

E-CREDA **European Commercial Real Estate Data Alliance**

Purpose and background of E-CREDA

We aim to improve access to and the understanding of available CRE data to facilitate higher quality applied research and interaction between investors, data providers and academic

Our objectives

Knowledge transfer

E-CREDA facilitates data vendors and partners to develop their data products and services by allowing investors and managers' subscriptions to be shared with academic partners for specific applied research projects of practical use to investors and managers.

Exchange of insights

E-CREDA increases the practical relevance of academic collaboration by improving data access to a broader range of legacy and emerging data sources to answer specific practical problems facing investors and managers.

Diffusion of findings

E-CREDA promotes innovation in applied research by investors and managers by allowing them to mobilise all the available data and scientific approach to use them in addressing specific market and strategic issues.

Our members

Data vendors

Investors

Academics

Our events, activities and publications



Our events, activities and publications (excerpt)



Research Articles

Portfolio Diversification Across U.S. Gateway and Non-Gateway Real Estate Markets

Martin Hoesli & Louis Johner

Pages 523-552 | Received 07 Jul 2021, Accepted 25 Jan 2022, Published online: 14 Apr 2022

Cite this article <https://doi.org/10.1080/08965803.2022.2038902>

Check for updates



Articles

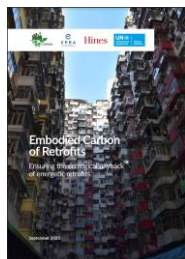
Does Retrofitting Pay Off? An Analysis of German Multifamily Building Data

Alexander Groh, Hunter Kuhlwein & Sven Bienert

Pages 95-112 | Received 03 May 2022, Accepted 03 Oct 2022, Published online: 03 Nov 2022

Cite this article <https://doi.org/10.1080/19498276.2022.2135188>

Check for updates



EMBODIED CARBON OF RETROFITS: Ensuring the Ecological Payback of Energetic Retrofits

Posted on 25/09/2023



Forecasting office rents with ensemble models – the case for European real estate markets

Benedict von Ahlefeldt-Dehn, Marcelo Cajias, Wolfgang Schäfers

Journal of Property Investment & Finance

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Interpretable machine learning for real estate market analysis

Felix Lorenz, Jonas Willwisch, Marcelo Cajias, Franz Fuerst

First published: 31 May 2022 | <https://doi.org/10.1111/1540-6229.12397> | Citations: 5

E-CREDA Academic Research: Goals, selection criteria and application

E-CREDA research projects

Project goal

E-CREDA provides young academics with the opportunity to access unique real estate data sets to carry out research projects.

The goal is to select researchers that possess the requisite knowledge, skills, and passion to collaborate effectively on the selected research projects.

Whenever researchers have identified a specific research project that requires the usage of data, E-CREDA can act as a facilitator and advisor for obtaining real estate data.

Selection criteria

The selection of researchers will be based on a throughout evaluation of their academic achievements, relevant and necessary experience and commitment to the objectives of the project.

Additionally, consideration will be given to diversity, including disciplinary backgrounds, perspectives and demographics, to foster dynamic and inclusive research environment.

The selection process may involve reviewing application, conducting interviews, and consulting with faculty advisors.

E-CREDA 40' Research Update

Quantifying the price expectations gap in CRE – illiquidity in European markets

Attendees will explore methodologies for assessing price discrepancies and examine case studies that highlight the impact of liquidity constraints on property valuations



Tom Leahy
Capital-Markets research
in Europe at MSCI



PhD Dorinth van Dijk
Principal Economist at De
Nederlandsche Bank

12th of September
15:00 – 15:40 CET
Online seminar

Registration



E-CREDA improves the access to and understanding of available CRE data to facilitate higher quality applied research and more frequent interaction between investors, data providers and academics to achieve data parity with other major asset classes, like stocks and bonds

Quantifying the price expectations gap in CRE – illiquidity in European markets - Scientific background

Dorinth van Dijk
De Nederlandsche Bank
September 12, 2024

E-CREDA Research update

Views expressed are those of the author and do not necessarily reflect official positions of De Nederlandsche Bank

