

Price Indexing

Data Issues and Liquidity

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1 Introduction

What are we going to do during this class:

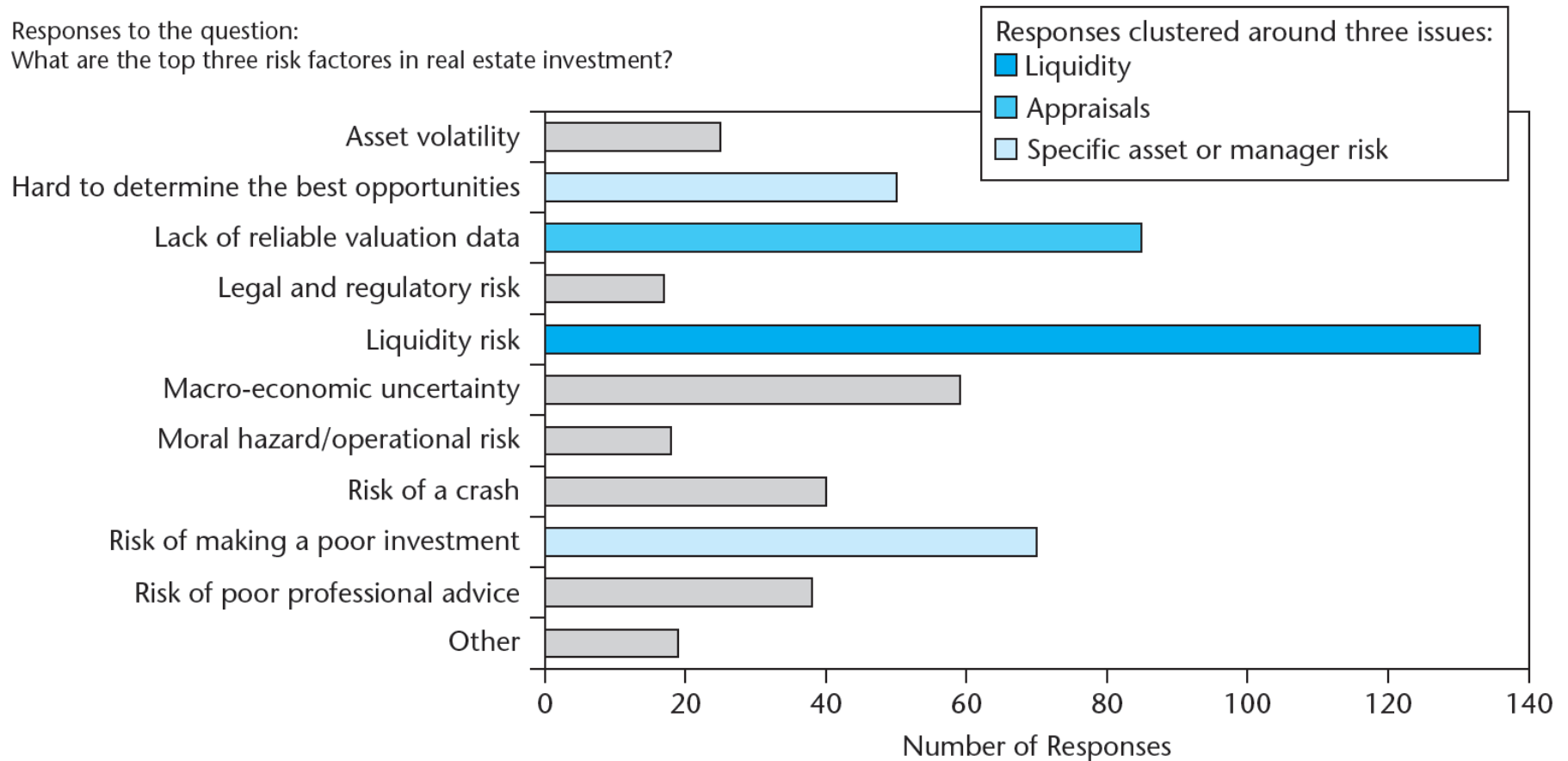
- Price indexes
- Data issues
- Liquidity

1 Introduction

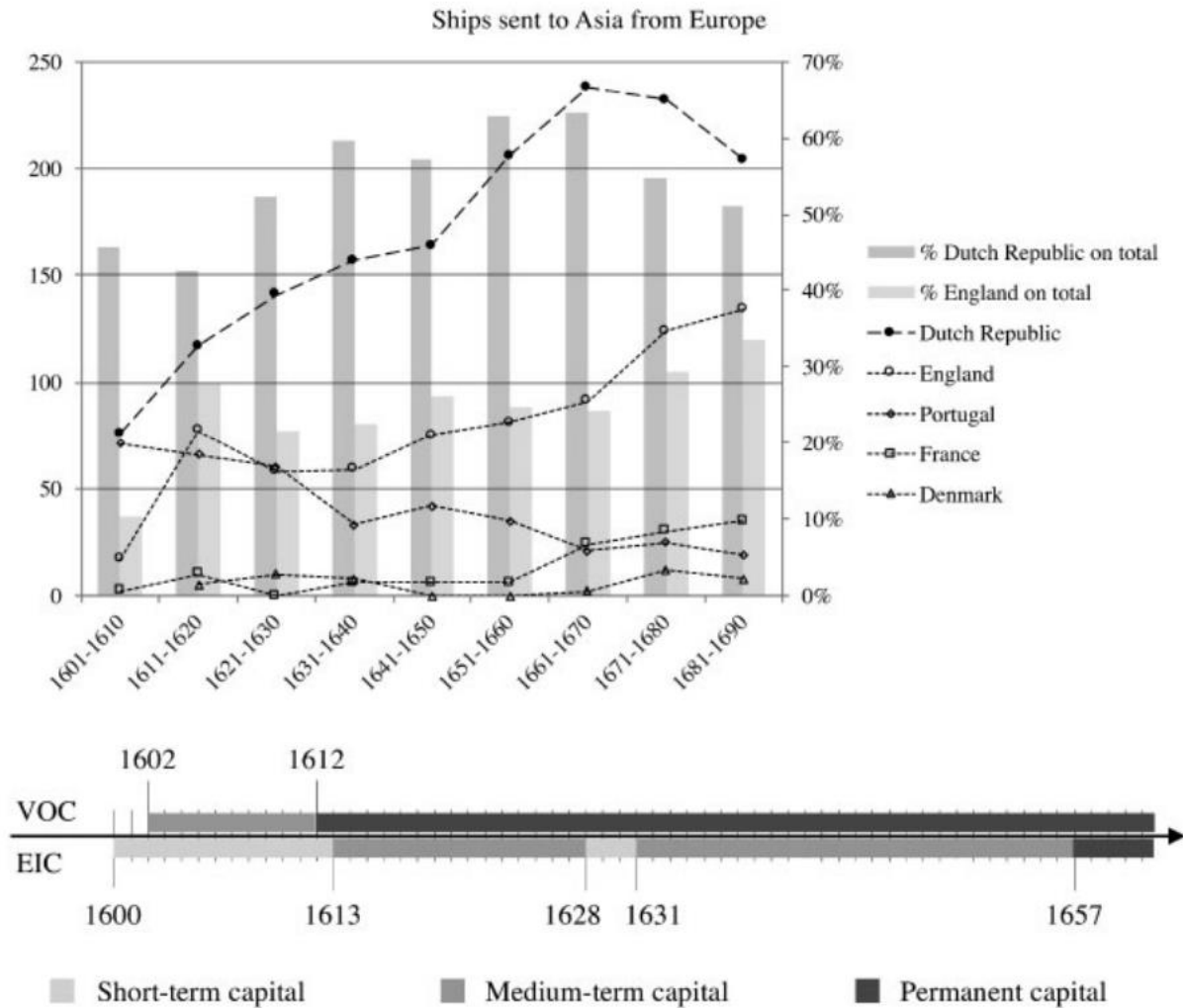
- We need **price return data** for multiple reasons;
 - Comparing investment performance of different asset classes (risk & return)
 - Determining the cost of capital of our investment (total returns)
 - Mark-to-Market portfolios
 - It is necessary for portfolio allocation
 - It is fundamental to measure investment management performance (benchmarking)
- Long story short... we need good return indexes!

1 Introduction

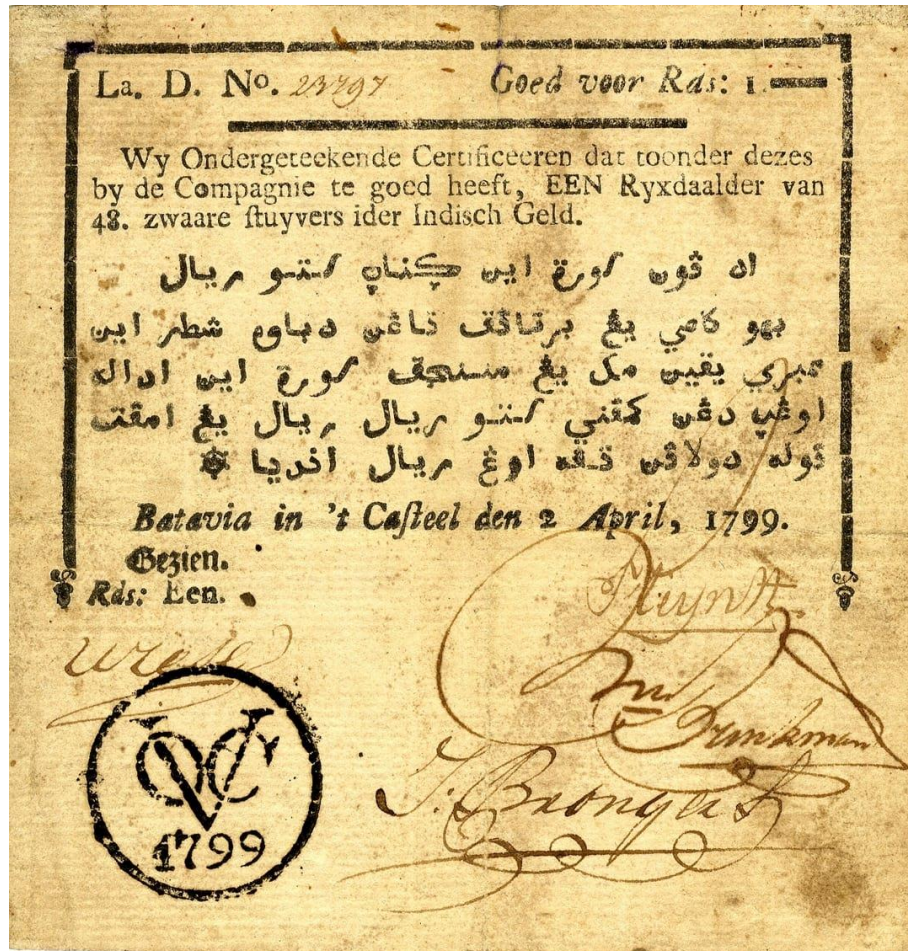
Responses to the question:
What are the top three risk factors in real estate investment?



