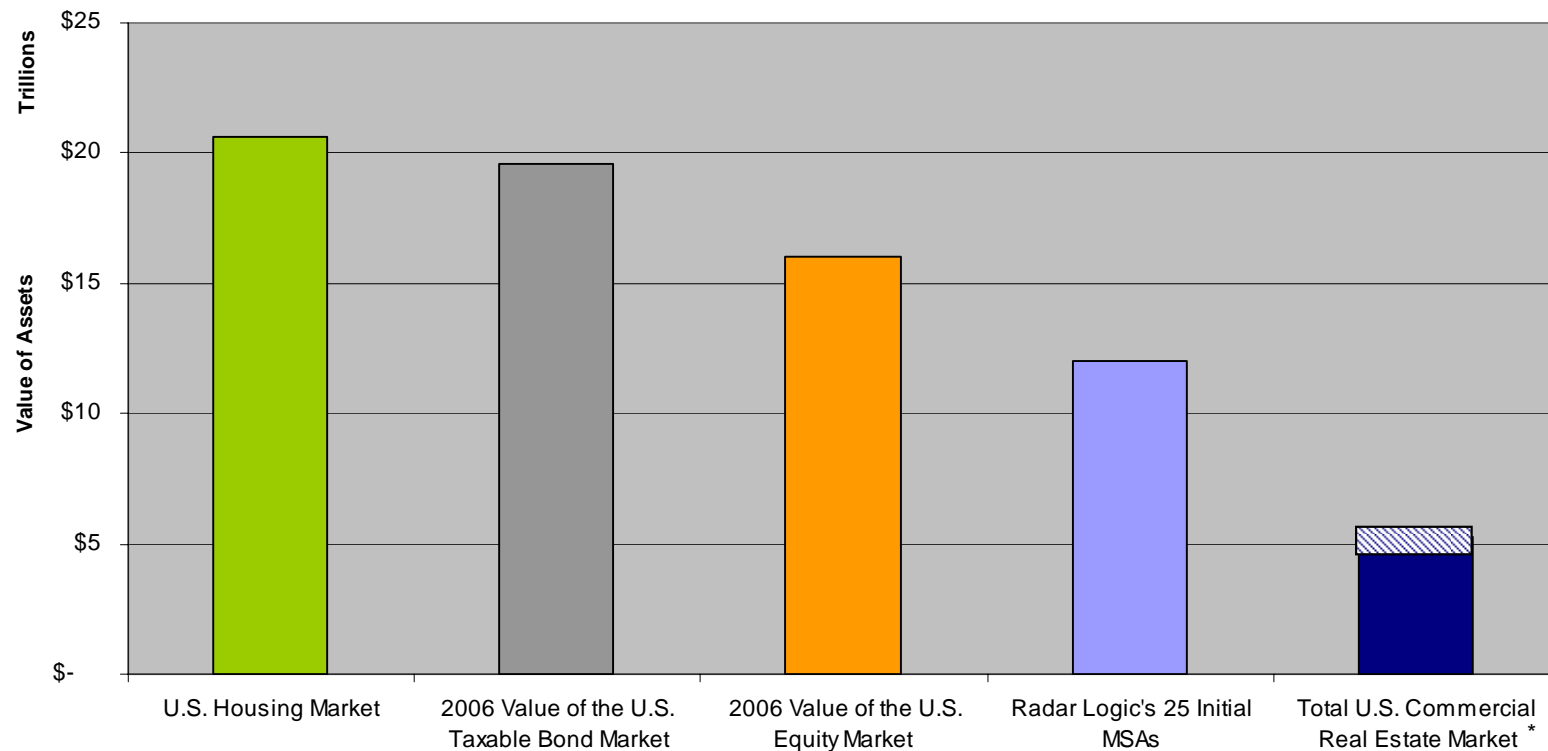
- The influence of factors other than pure real estate prices causes the obvious lack of direct correlation among these vehicles



# However, Real Estate Is a Market

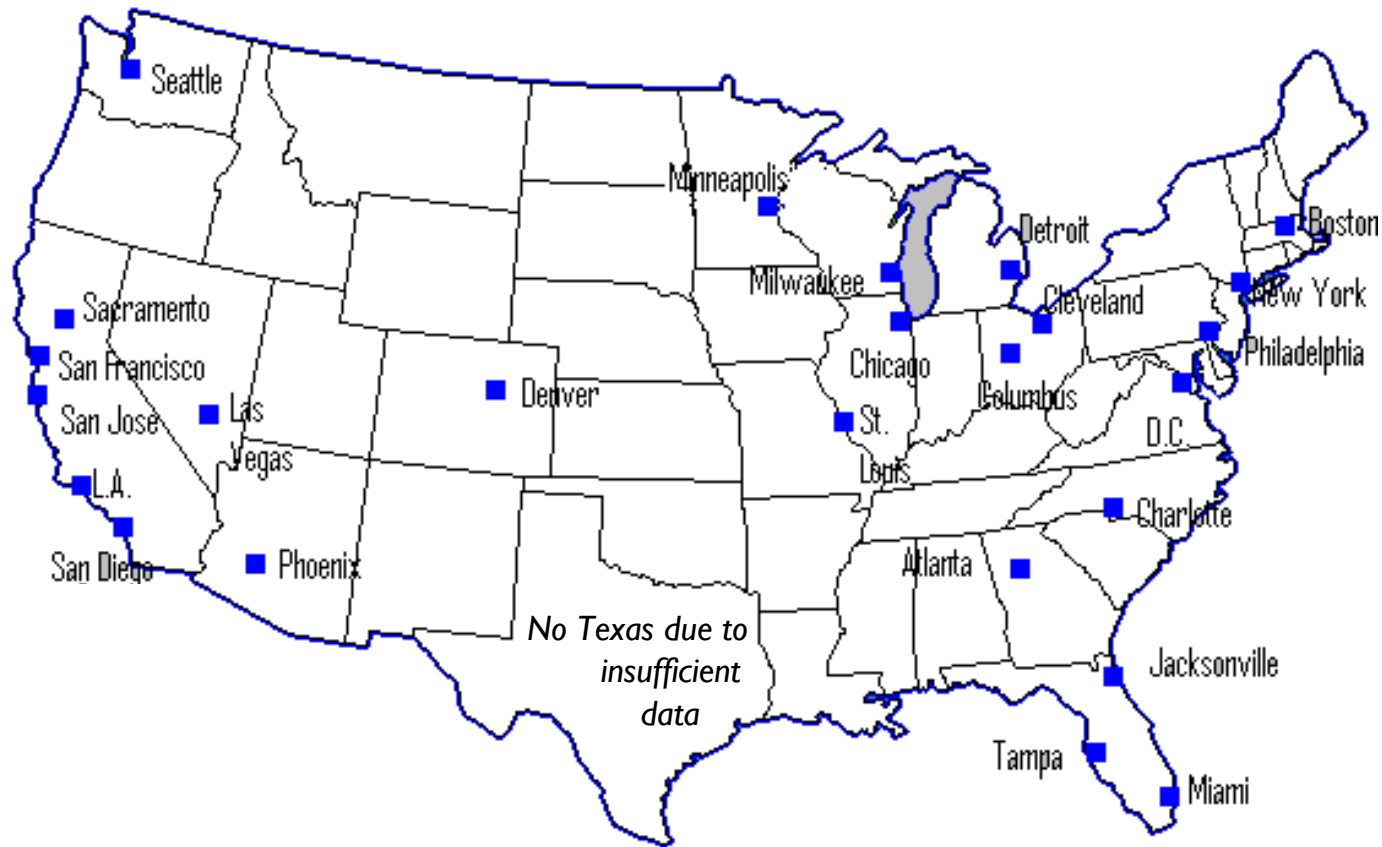
- U.S. residential housing has a greater valuation than either the U.S. taxable bond markets or the U.S. equity market
- 124 million units in U.S. housing inventory
- 7.5 million residential transactions in 2006 = \$1.8 trillion value

Market Comparison



\* \$1.3 trillion of U.S. commercial real estate market assets are residential.

# Radar Logic's 25 Initial MSAs



**Radar Logic's 25 initial MSAs represent over \$10 trillion in assets;  
we will produce a "composite" index as well.**

# How Radar Logic Looks at the Market: Calculating Intelligible Values from Actual Data

- Radar Logic calculates intelligible values from the actual data
- We combine title transfer prices with available data on square footage
  - The public source data comes from municipal offices
  - Unlike other property derivative entrants, we include as many transactions as we can (e.g., condos, new homes, foreclosure sales, etc.)
- By using maximum data with the power of advanced statistical analysis:
  - We are able to be more robust than other indices
  - We illuminate market trends and volatility, and
  - Our daily prices are highly representative of the actual property markets
- This sophisticated analysis was accomplished through the development of proprietary algorithms by our affiliate, Ventana Systems, one of the leading mathematical consulting firms in the world

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VENTANA  
systems, inc.