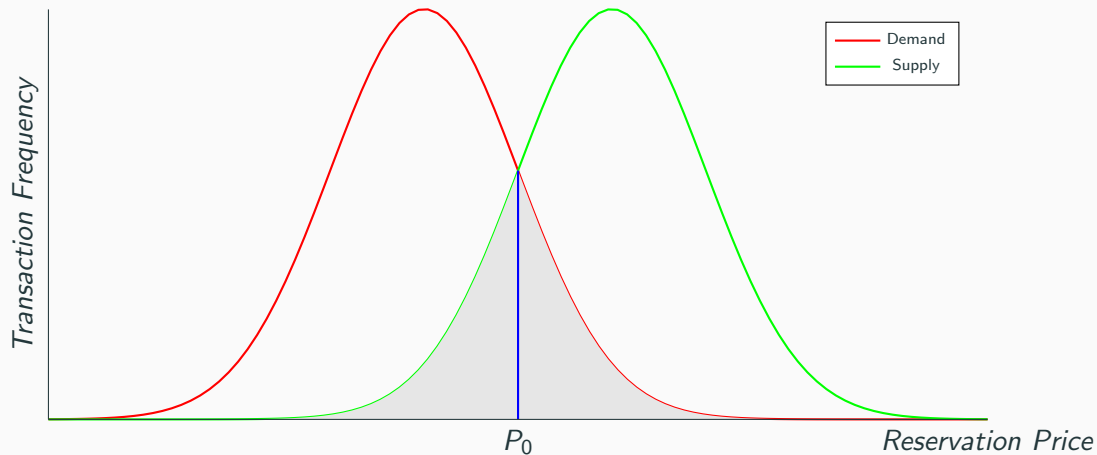
Introduction

- Market liquidity is crucial in any investment class and is defined as the “ease to sell properties”
- In private CRE oftentimes volume is used, Fisher, Gatzlaff, Geltner, and Haurin, 2003 (FGGH) explore dynamic relationship between liquidity and price by quantifying indices of demand (potential buyers) and supply (potential sellers)
- Demand tends to move quicker, leading to the well-documented pro-cyclicality in market liquidity and price returns
- The gap between demand and supply can serve as a liquidity metric for private commercial real estate markets

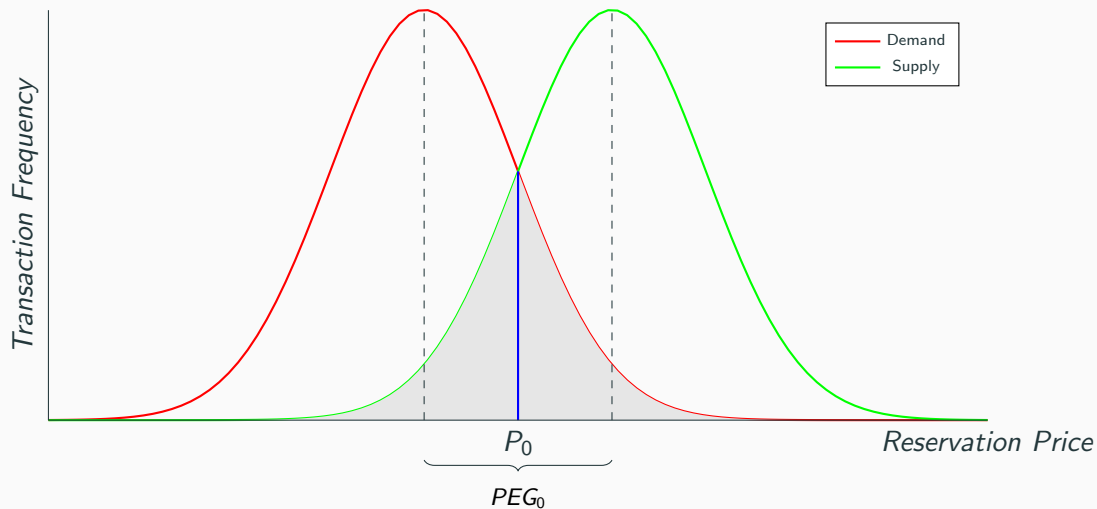
- The goal of our paper was to extend FGGH in two ways: regionally and in a repeat sales framework
- This enables to model the be used better in practice
- Today I discuss the method of the original paper (van Dijk, Geltner, and van de Minne, 2022)
- And some results of a follow-up paper (Van Dijk and Francke, 2021)
- MSCI publishes “Price expectations gap” based on the market liquidity measure in our paper