1 Introduction



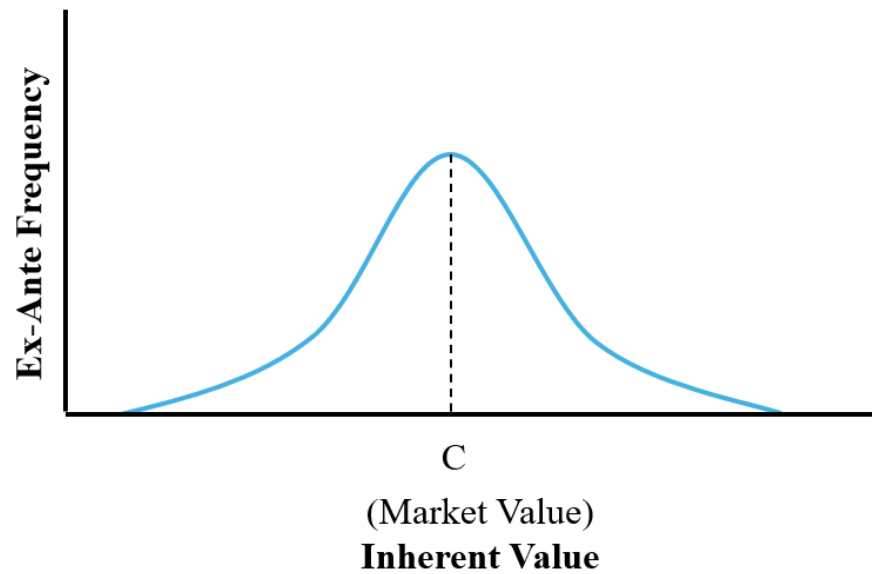
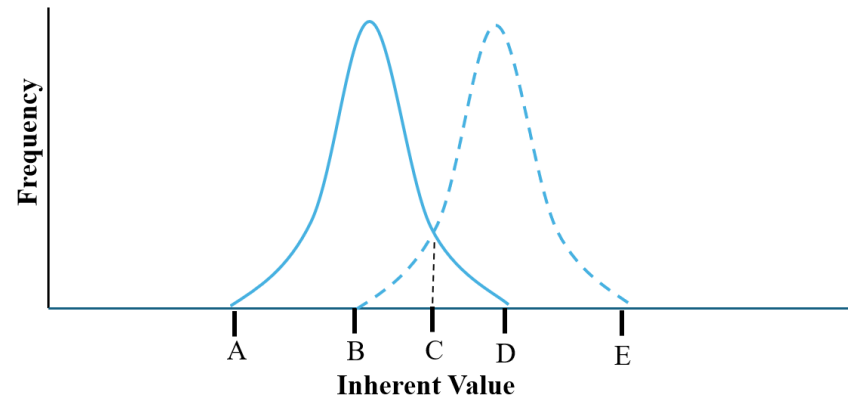
1 Introduction



2 Types of Return Data

- There are three major types of return data:
 1. Appraisal-based
 2. Transaction-based
 3. Stock market-based
- We will go through the strengths and weaknesses of these types of data, but first, we will discuss some specific issues with real estate return data.
- Most notably;
 - Lag bias
 - Random error

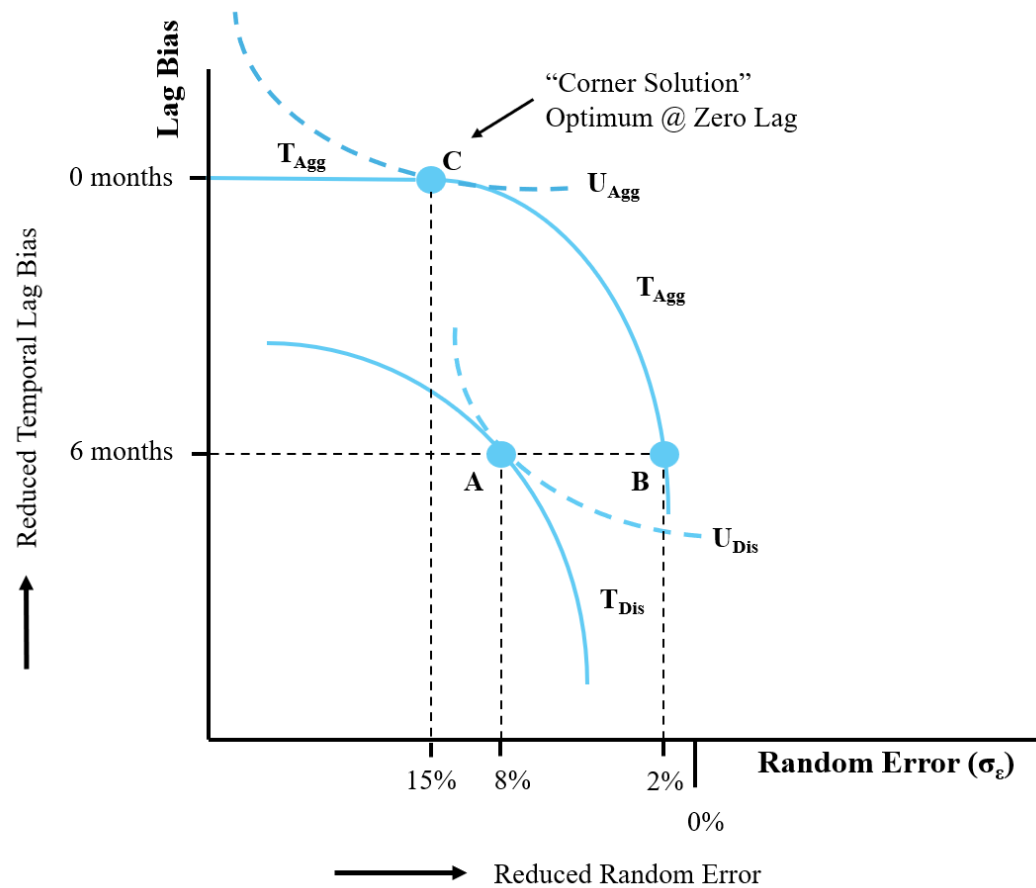
2 Noise



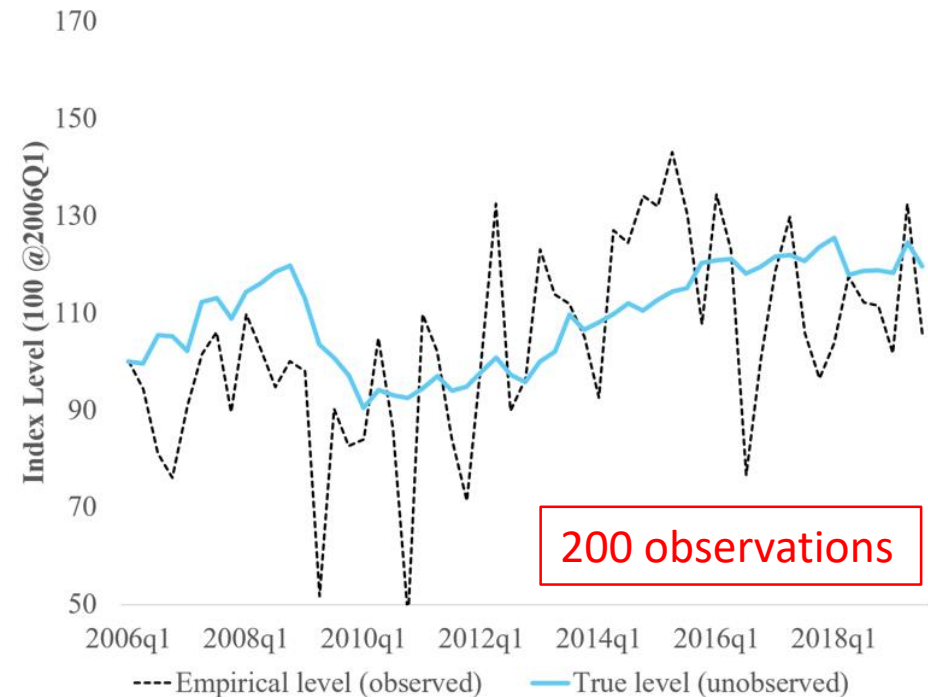
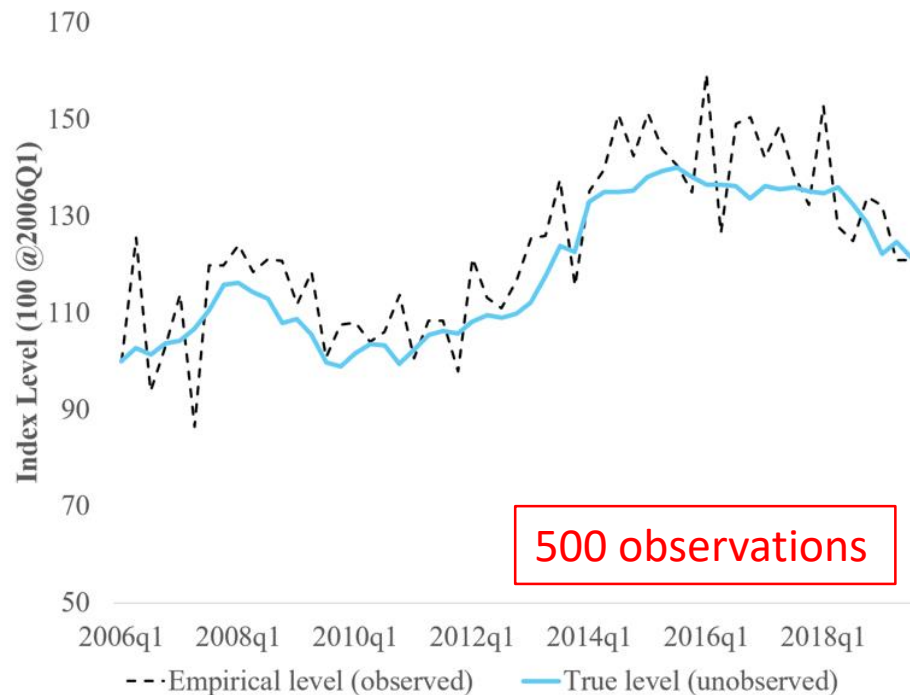
2 Noise

- Values are **unbiased** as long as there are many participants in the market and the error is purely **random**.
- However, with temporal lag, values *will be biased*.
- The problem is that a less random price estimate typically also tends to be more biased.
 - The more price information you are looking for, the further back in time you must look.
 - Think of the famous **Square Root of n Rule**. If you use six comps instead of two comps, you will have $1/\sqrt{3}$ (or about 58 percent) less error (because $6/2 = 3$)
- This tradeoff is different when you think of individual property appraisal or macro-level return statistics. (Like indexes.)