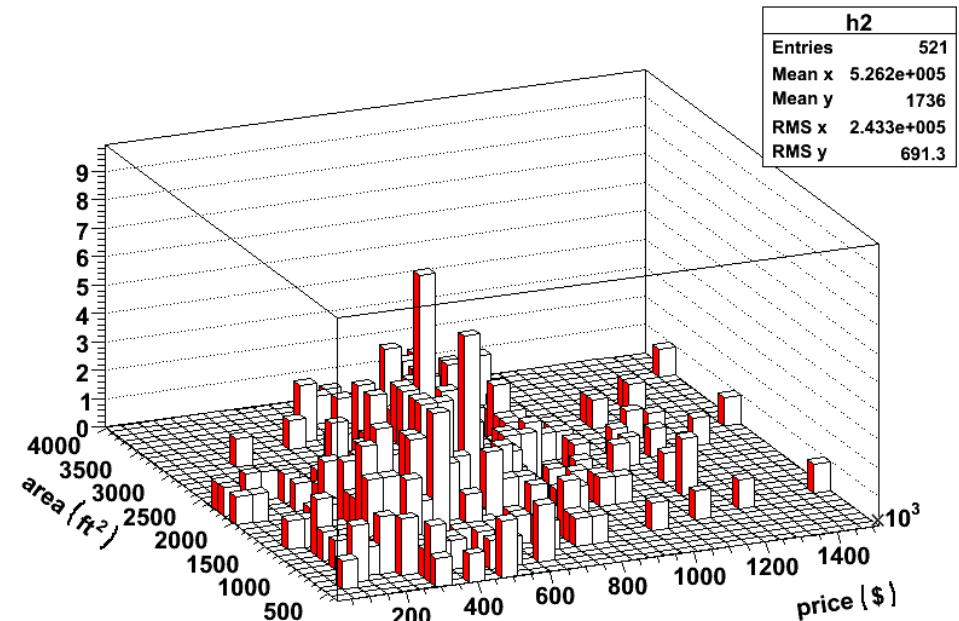
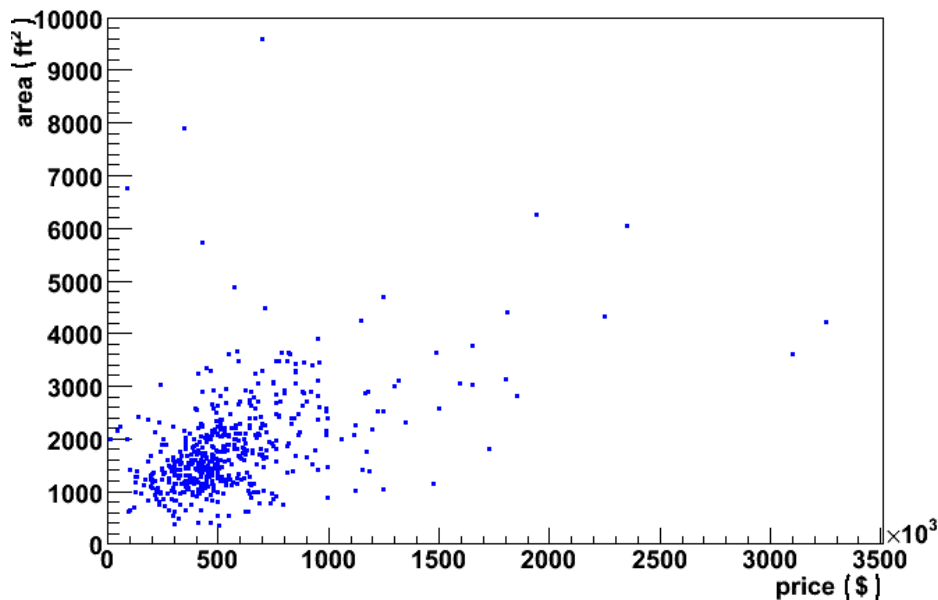
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# How Radar Logic Looks at the Prices

- We considered using simple statistics like average or median
- Our analysis showed that there is a pattern in the data that holds across different times and different MSAs
  - The pattern segments the ppsf spectrum into three ranges which roughly correspond to the low, mainstream, and high ends of the market
- We apply a sophisticated statistical technique and generate a more robust output
  - We use a year's worth of transaction data to understand the pattern of the underlying housing price in the MSA
  - We use a given day's transactions to identify the daily price within that landscape
  - In mathematical terms, we generate a probability distribution function with parameters derived from a year of data, and then calculate the daily prices using "maximum likelihood"
  - **We do not eliminate any trade that we are confident is legitimate**

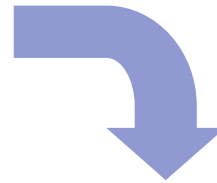
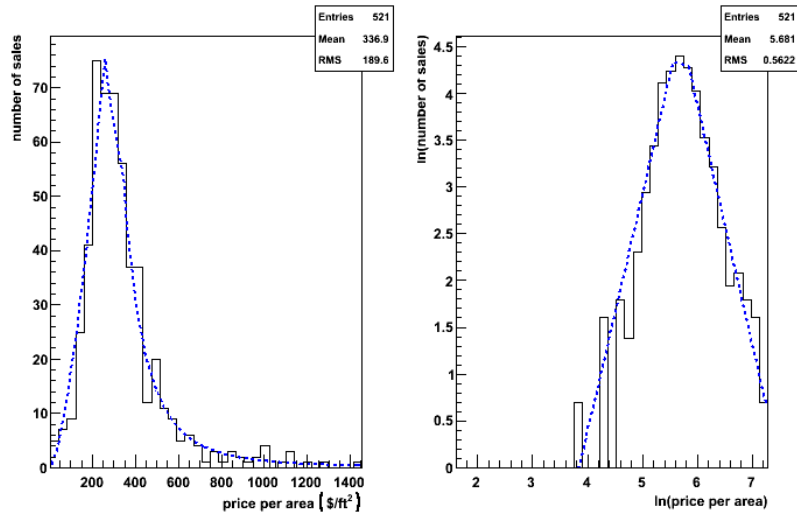
# Chaotic Data Distribution ... Sample Distribution of Transaction Data in the New York MSA



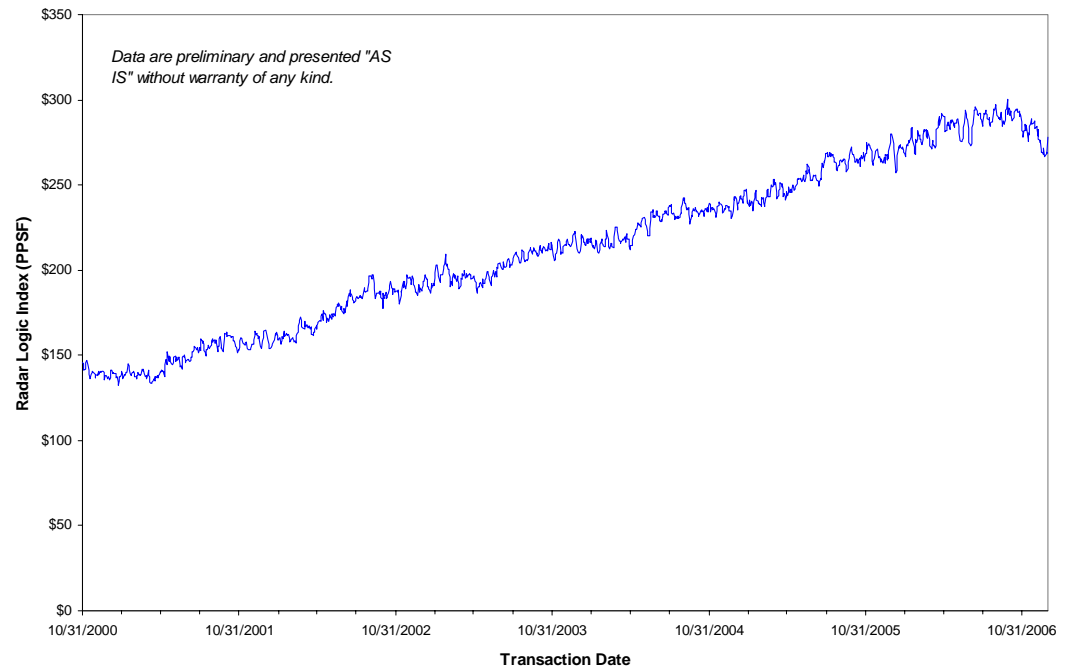
- In its raw form, the distribution of transaction observations appears to be chaotic



# Logical Results: Our Pattern Recognition Techniques Enable Visibility of Actual Market Dynamics



Radar Logic Index: New York (7-day)