Stylized theory

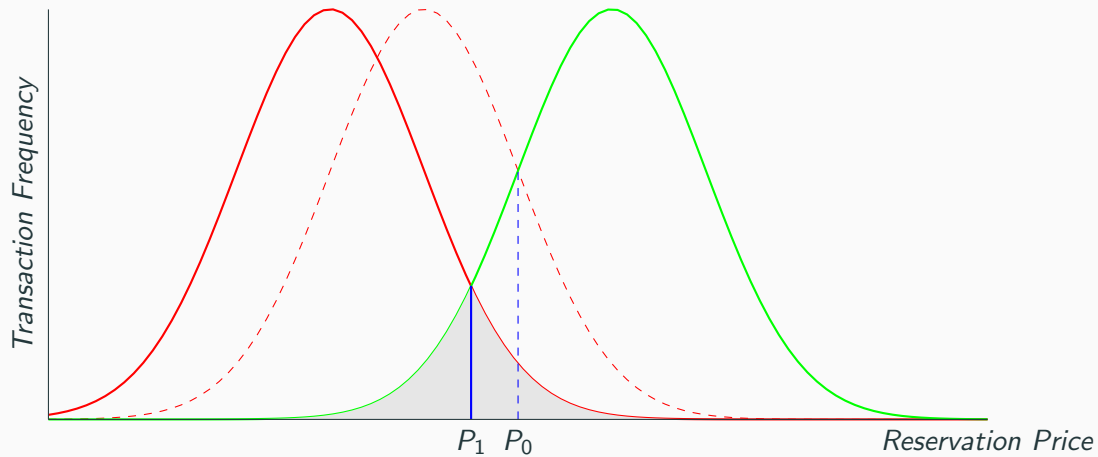
Measuring liquidity: reservation prices in normal market



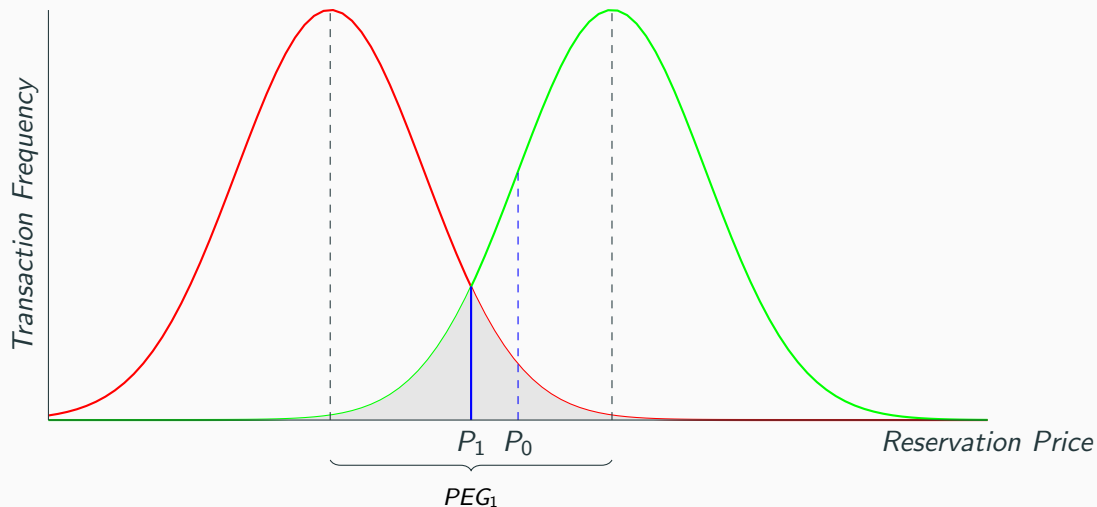
Measuring liquidity: reservation prices in normal market