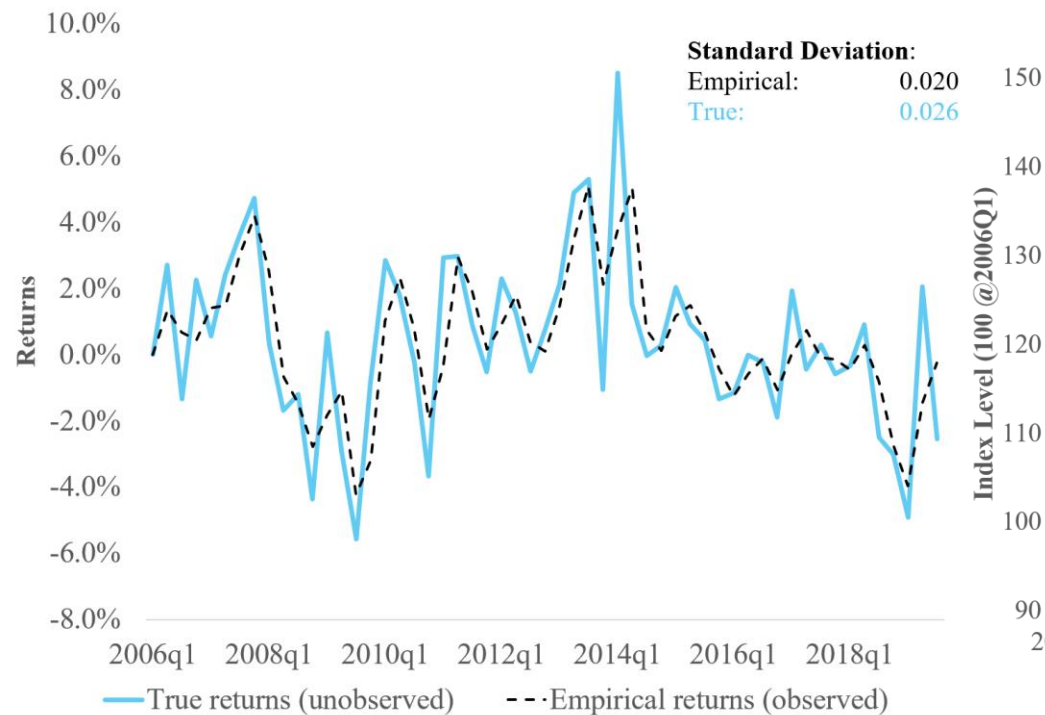
2 Noise



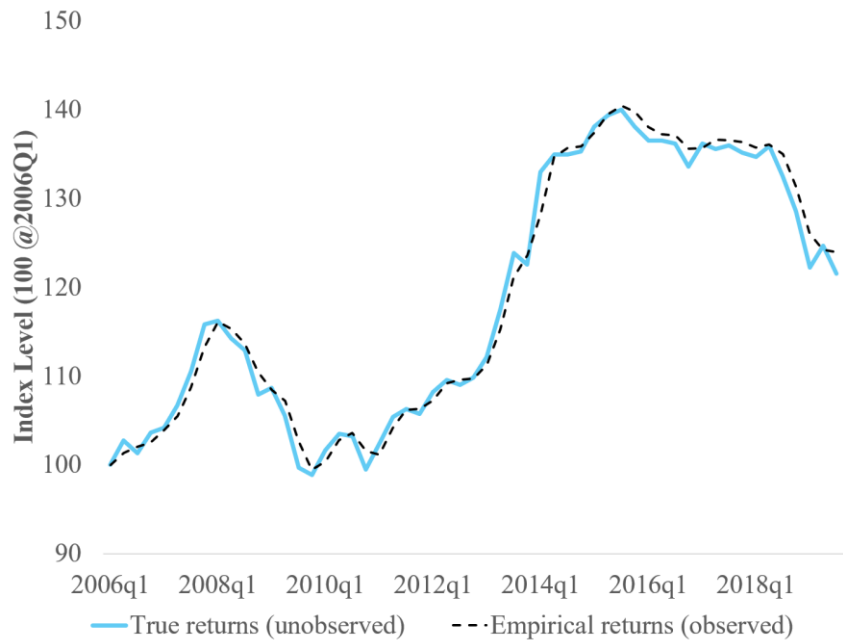
2 Noise and Index Levels



2 Lag and Indexes

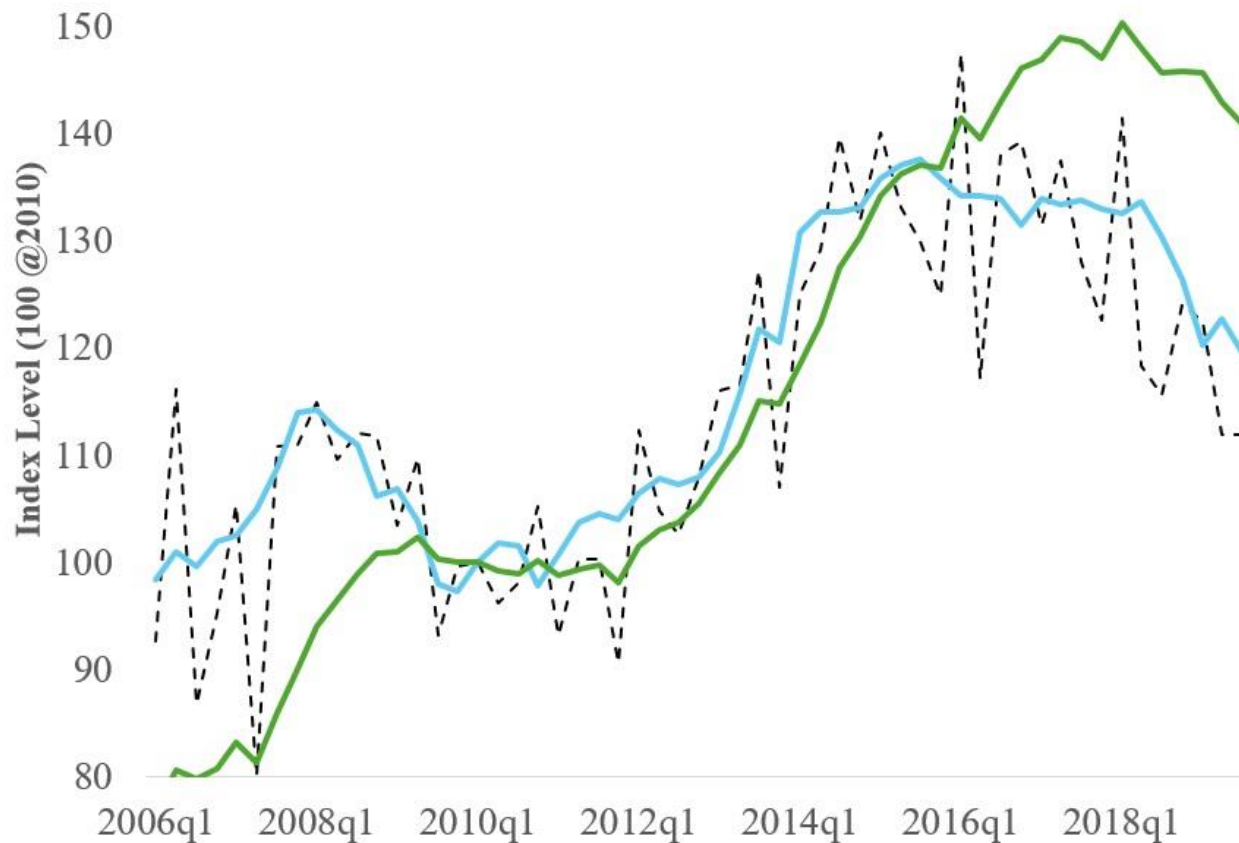


returns

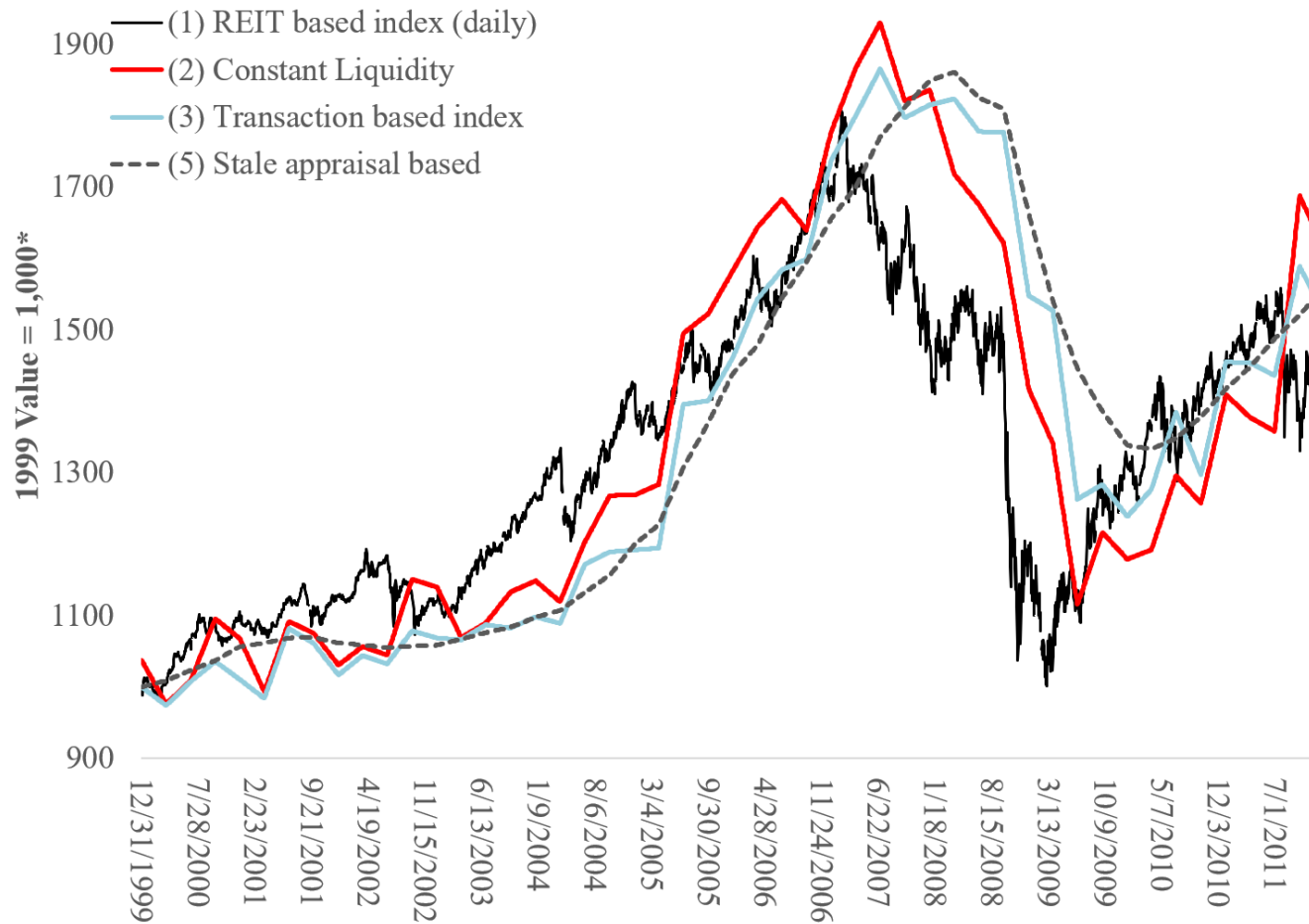


index

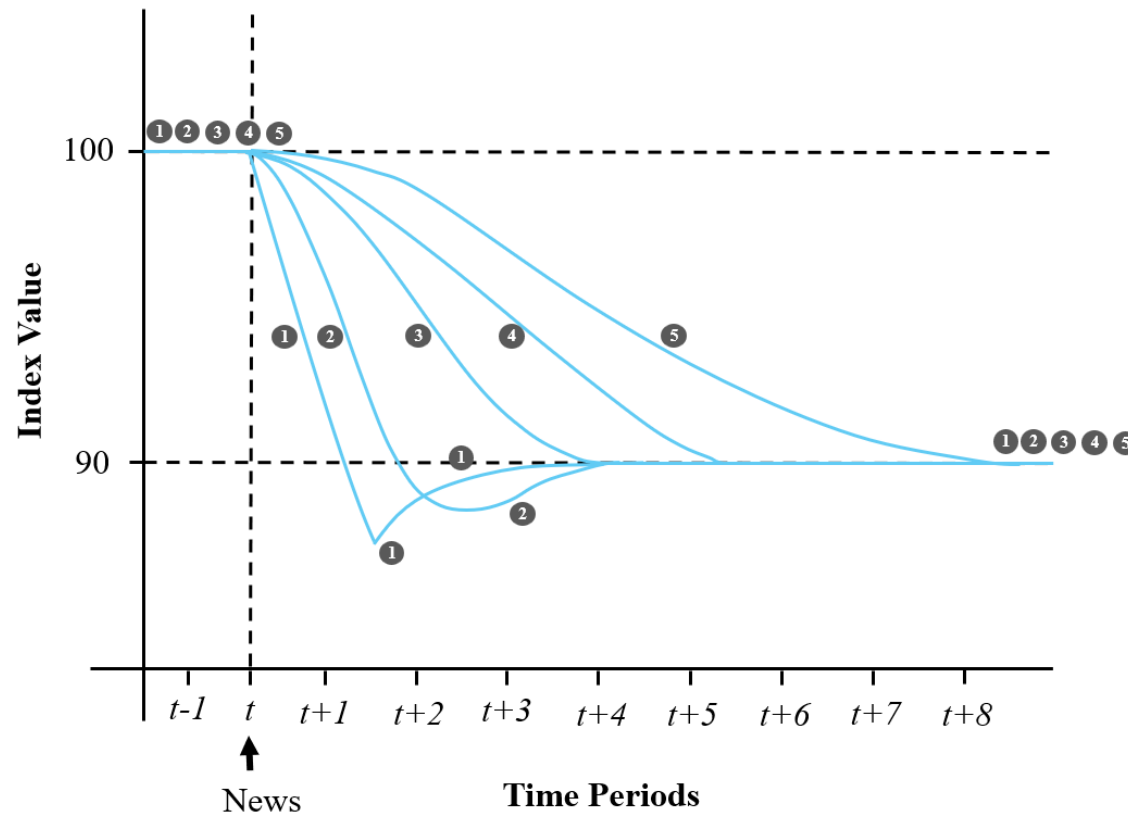
2 Putting them Together



3 Circling Back, the Indexes

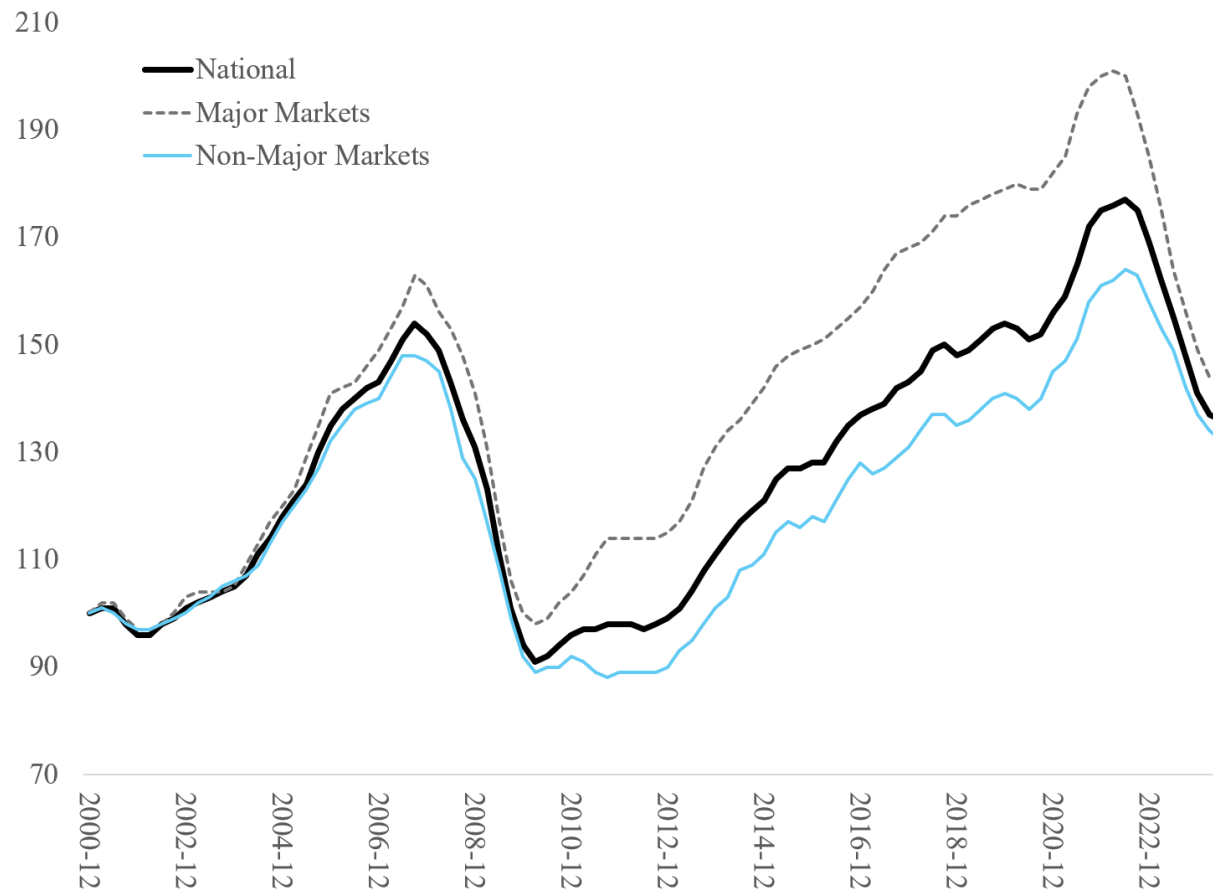


3 Circling Back, the Indexes

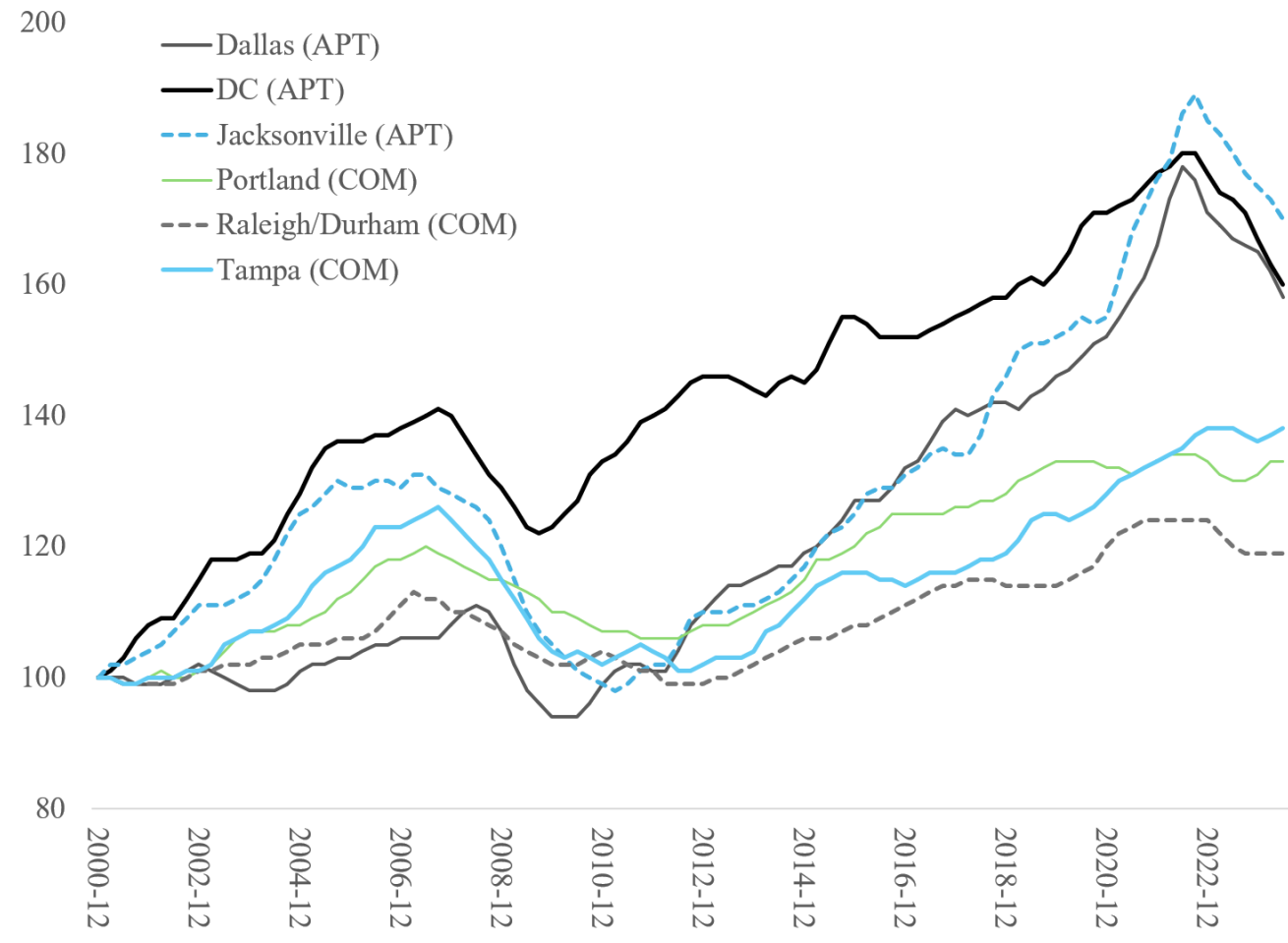


- ① = REIT Index
- ② = Constant-Liquidity Index
- ③ = Transaction Price Index
- ④ = Appraisal-Based Index (Contemporaneous)
- ⑤ = Appraisal-Based Index (Staggered)

3 MSCI RCA CPPIs



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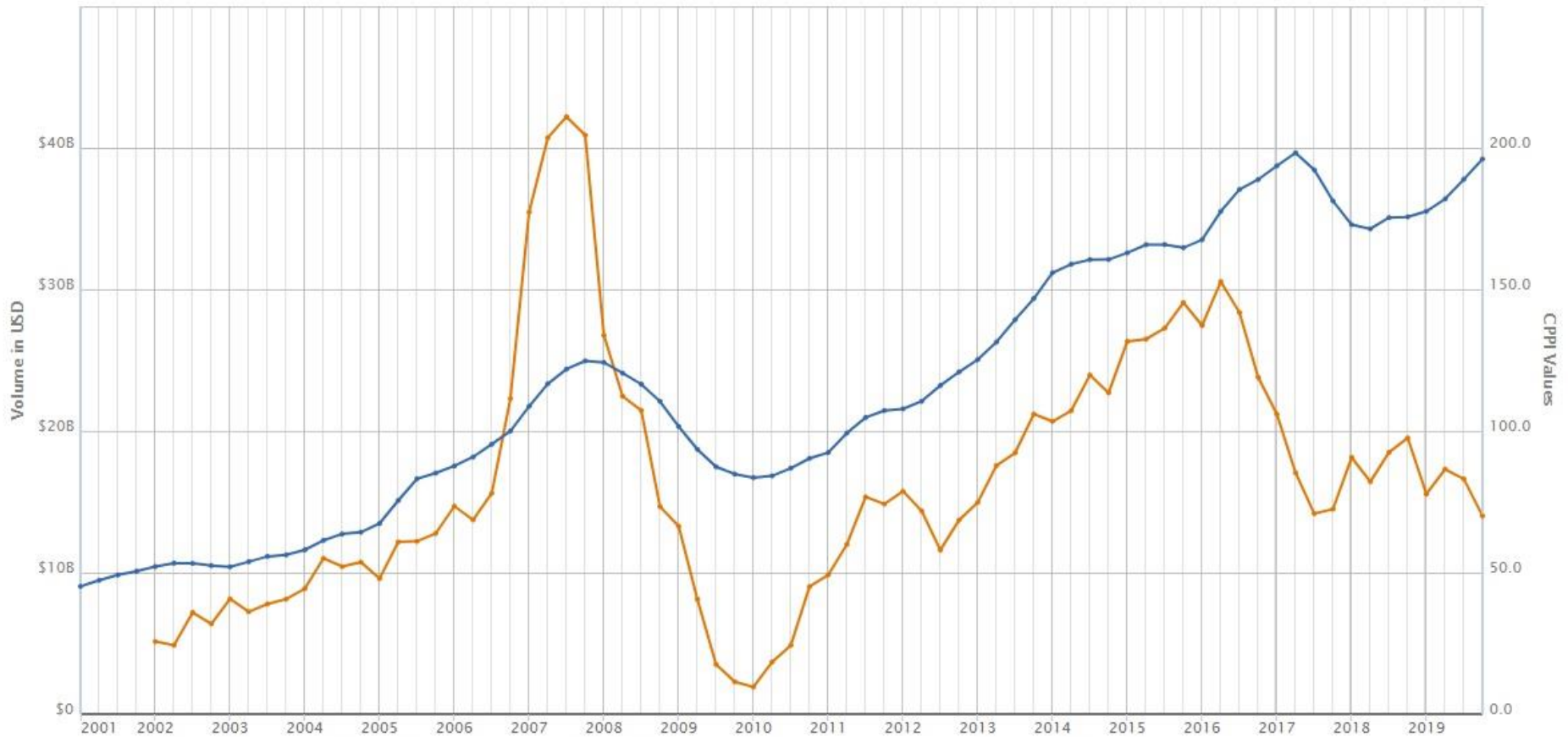


4 Liquidity

- One definition of **liquidity for real estate** could be;
- The ease in which you can buy and sell in each market, under normal conditions, without being forced to buy or sell.
- “Normal conditions” include that you can sell (or buy) the real estate for a “normal” (or market) price.
- One immediate issue is the question on how do we *measure* liquidity?
 - There is no direct index of liquidity, as it is not something you can directly measure, as say prices.
 - However, we can look at the consequence of good versus bad liquidity; **Transaction volume**.
 - With transaction volume we mean the total amount of (dollar) purchases in a given period.

4 Transaction Volume

Manhattan Office Volume (\$) Manhattan Office CPPI



Price floor selections do not apply to Indices, Hedonic or Fundamentals data. Volume displayed as 12 Month Totals. Cap rates and PPU displayed as a 12 Month Average.
Includes property or portfolio sales \$2.5 million or greater. .