# The Application-centric Approach

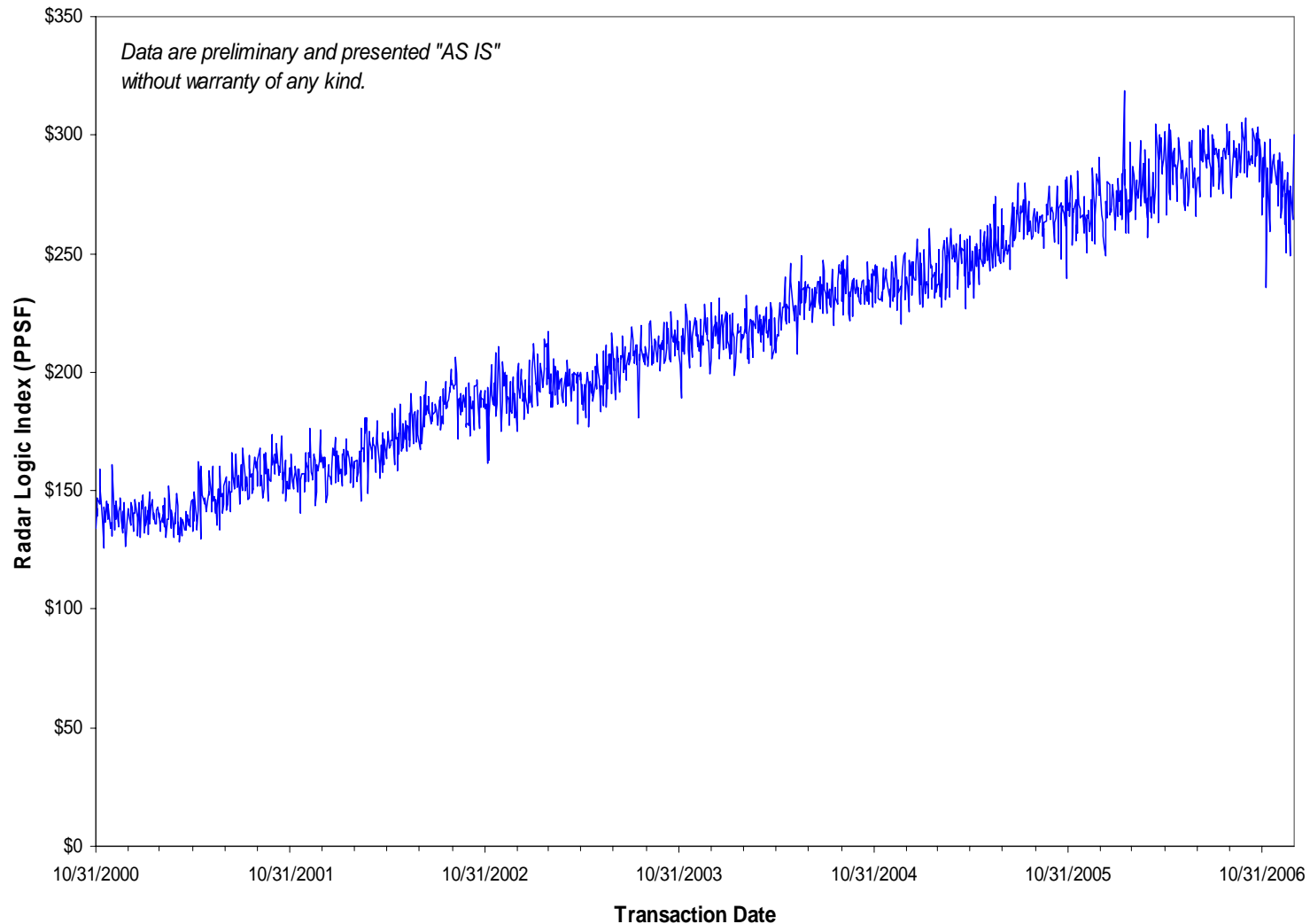
- Application-centric approach: start with what has practical value to end user customers
  - Financial customers: investment alternatives, enhanced project finance
  - Enterprise customers: opportunity and risk management
- Defining the ideal application
  - What's the right metric?
  - What's the right frequency?
  - Which transactions should be captured?
- Metric: price per square foot
- Frequency: daily
- Transactions captured
  - Every transaction is a trade

***“THE MARKET IS THE MARKET”***

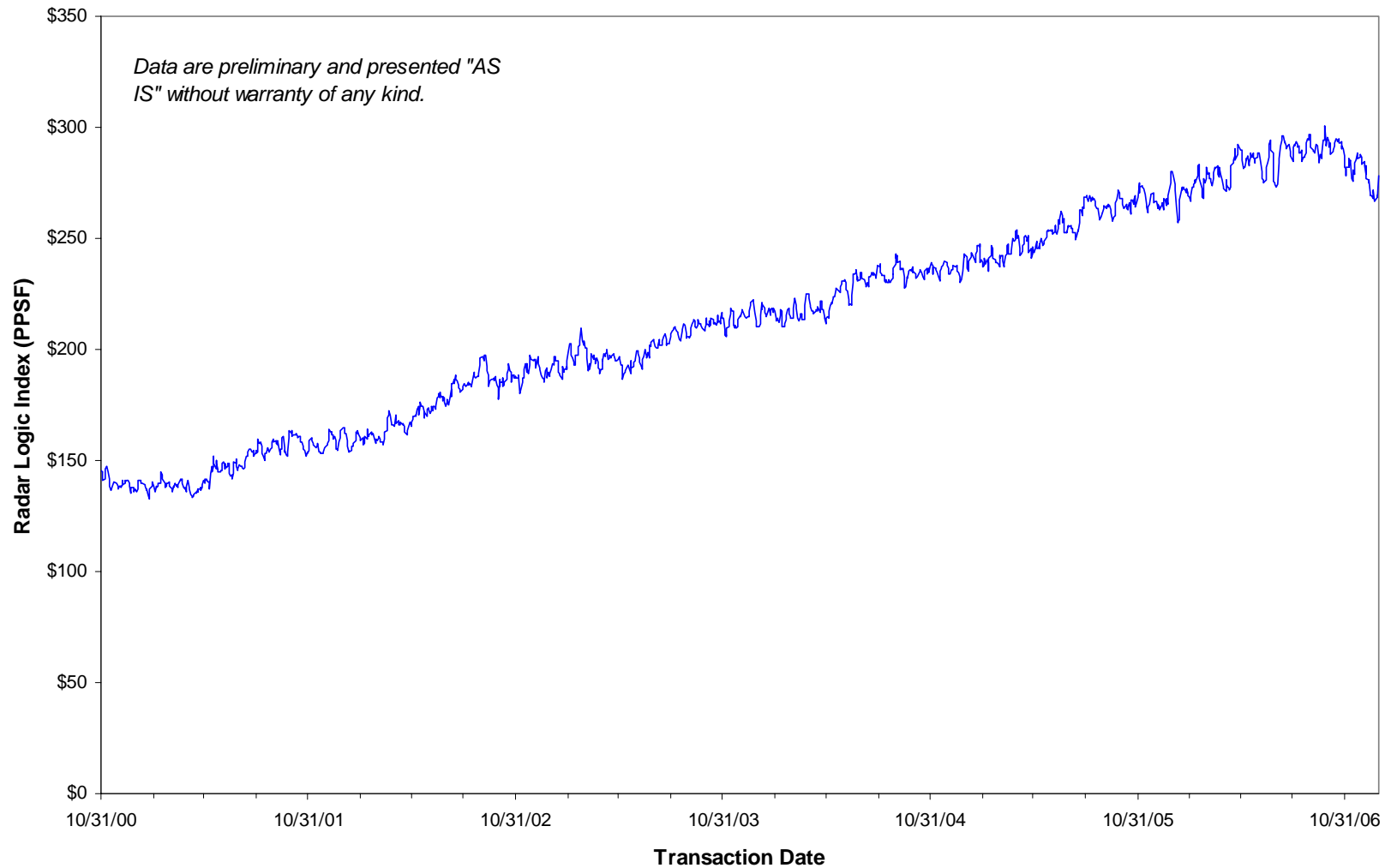
# The Application-centric Approach

- The next three charts show our results for the New York MSA on a 1, 7 and 28 day basis.
  - 1 day: This is the daily price observation exhibited as each day's actual observations, one day at a time.
  - 7 day: Exhibits our output as a daily calculation of the price observed as a result of 7 rolling calendar days worth of observations
  - 28 day: Exhibits our output as a daily calculation of the price observed as a result of 28 rolling calendar days worth of observations