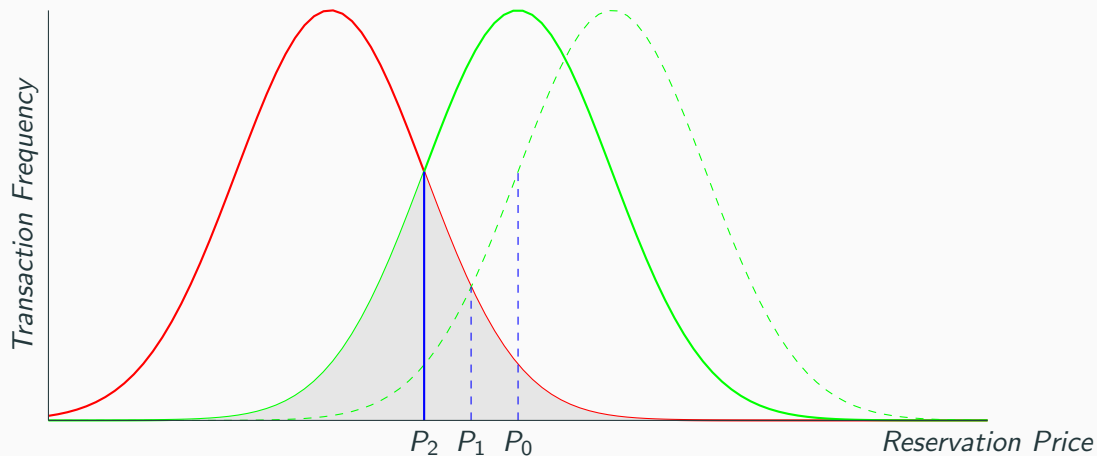
Downturn $t=1$: buyers to the left!



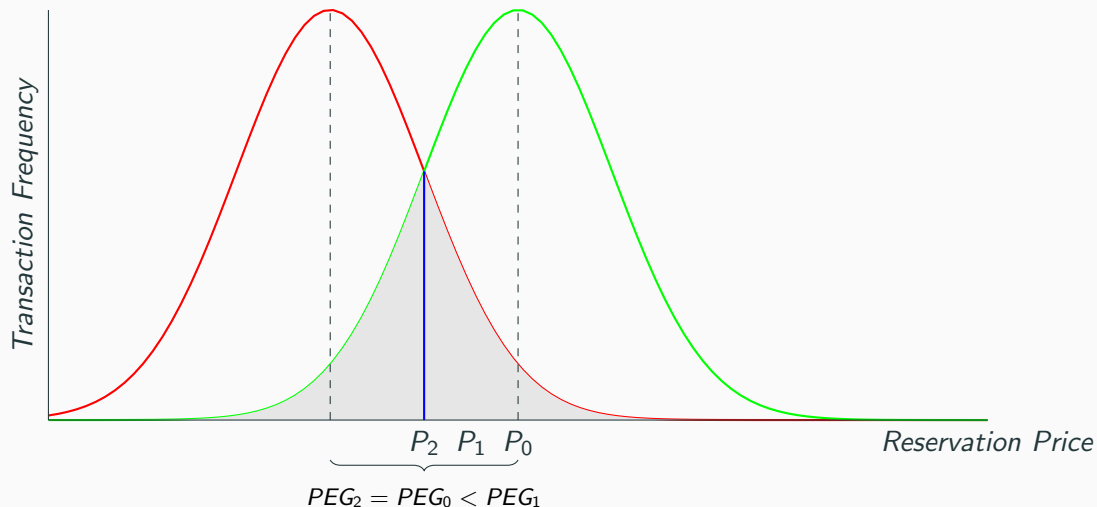
Downturn $t=1$: lower market liquidity and (slightly) lower prices



Downturn $t=2$: sellers move to the left!