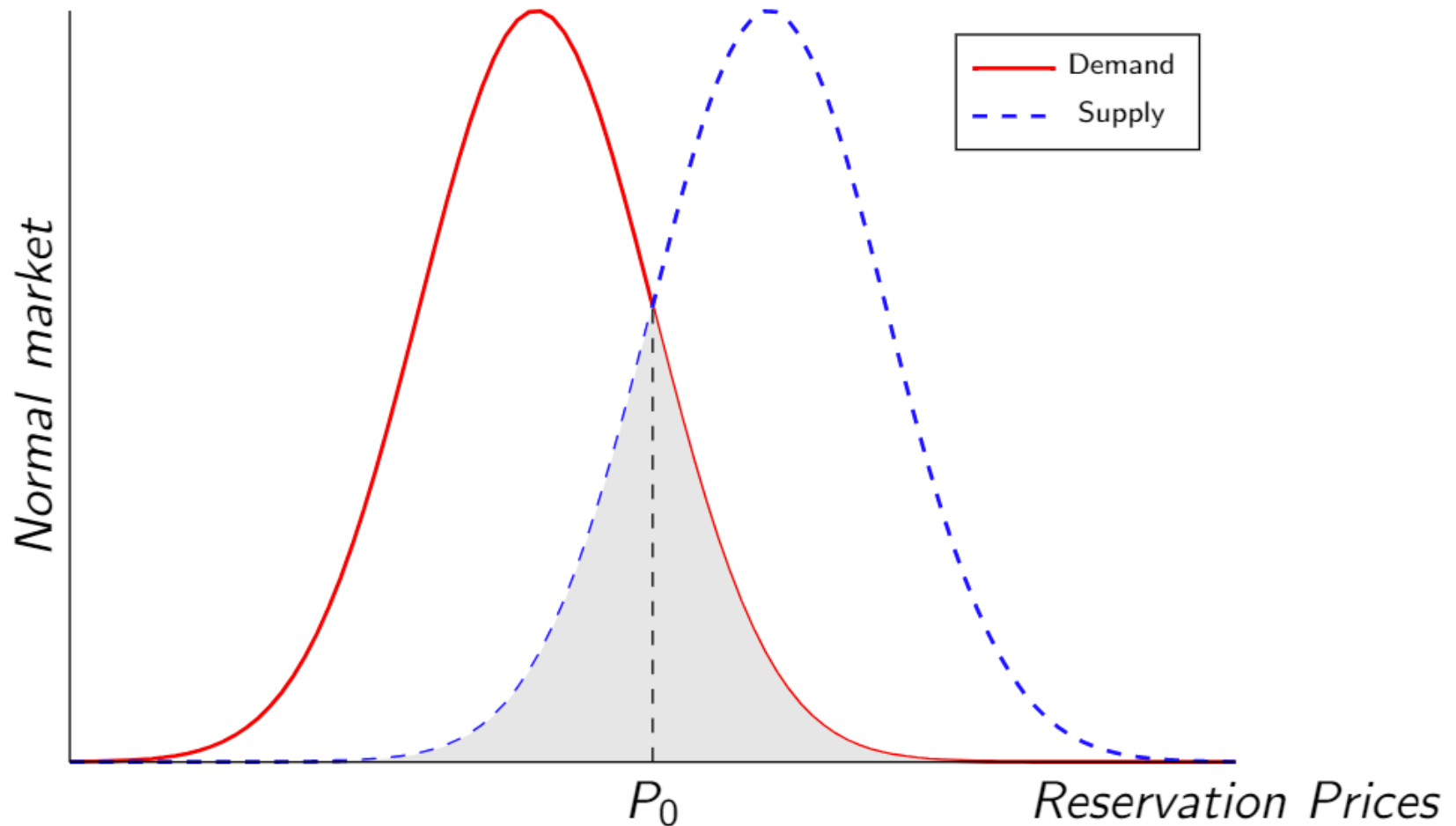
4 Transaction Volume

- The trends are for offices in Manhattan.
- There are a few interesting things to note;
 - First, see that transaction volume drops considerably during the GFC? Prices dropped as well, but not nearly as much as transaction volume.
 - Volume in general seems more volatile.
 - However, there is a correlation between prices and volume. This so-called **positive price-volume correlation** is specific for real estate.
 - Note that volume seems to lead prices?!
- Whew... that seems like a lot! What is going on?
- In reality it is even worse, as volume is smoothed and therefore lagged.

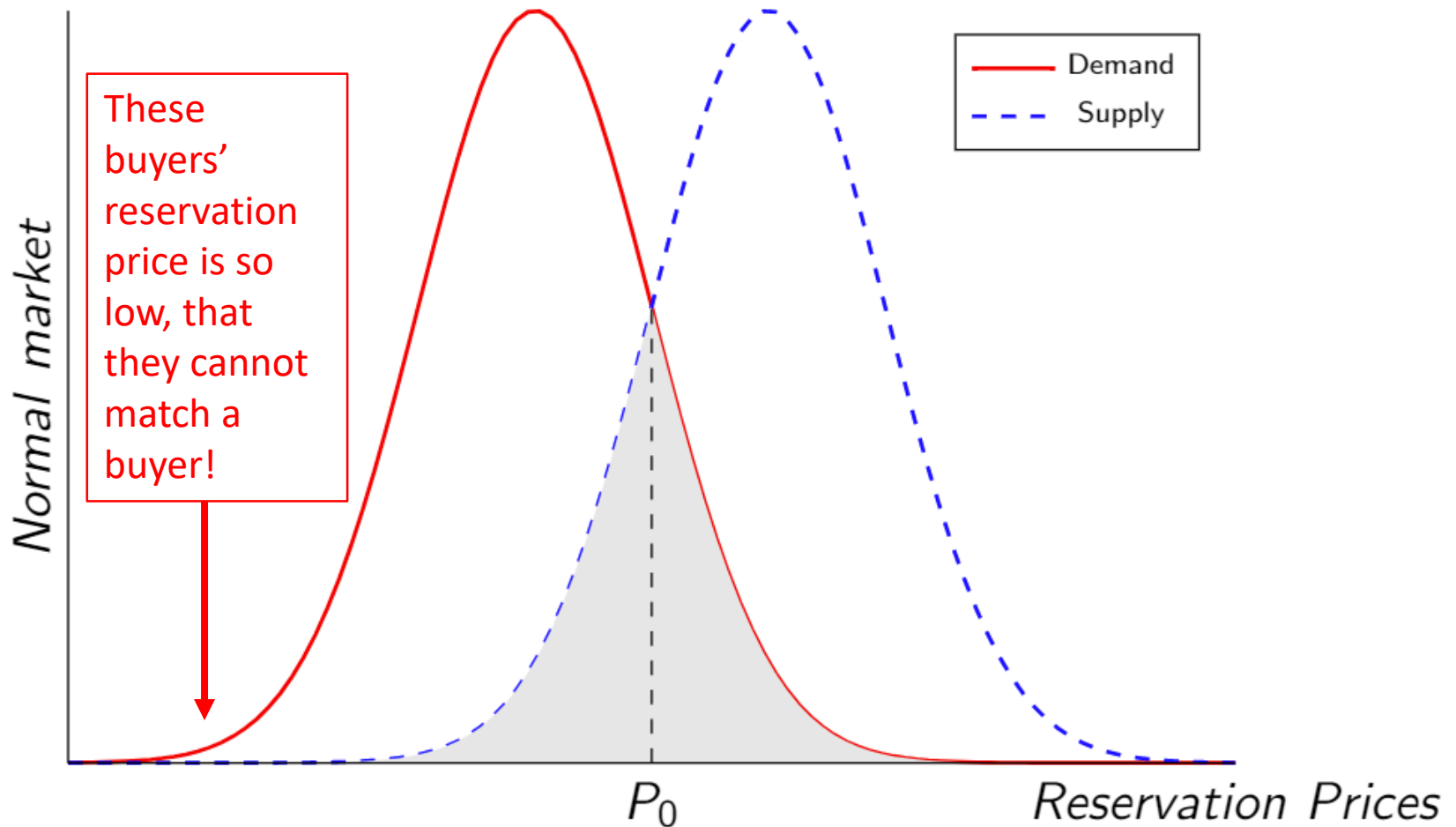
5 Supply and Demand for Real Estate

- To explain some of the above phenomena, it might help to take a step back and think more thoroughly about liquidity.
- Another way to look at liquidity is to think about **reservation prices** and how the reservation prices of (potential) buyers overlap with (potential) sellers.
 - **Seller:** The reservation price is the minimum price for which you would *sell* your property in case you own the real estate.
 - **Buyer:** The reservation price is the maximum price you are willing to *pay* for a property if you are a potential buyer.
 - Only if the reservation price of the (potential) buyer is higher than the reservation price of the seller would we get a **transaction**. The average **price** (on a market level) is the *average* between the *average* reservation prices of buyers and sellers.
- Note that reservation prices are private! However, we have statistical techniques to tease them out.