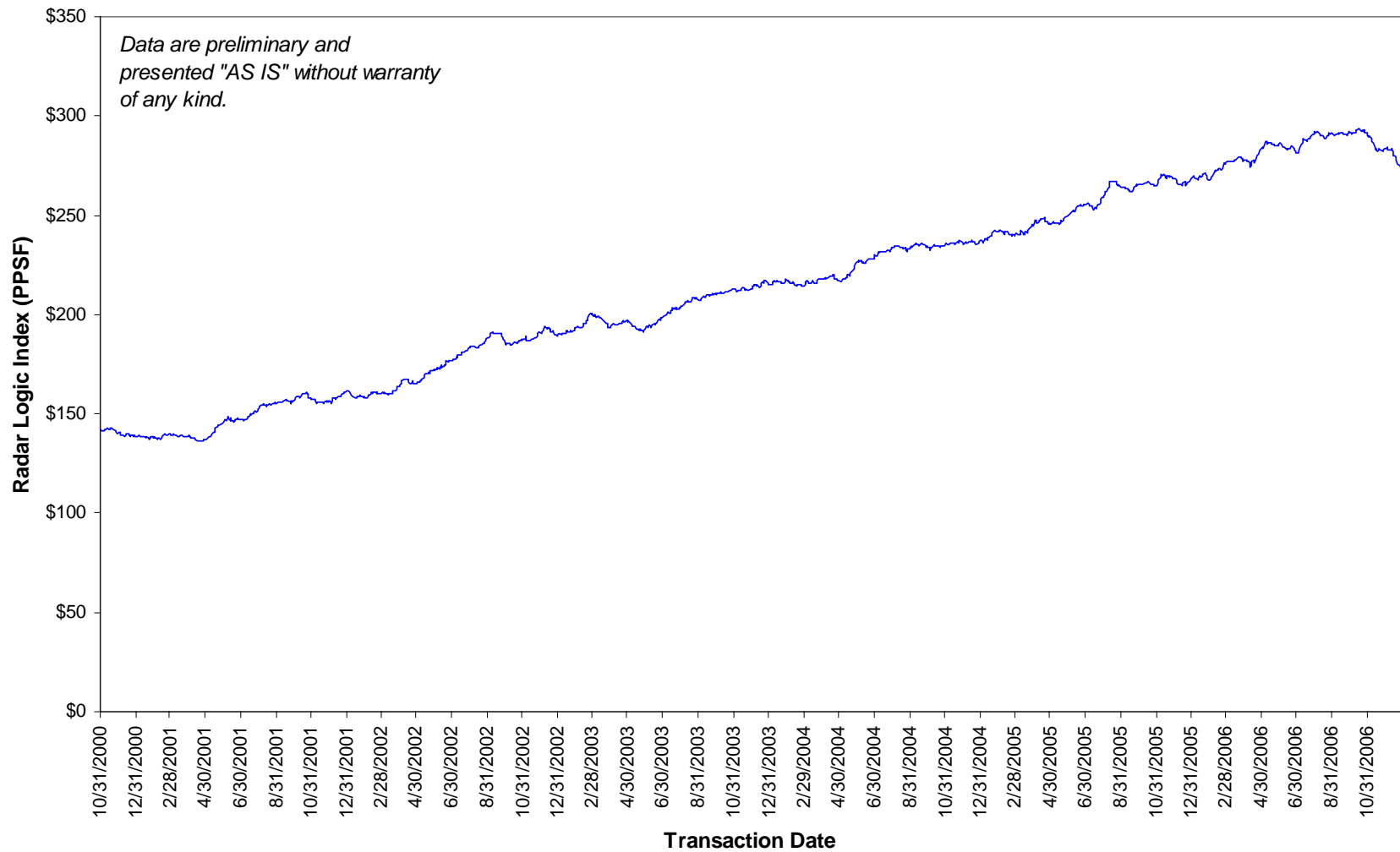
# New York Daily Price



# New York (7-day)



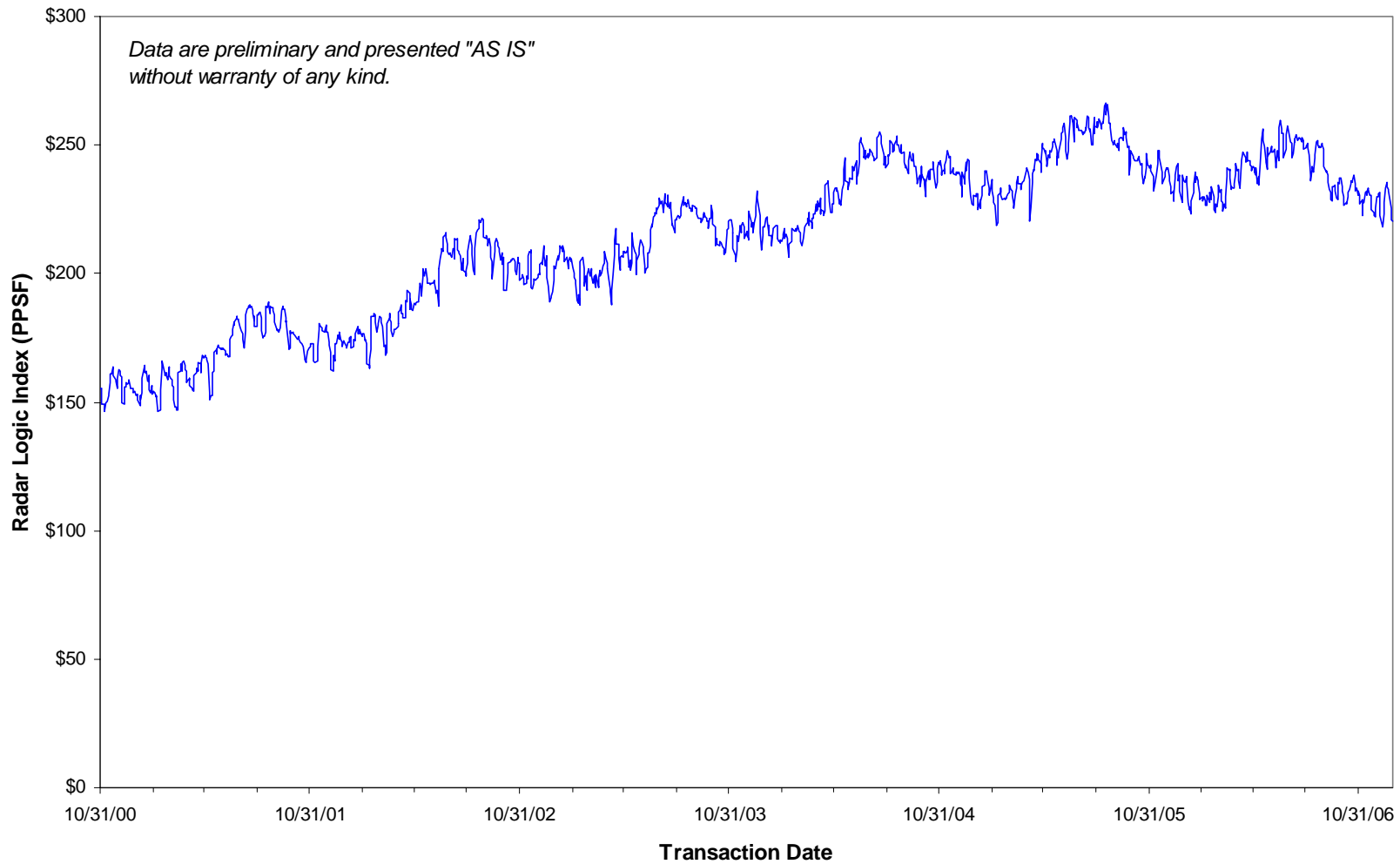
# New York (28-day)