New equilibrium $t=2$: normal market liquidity and lower prices



Some econometrics

Econometrics to derive reservation prices and Liquidity Metric

- Adapt Heckman selection model for repeat sales developed by (Gatzlaff and Haurin, 1997)
- Estimate probability of sale:

$$\begin{aligned} S_{i,t}^* &= \gamma_t + X_i\omega + \eta_{i,t}, & \eta_{i,t} &\sim N(0, 1). \\ &= \Pr(S_{i,t} = 1|X_i) = \Phi(\gamma_t + X_i\omega) \end{aligned}$$

- Estimate the Bayesian repeat sales model:

$$\begin{aligned} P_{i,t} - P_{i,s} &= \beta_t - \beta_s + \sigma_{\varepsilon,\eta}(\lambda_2 - \lambda_1) + v_i, & v_i &\sim N(0, \sigma_v^2) \\ \Delta\beta_t &= \rho\Delta\beta_{t-1} + \xi_t, & \xi_t &\sim N(0, \frac{\sigma_\xi^2}{1 - \rho^2}). \end{aligned}$$

- λ are the “inverse Mills Ratios” from the probit

Econometrics to derive reservation prices and Liquidity Metric

- Combine probit and RS results to obtain investor demand, supply, and liquidity indices:

$$\hat{\beta}_t^b = \hat{\beta}_t + \frac{1}{2}\hat{\sigma}\hat{\gamma}_t$$

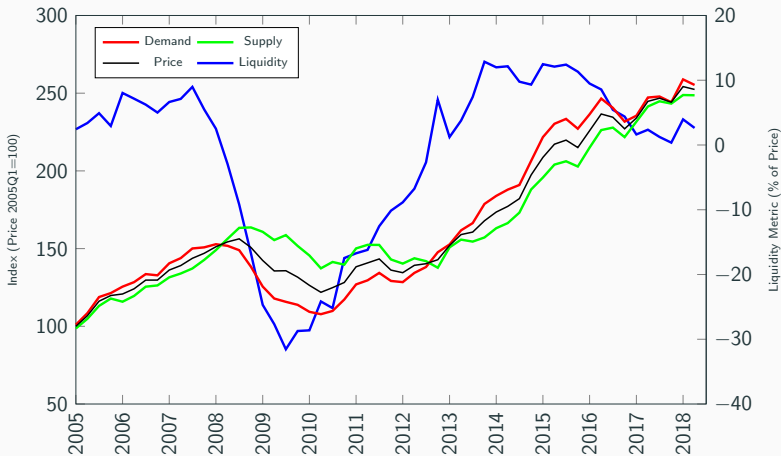
$$\hat{\beta}_t^s = \hat{\beta}_t - \frac{1}{2}\hat{\sigma}\hat{\gamma}_t$$

$$Liqt = \frac{\hat{\beta}_t^b - \hat{\beta}_t^s}{\hat{\beta}_t} = \frac{\hat{\sigma}\hat{\gamma}_t}{\hat{\beta}_t}.$$

- Some assumptions: whole property universe is observed, price midpoint between buyer and seller, reservation prices normally distributed with constant variance, sales at arm's length, no renovations
- Complete model [here](#)

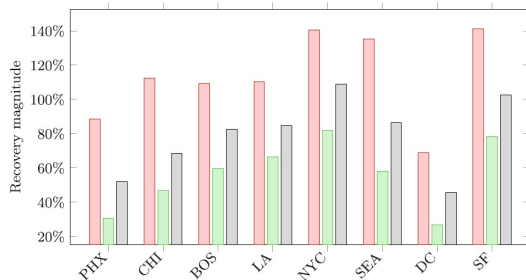
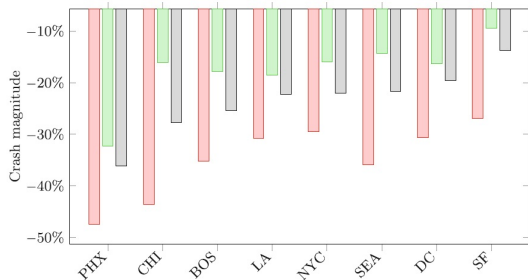
Empirical results