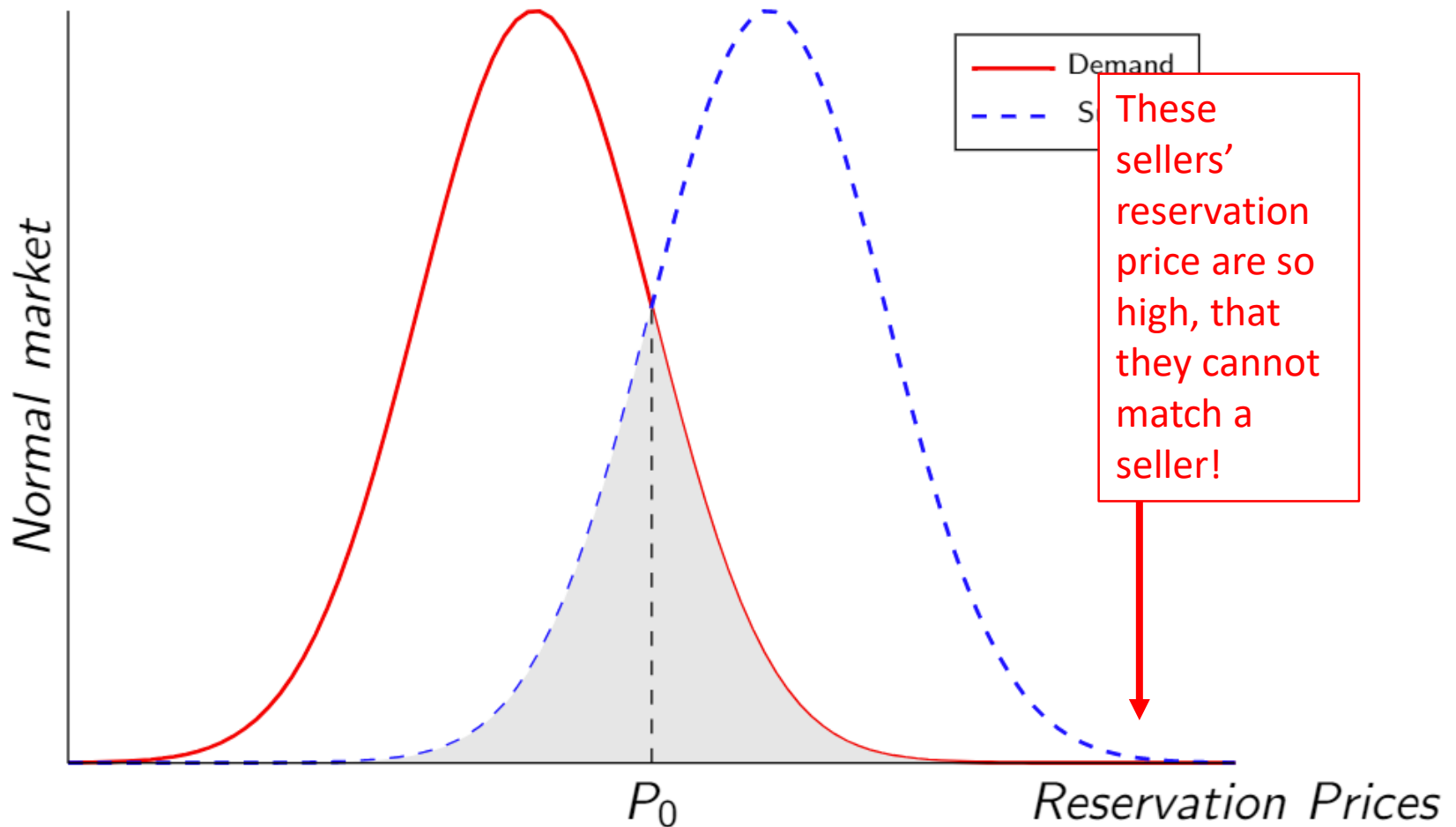
5 Supply and Demand for Real Estate



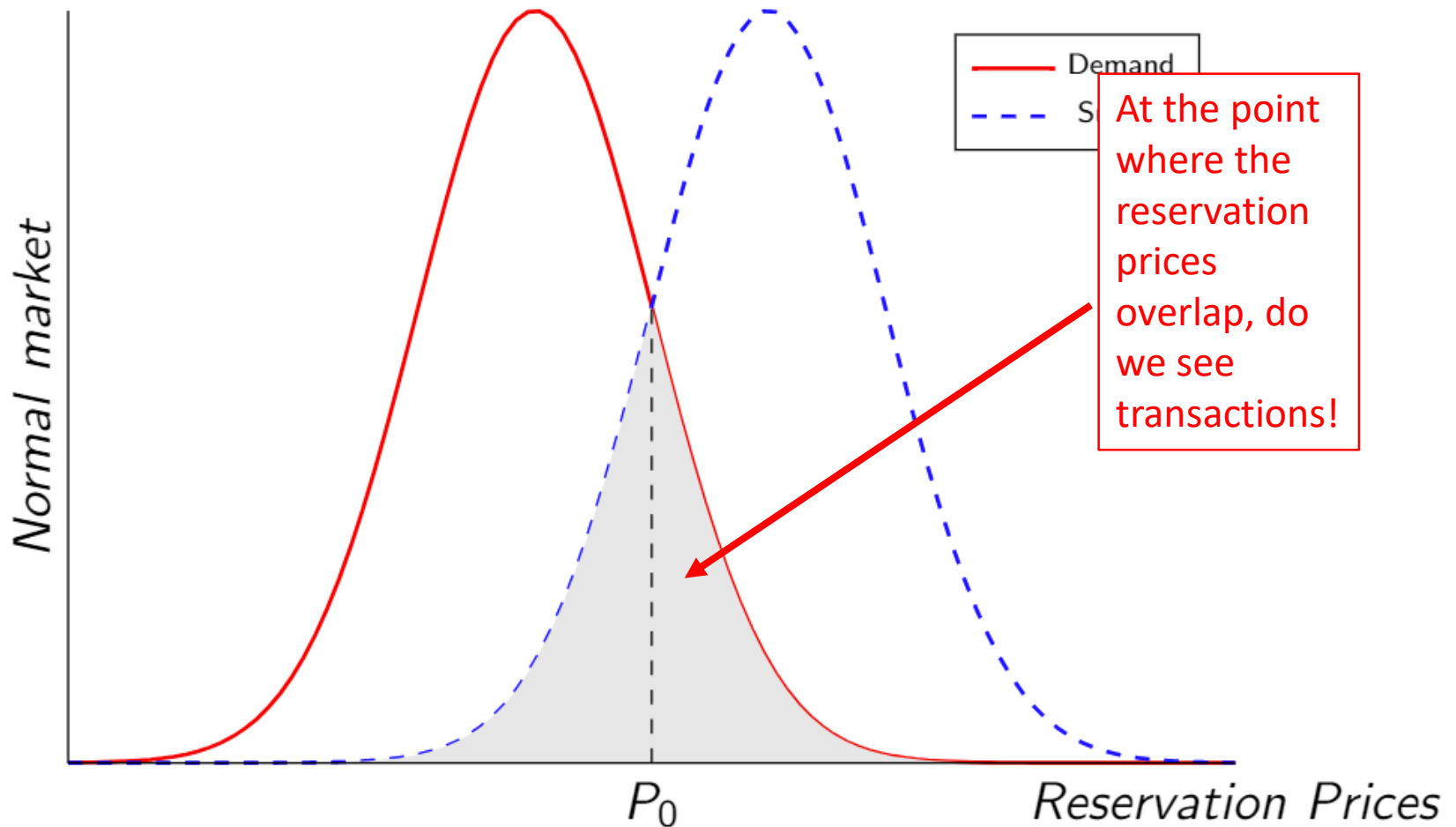
5 Supply and Demand for Real Estate



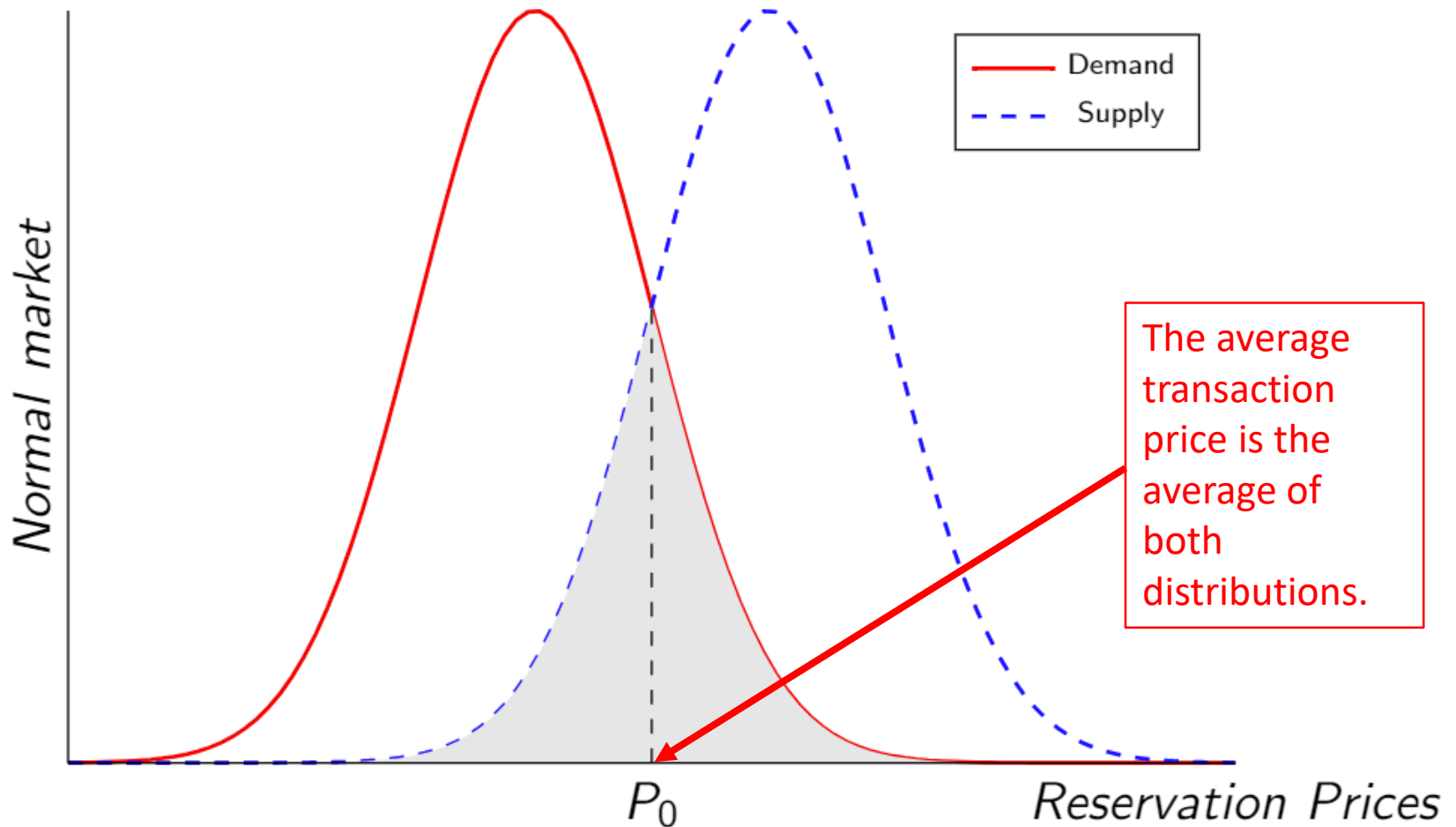
5 Supply and Demand for Real Estate



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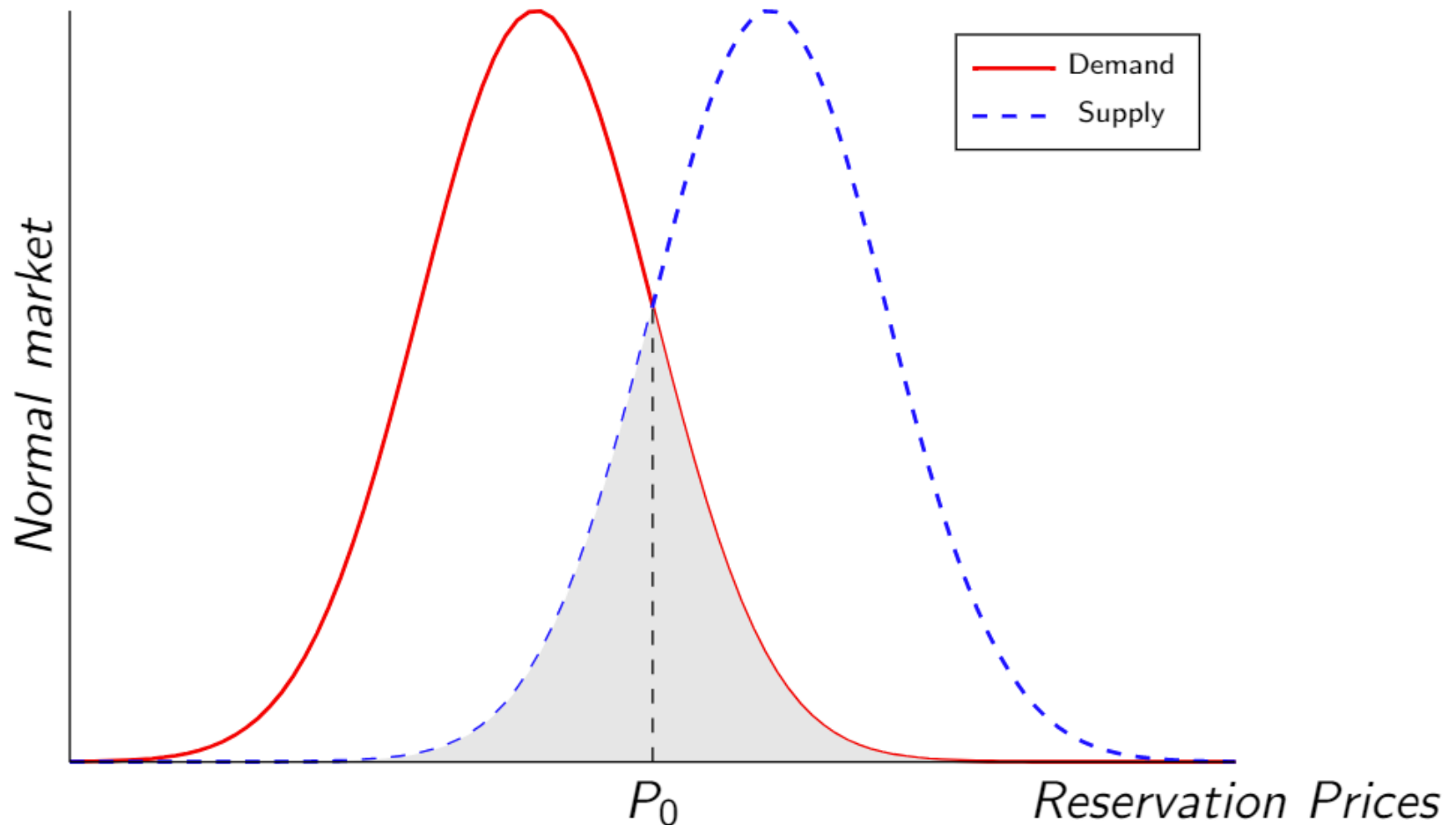
5 Supply and Demand for Real Estate

- The more the reservation prices overlap, the more liquid the market is, meaning there are more transactions!
- Next, let's have a look at the lead/lag relationship. Why does “liquidity” generally move first in real estate?
- To understand this, we must first go back 150 years back in time and revisit Walras. More specifically, the process called “**tatonnement**.”
- This principle is applied to many other fields, most famously unemployment and wages;
 - Employers cannot “observe” the “correct” wage.
 - If employees ask a raise, what should the employer do?
 - If she refuses the raise (while wages *have* gone up) the employees will leave the company.
 - The employer notices this mistake, and quickly increases wages until a new equilibrium is reached.
 - Hence, the employers always “lag” the wages.