# What the Data Can Tell Us: Seasonality

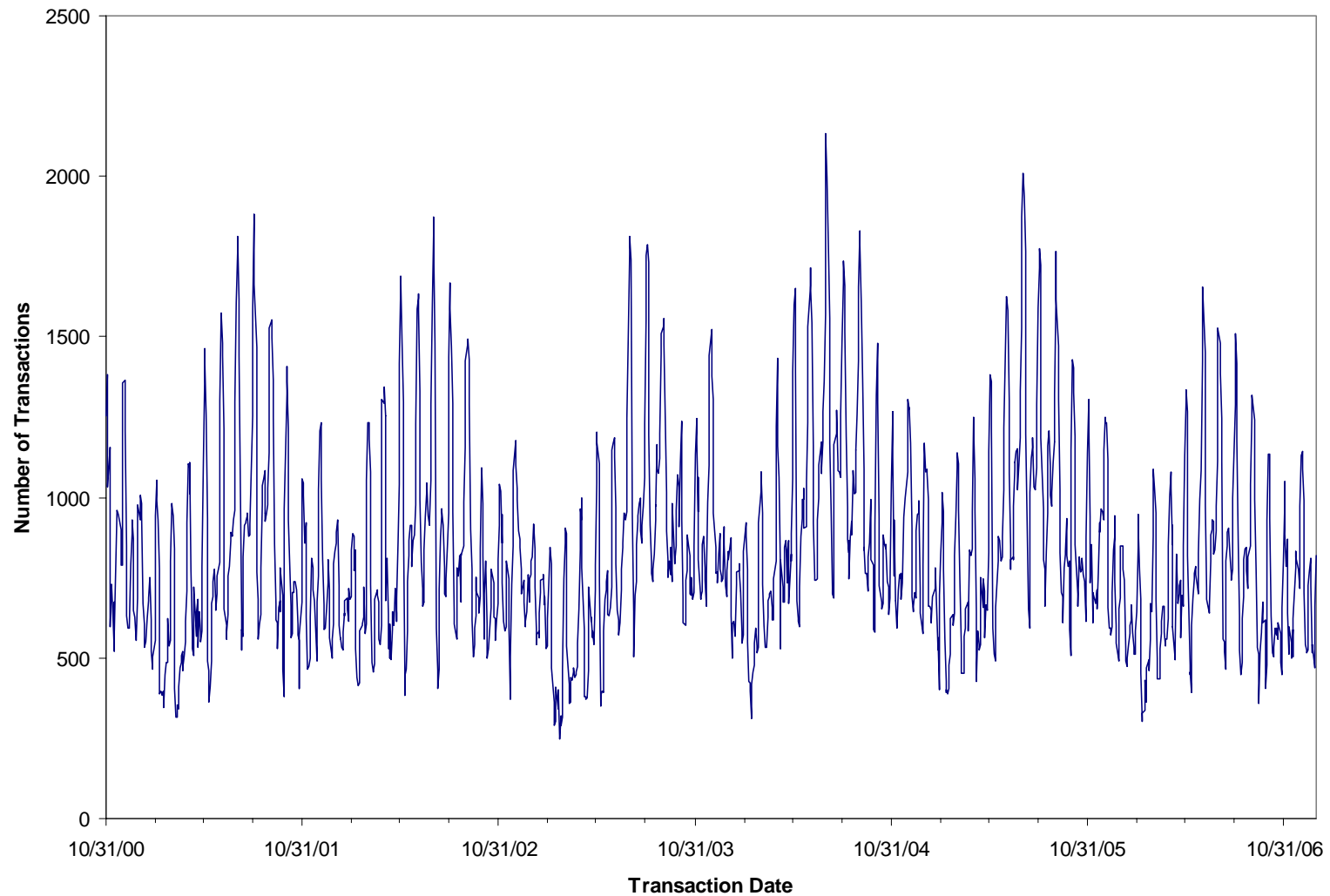
- Financial customer
  - Does it matter when your trade settles?
- Enterprise customer
  - Does it matter when you sell your product?
  - Does it matter how you hedge?
- If there is no *seasonality* in a given market, the answer to these questions may be “NO”
- However, if there is meaningful *seasonality*, the answer is clearly “YES”
- Let’s look at Boston
  - Seasonality is evident in both price observation and volume observation
  - Other vehicles do not exhibit the existence of seasonality