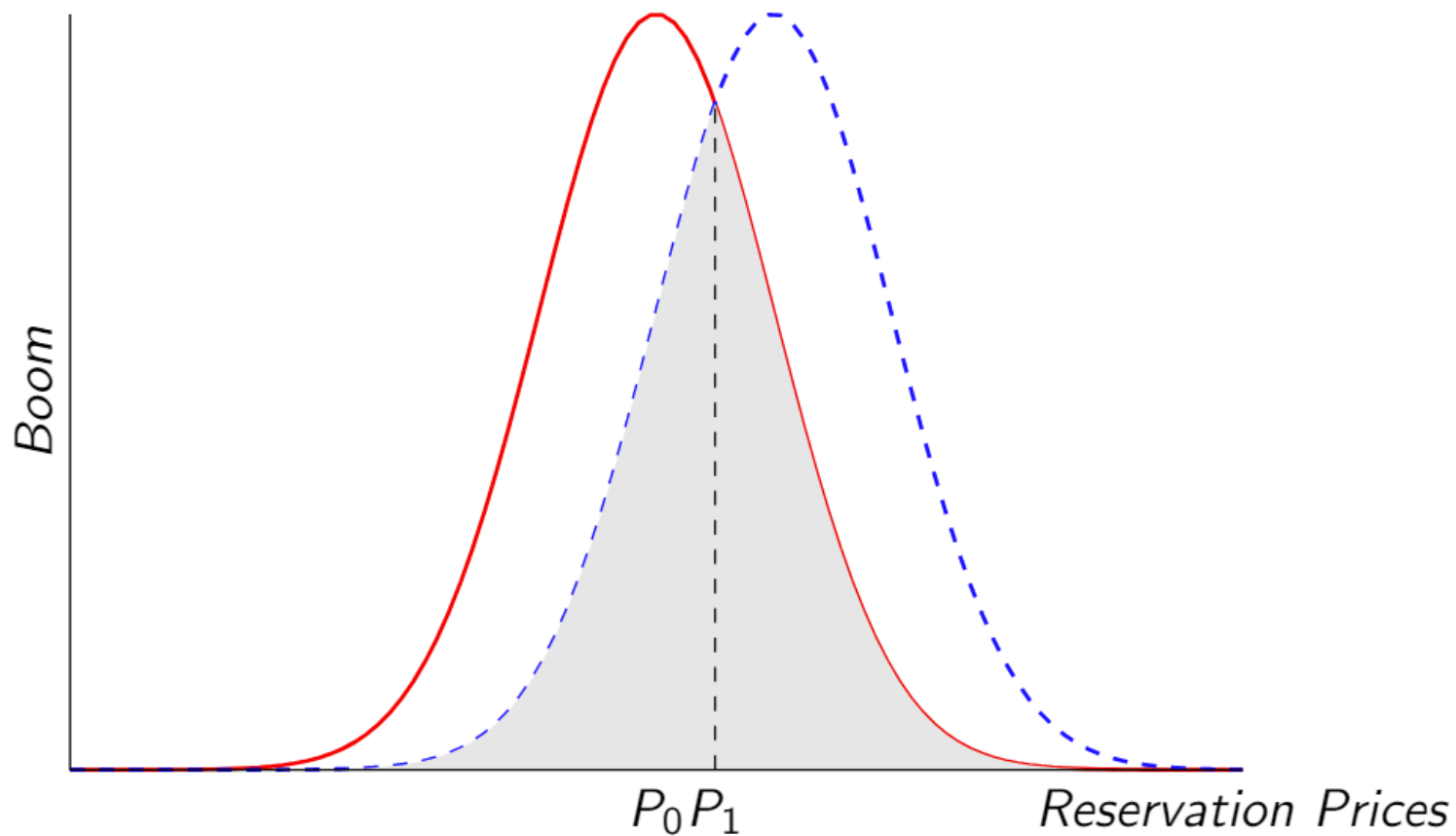
5 Supply and Demand for Real Estate

- It is relatively straightforward to project this line of thinking to real estate.
 - A real estate owner puts the property on the market, using historic information. It thinks the “correct” price should be \$10M.
 - Now, say that demand for real estate has gone up. This means that the sell very quickly... A bit too fast!
 - The previous owner sells the property almost instantaneously and realized she *could* have asked \$12M.
 - By the time the current owners increased its reservation prices a new equilibrium is reached.
- Although it should be noted, that because of the slowness in the response perhaps the market will never reach equilibrium.
- Note that this means that demand for real estate is the thing that leads everything.

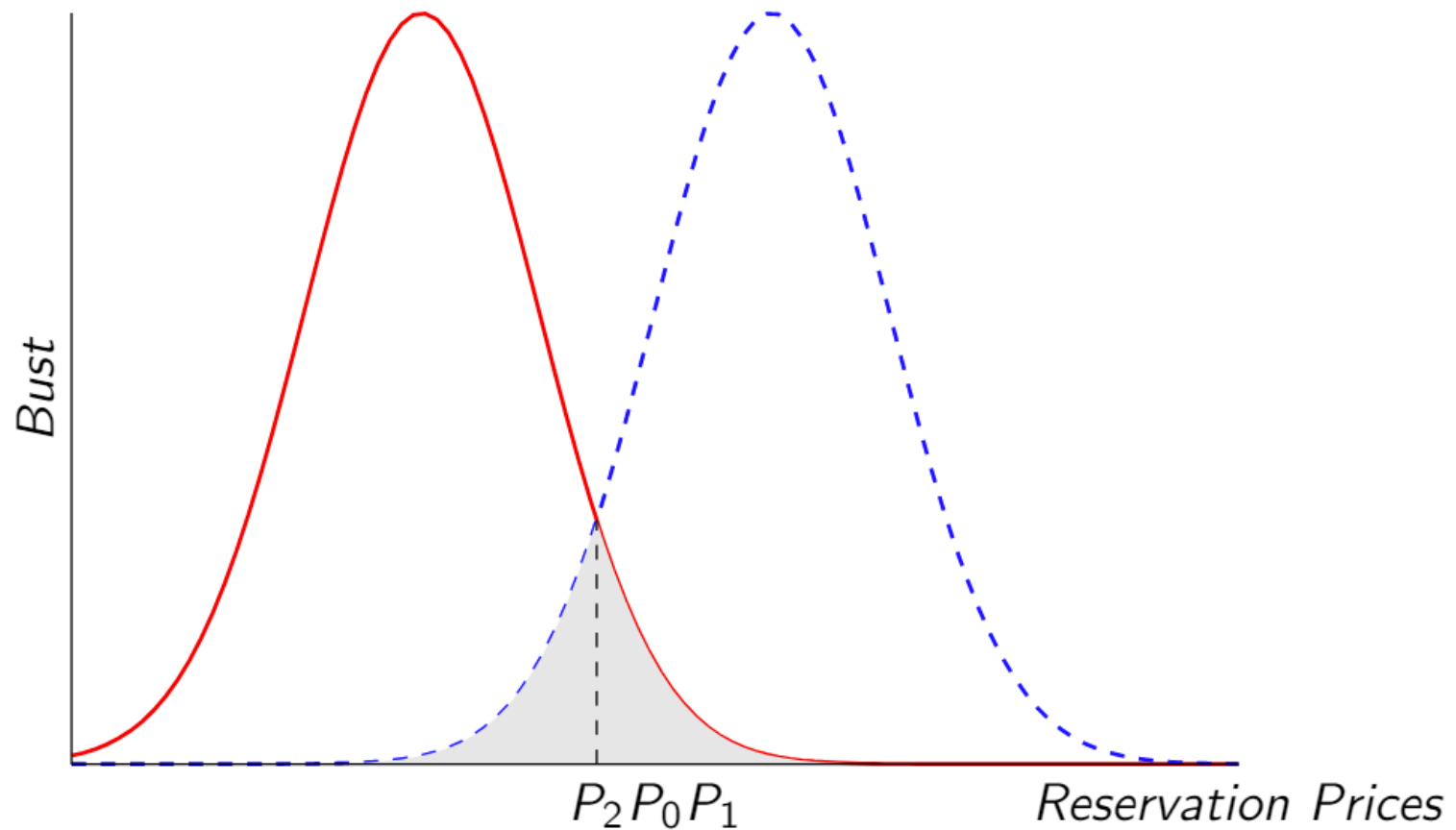
5 Supply and Demand for Real Estate – normal liquidity



5 Supply and Demand for Real Estate – high liquidity



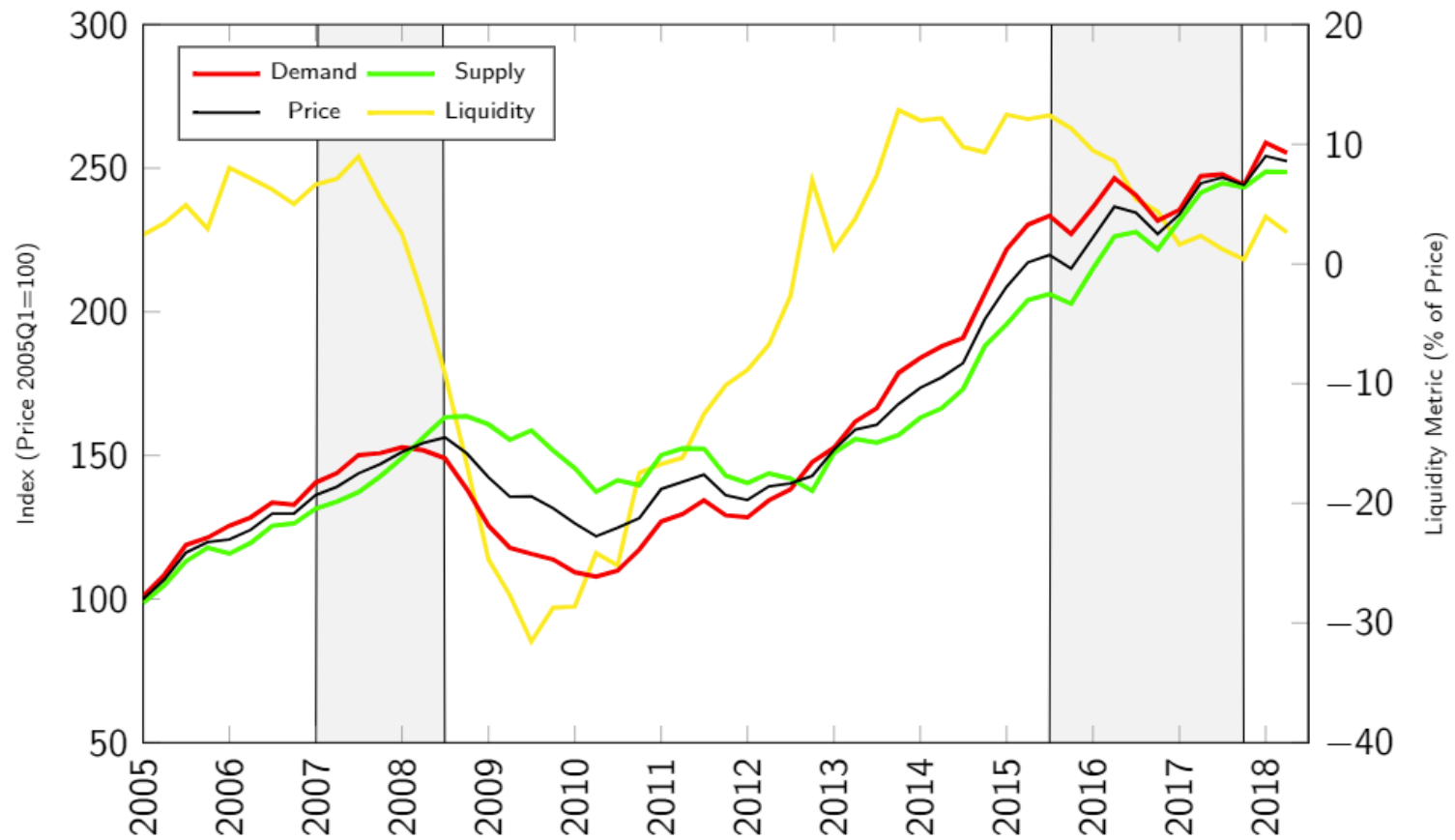
5 Supply and Demand for Real Estate – low liquidity