# Boston (7-day)

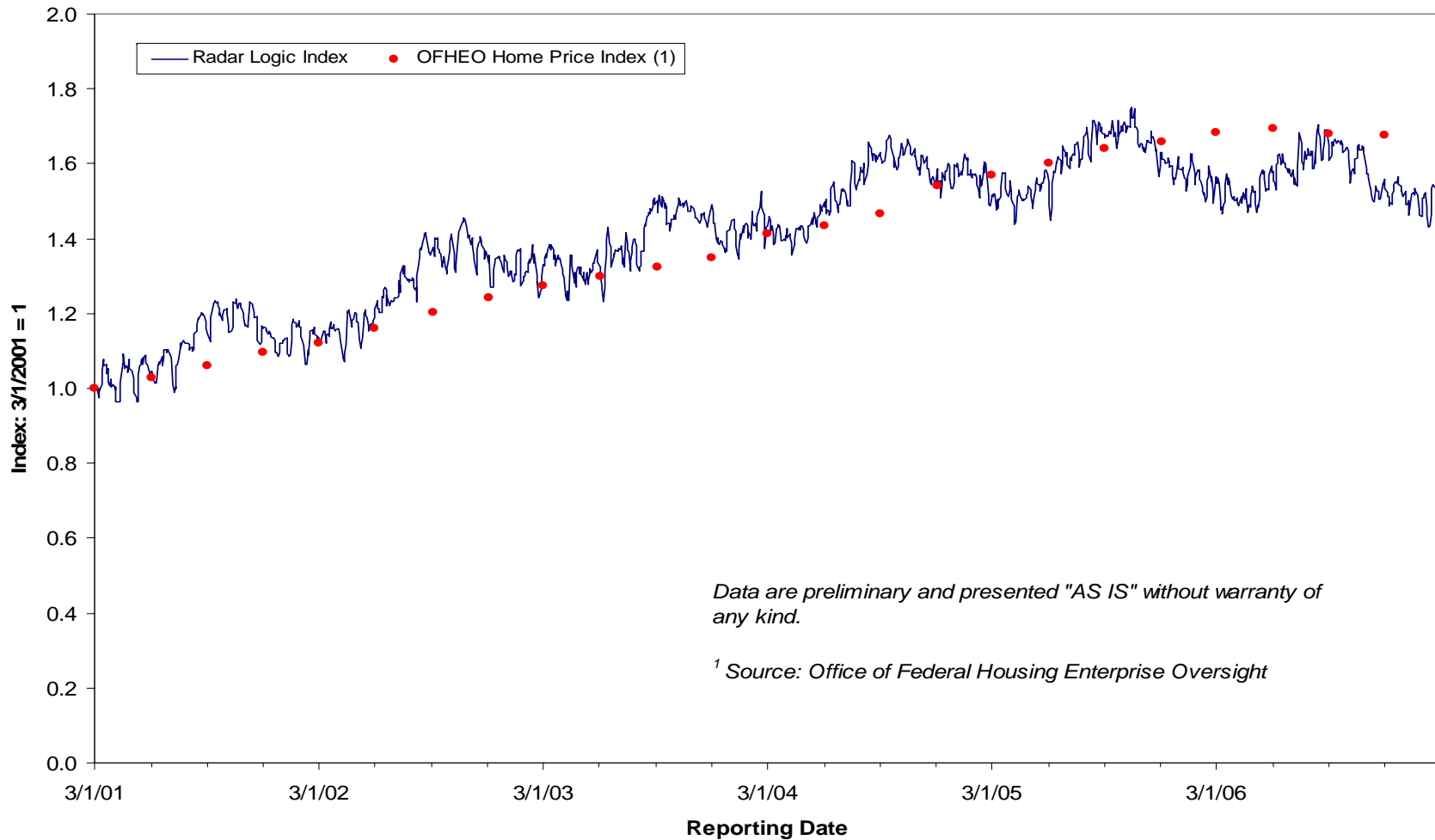




# Boston (7-day): Transaction Volume



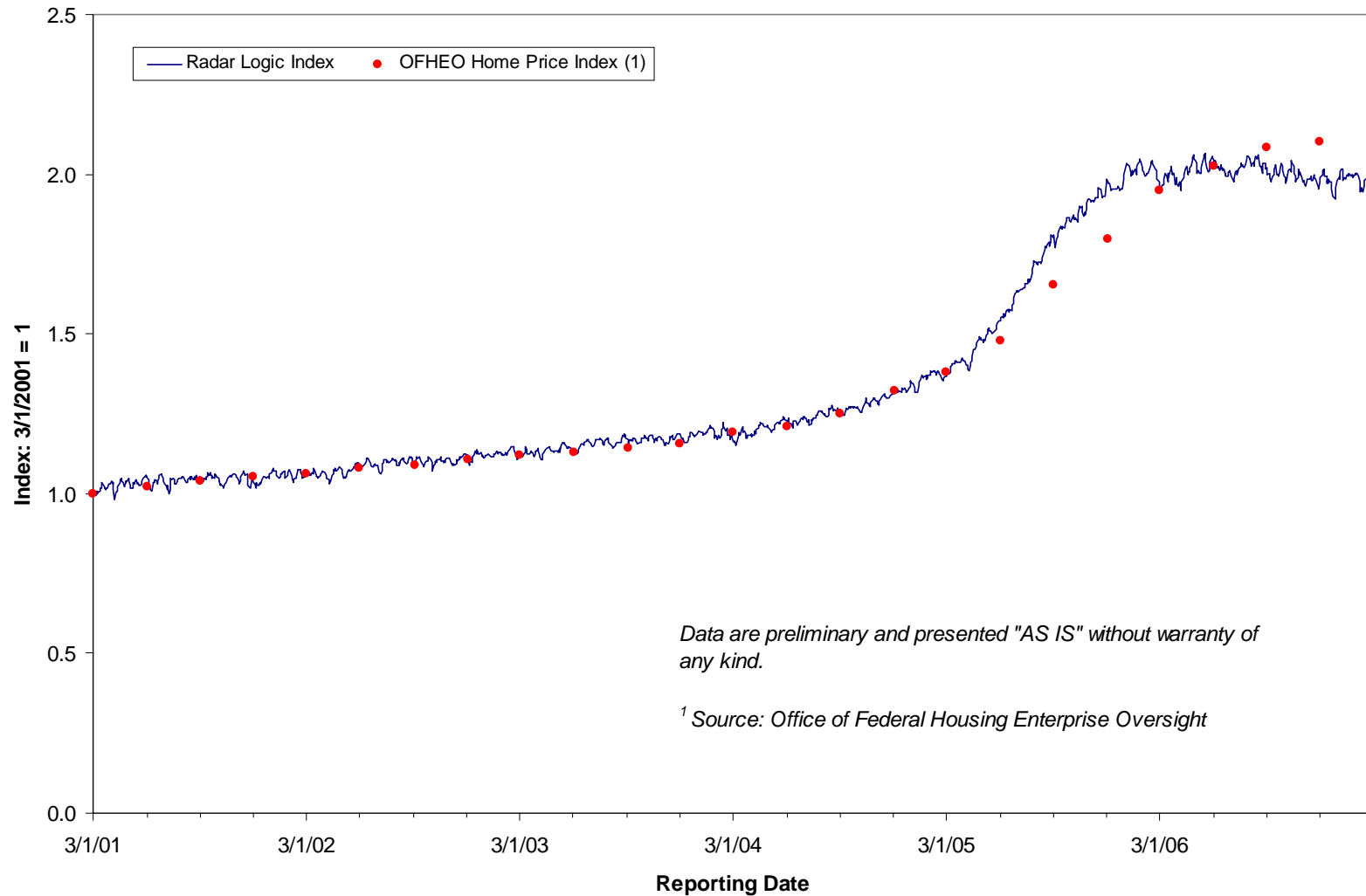
# Boston (7-day) vs. OFHEO



# What the Data Can Tell Us: Frequency

- Does the frequency of reporting matter?
  - If markets are stable then “NO”
  - If markets are rapidly moving, then “YES”
    - “Seeing” the market turn
- Let’s look at Phoenix
  - By viewing the data daily, we see market trends sooner and more clearly

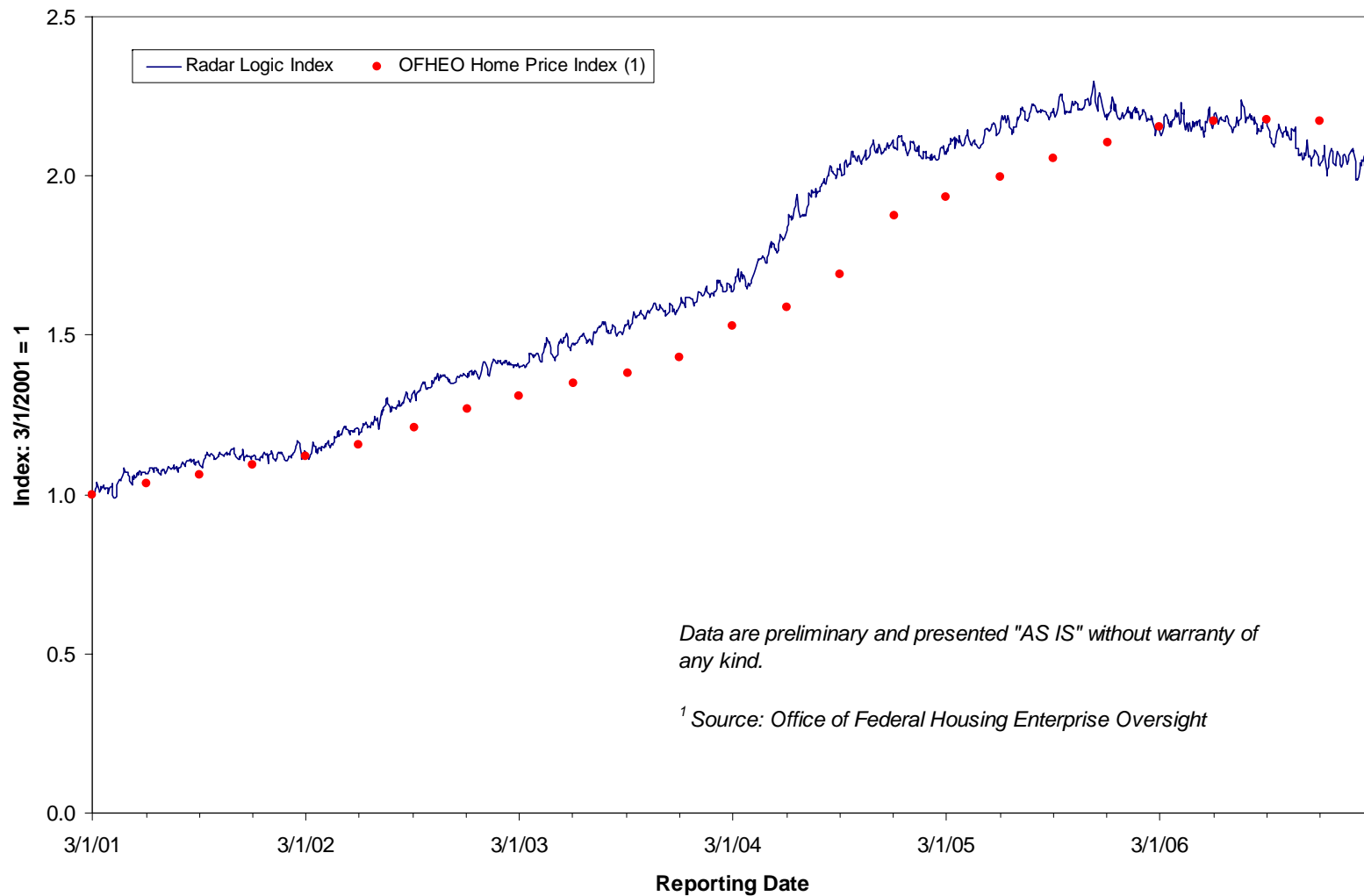
# Phoenix (7-day) vs. OFHEO



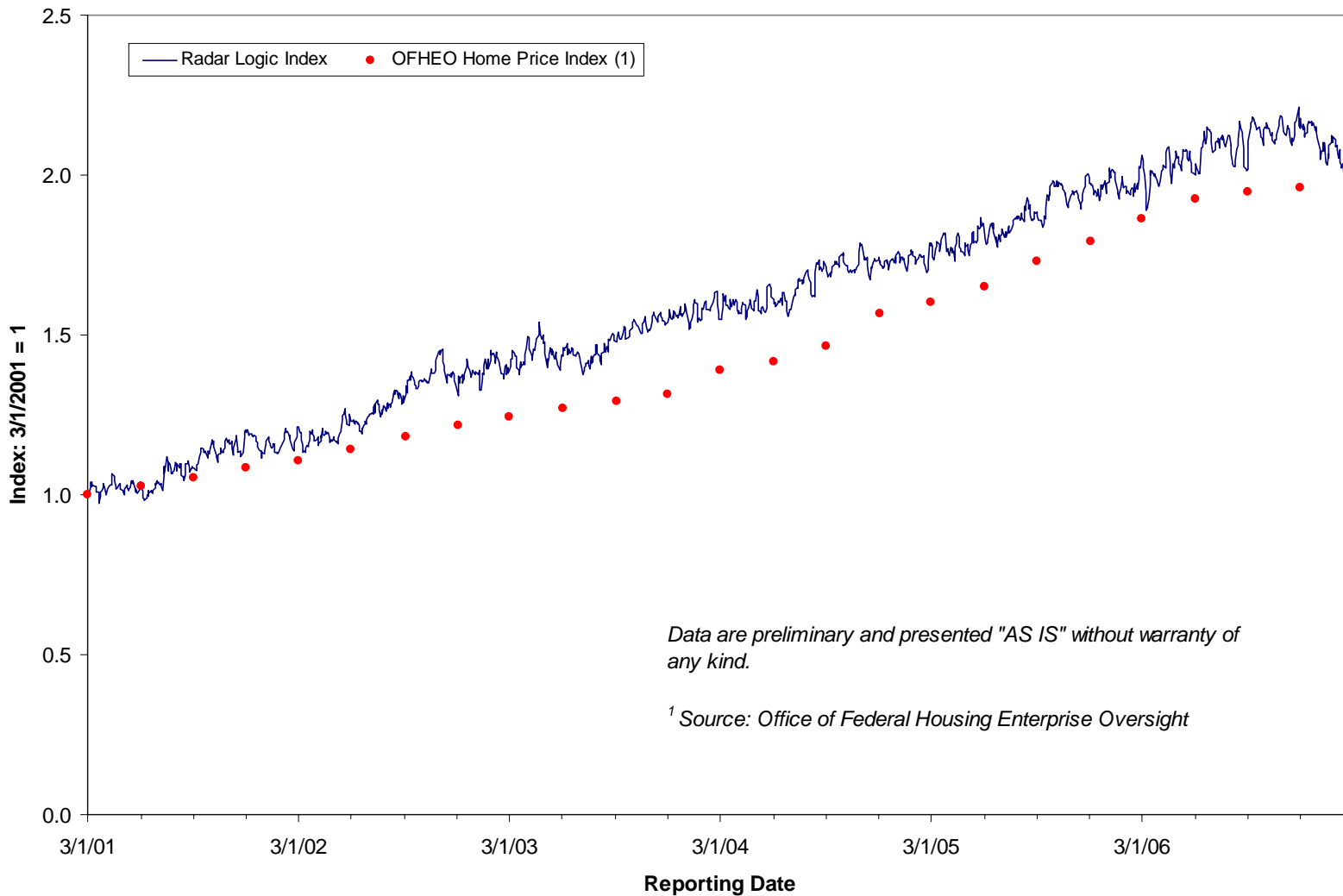
# What the Data Can Tell Us: Inclusive

- Does the *inclusion* of all valid transactions matter?
  - If markets include only homogenous assets, then “NO”
  - If markets have a wide variety of housing stock, then “YES”
- Let's look at San Diego and New York
  - Both of these markets have experienced substantial non-conforming condominium development
  - As a result, our broad data inclusion shows true price movements in these markets

# San Diego (7-day) vs. OFHEO



# New York (7-day) vs. OFHEO

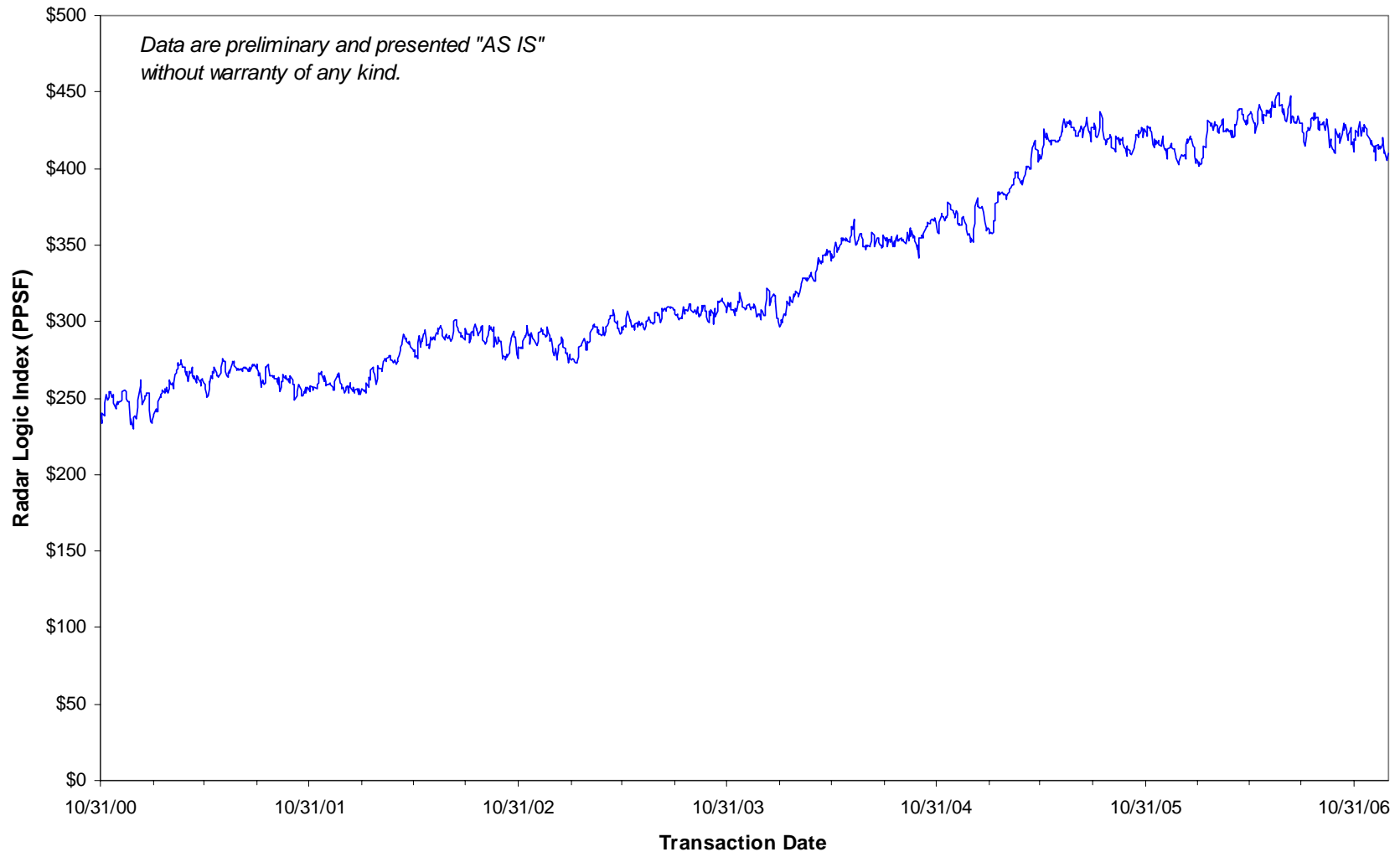


# What the Data Can Tell Us: Inclusive

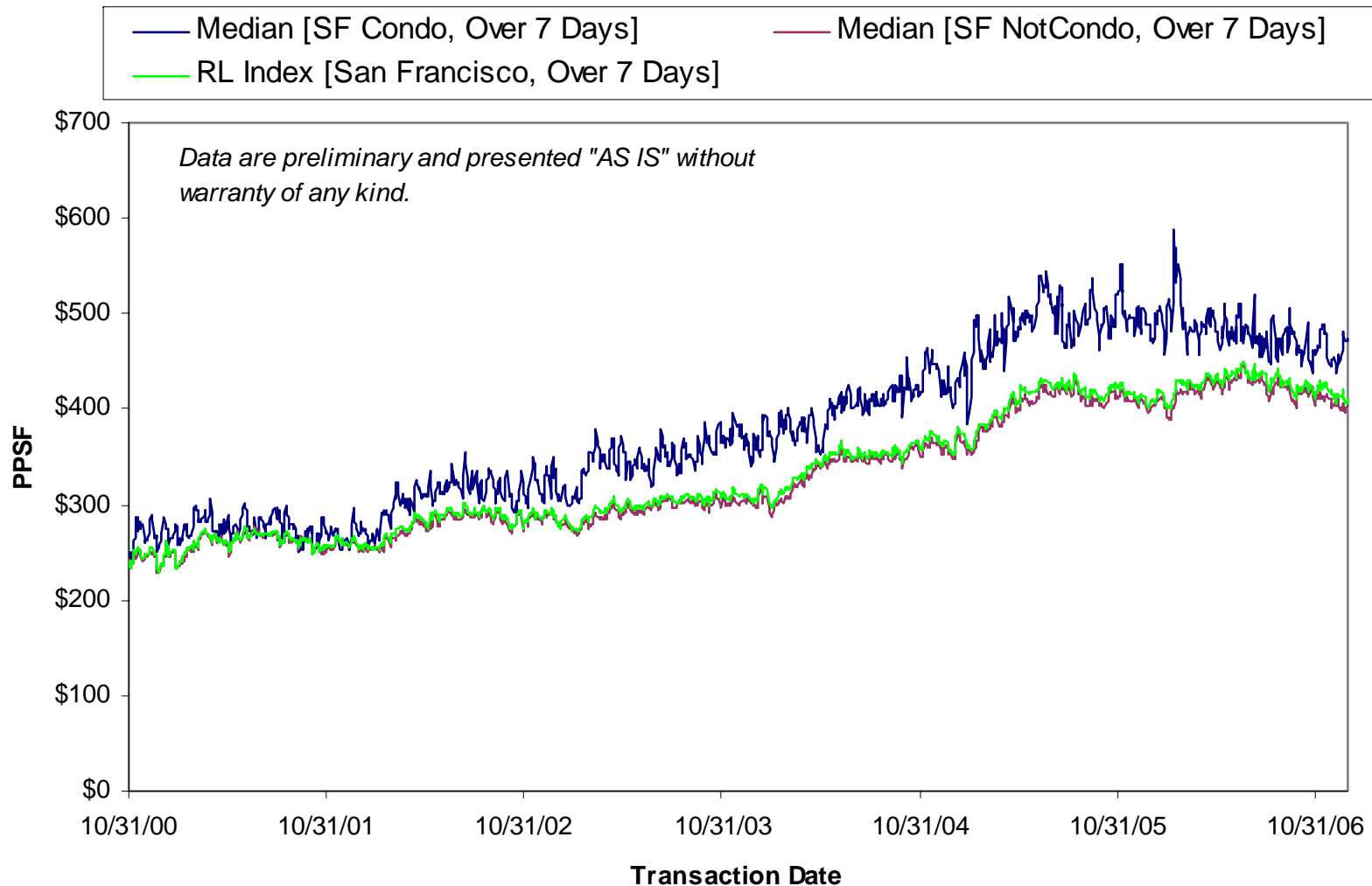
- Does the *inclusion* of all valid transactions matter?
  - If markets include only homogenous assets, then “NO”
  - If markets have a wide variety of housing stock, then “YES”
- Let's look at San Francisco
  - There's been a distinct difference in the performance of condos versus non-condos in San Francisco
  - Radar Logic's daily price enables tracking of specific asset performance