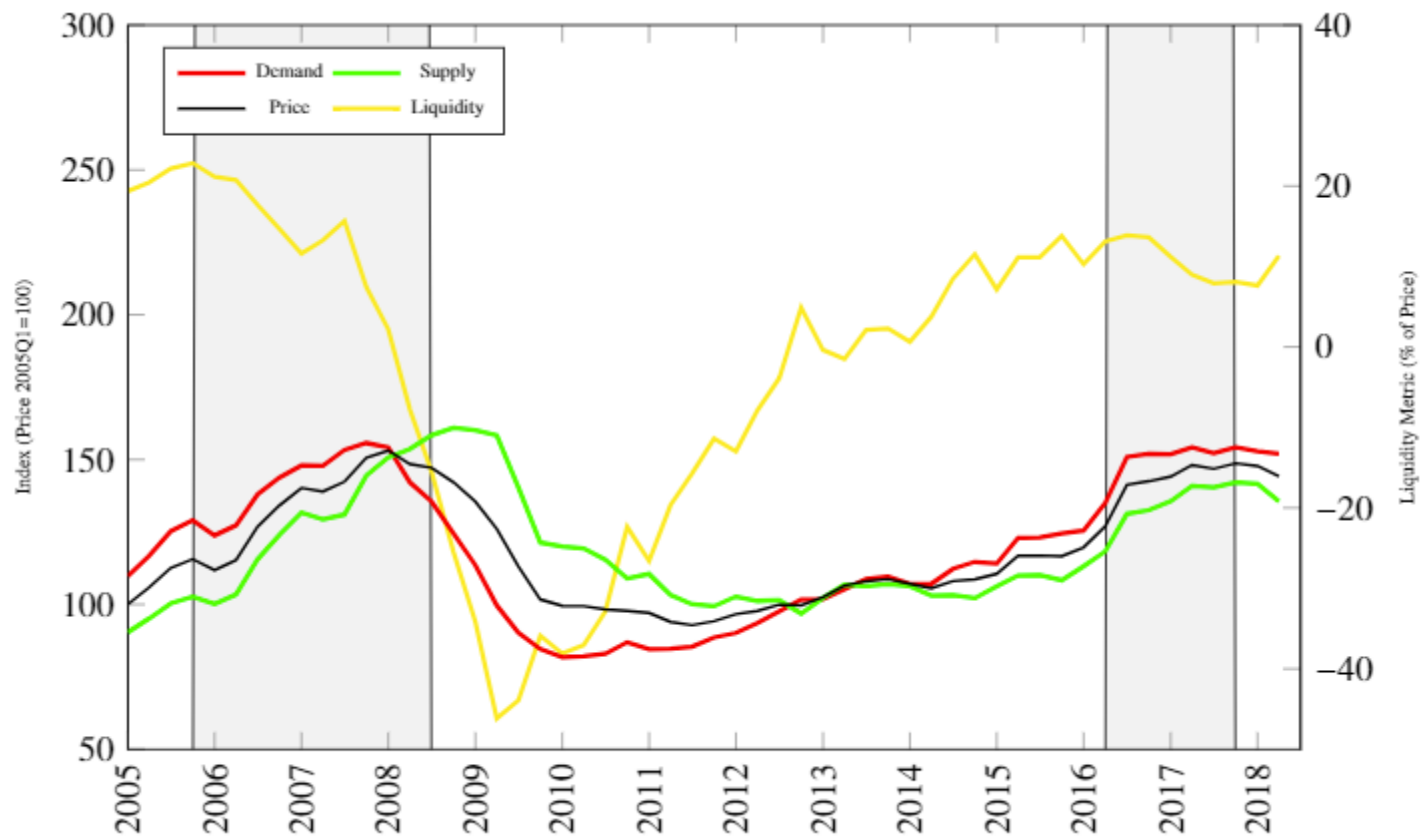
5 Supply and Demand for Real Estate

- This is very fundamental stuff guys!
- Note that we have all the puzzle pieces.
 - Demand moves, and supply doesn't respond immediately.
 - As a result, demand moves first and drives the market.
 - Properties will sell more often, and for higher prices.
 - This is essentially why we observe positive price-volume correlation in real estate.
- Liquidity is measured by how far the reservation prices (on average) of buyers and sellers are apart.
- Let's look back in history and see how all these elements moved together. (Prices, reservation prices for buyers and sellers and liquidity.)

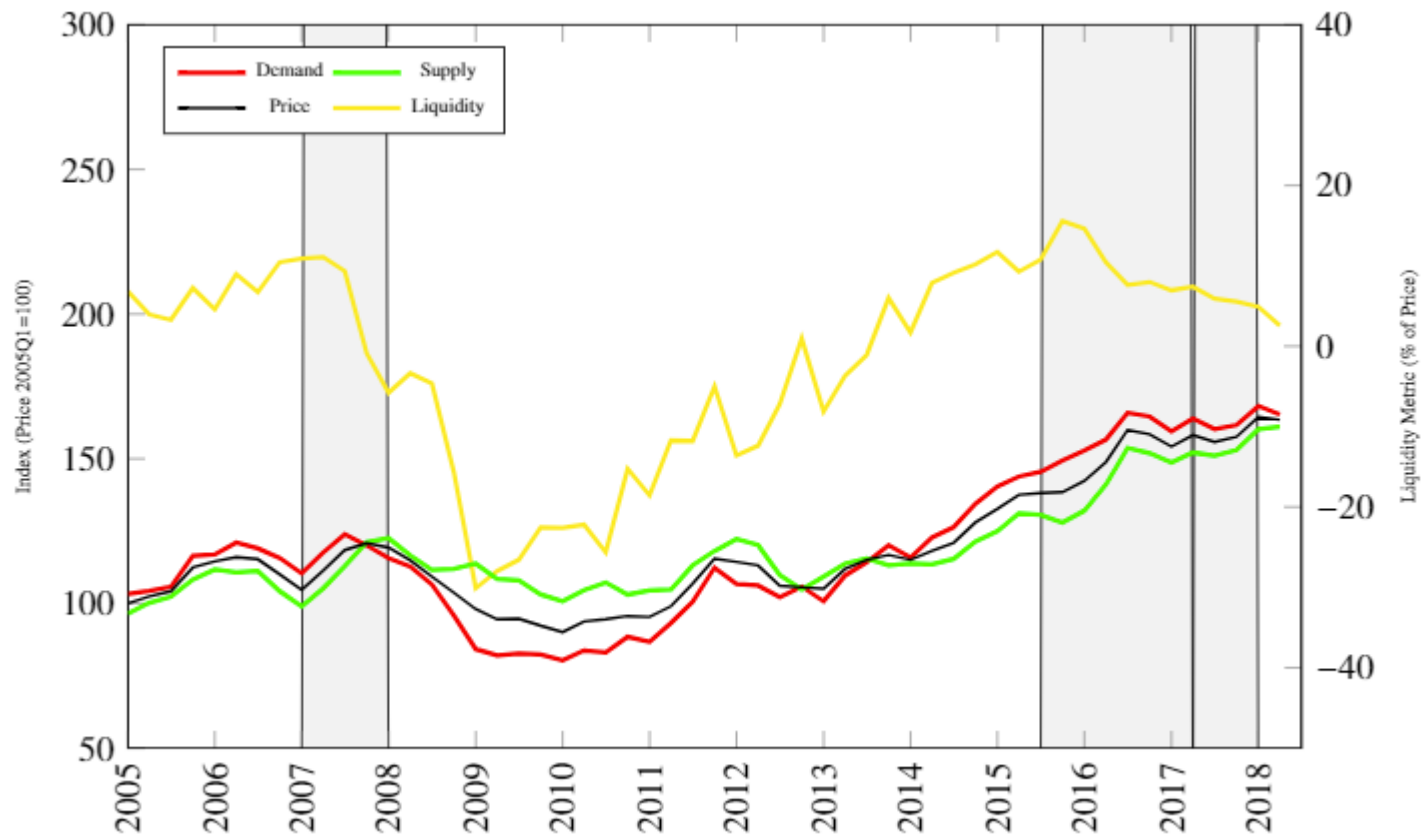
5 New York



5 Phoenix



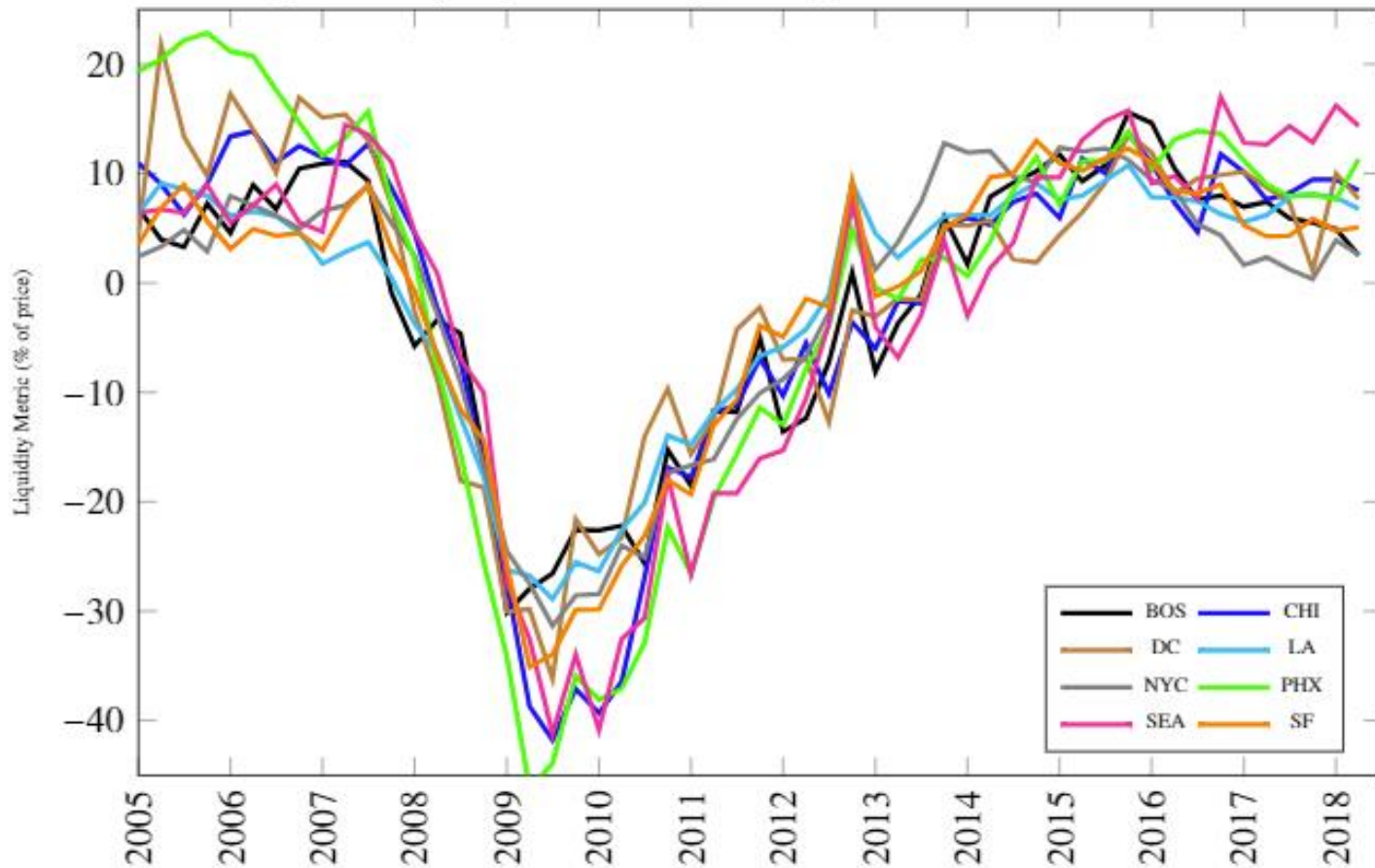
5 Boston



5 Supply and Demand

- Note that the red line (representing demand) indeed *almost* always leads the other lines.
- Another point that is very interesting is the correlation between the liquidity of the markets. (The yellow line.)
 - To make sure it is not some statistical fluke, we looked at multiple cities in the US.
 - We find that this correlation persists.
 - What could drive these correlations?
 - Liquidity for real estate is mostly driven by the asset market. Remember that the asset market is a cointegrated market and co-moves to a large extent? This is another manifestation.
 - New researched showed that it mostly goes through interest rates. Lower interests spurs demand, etc.

5 Supply and Demand



5 Supply and Demand