# San Francisco (7-day)



# San Francisco (7-day) Condo vs. Non-Condo



# A Unique Perspective

## ■ Prices + Tools = Utility

- Radar Logic's comprehensive analytic tools present the ability to segment markets with granularity which has previously been unavailable to investors.
- Our analytic tools allow segmentation by:
  - Area specificity down to zip code levels
  - Asset filtering by property type, and
  - Segmentation by price range and size

## ■ Understanding “basis” risk

- Our web-based analytics enable users to examine user-defined elements within MSAs

# A Unique Perspective: Radar Logic Analytics

## 1. Select an MSA Index

## 2. Define a Data Set for comparison

Specify a Price Range

From \$  to \$

## 3. Define a Timeline

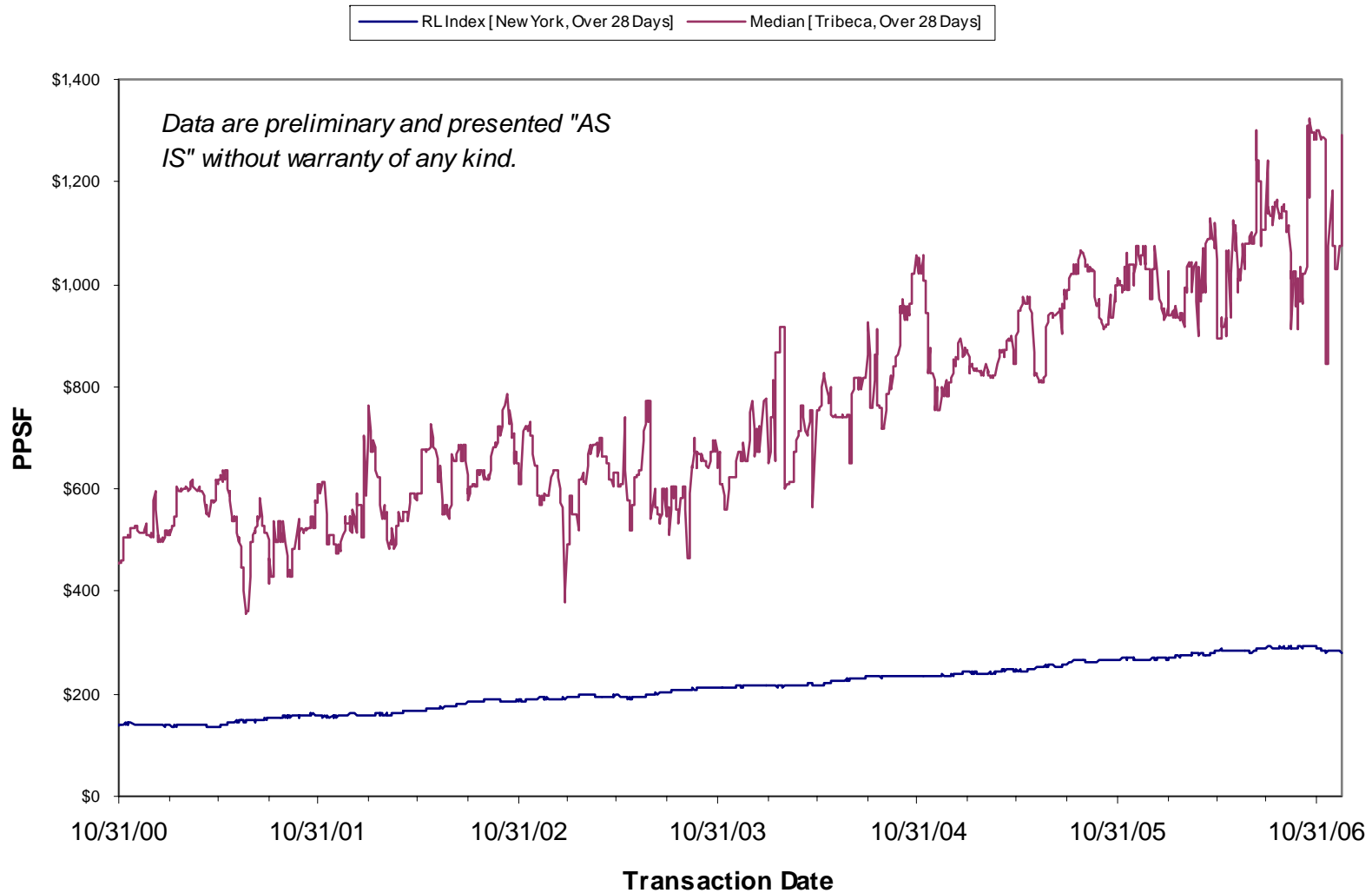
Show results between

 and 

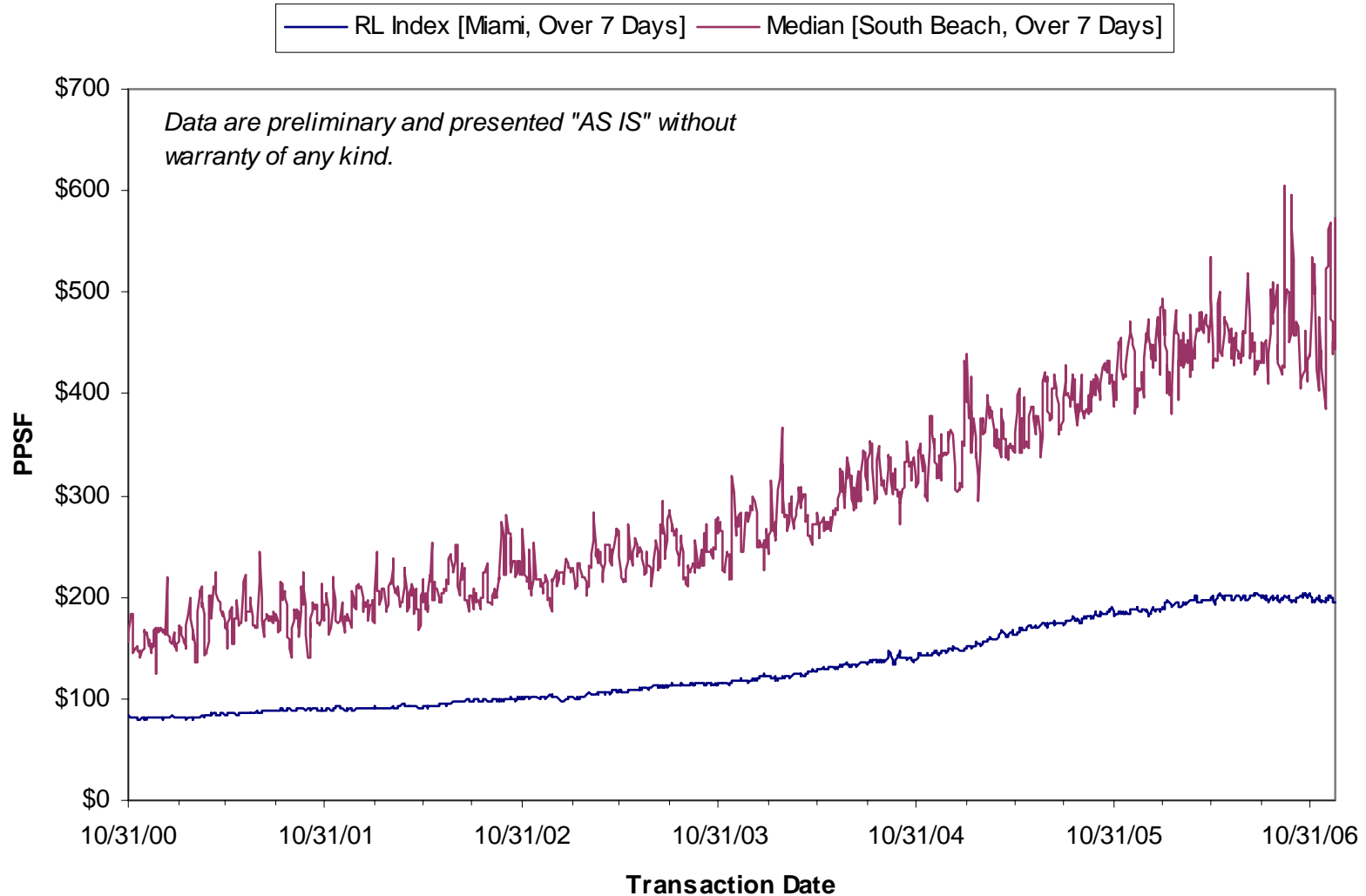
Aggregate results

Create Chart

# Tribeca (28-day) vs. New York (28-day)



# South Beach (7-day) vs. Miami (7-day)



# What Will Make This Market Work

- Utility/benefit
- Breadth and depth
- Opportunity for balance
- **Ultimately, it's about liquidity**
  - Natural longs vs. natural shorts
  - The ability to customize products
  - “Bankable” productivity for all involved

# Contact Us

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