Indices: New York City



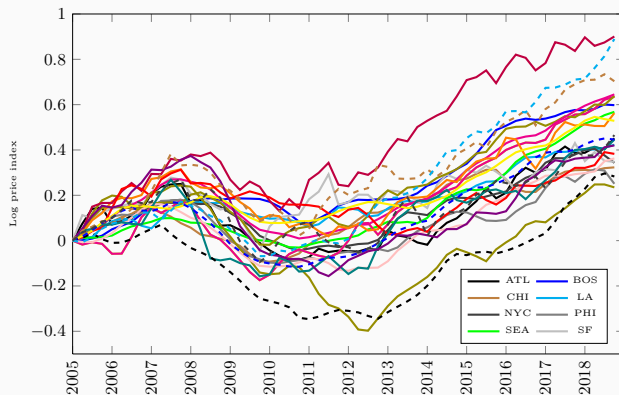
- Demand moves quicker than supply: market liquidity leads price movements

Procyclical liquidity



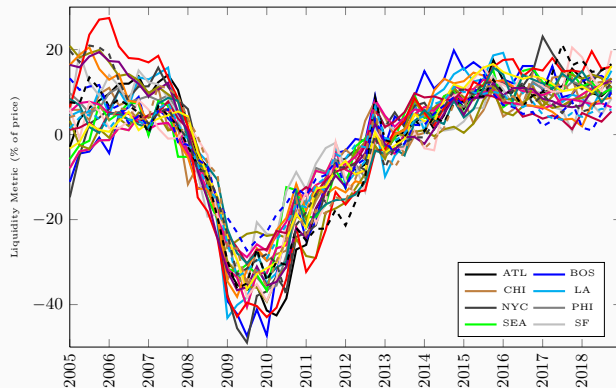
- Demand (red) drops and recovers more strongly than supply (green)
- → Procyclical market liquidity

Commonality in (US) price indices



- Prices move similarly...

Commonality in (US) market liquidity



- ...but not nearly as much as liquidity!
- Prices are determined by global capital markets + local space markets, market liquidity mostly by capital markets (Van Dijk and Francke, 2021)

Conclusions

- We introduce a way to measure market liquidity in private commercial real estate markets
- Measure is applicable in a repeat sales framework and to local markets
- Three facts about market liquidity:
 - 1 Market liquidity is pro-cyclical (market indicator)
 - 2 Market liquidity moves quicker than prices (leading indicator)
 - 3 Market liquidity co-moves extremely strongly across markets (diversification)

References

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- Gatzlaff, D. H. and D. R. Haurin (1997). Sample selection bias and repeat-sales index estimates. *The Journal of Real Estate Finance and Economics* 14(1), 33–50.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 153–161.
- Hoffman, M. D. and A. Gelman (2014). The No-U-turn sampler: Adaptively setting path lengths in Hamiltonian Monte Carlo. *Journal of Machine Learning Research* 15(1), 1593–1623.
- Van Dijk, D. W. and M. K. Francke (2021). Commonalities in private commercial real estate market liquidity and price index returns. *The Journal of Real Estate Finance and Economics* *Forthcoming*, 1–37.
- van Dijk, D. W., D. M. Geltner, and A. M. van de Minne (2022). The dynamics of liquidity in commercial property markets: Revisiting supply and demand indexes in real estate. *The Journal of Real Estate Finance and Economics* 64(3), 327–360.

Appendix slides

Reservation price model (long)

Starting point are the reservation prices:

$$RP_{i,t}^b = \beta_t^b + X_i \alpha^b + \varepsilon_{i,t}^b,$$

$$RP_{i,t}^s = \beta_t^s + X_i \alpha^s + \varepsilon_{i,t}^s.$$

Normal hedonic model estimates the following:

$$E(P_{i,t}) = \frac{1}{2}(\beta_t^b + \beta_t^s) + \frac{1}{2}X_i(\alpha^b + \alpha^s) + \frac{1}{2}E((\varepsilon_{i,t}^b + \varepsilon_{i,t}^s) | RP_{i,t}^b \geq RP_{i,t}^s),$$

$$E(P_{i,t}) = \beta_t + X_i \alpha + E(\varepsilon_{i,t} | RP_{i,t}^b \geq RP_{i,t}^s).$$

We observe $S_{i,t} = 1$ if a transaction is consummated:

$$S_{i,t}^* = RP_{i,t}^b - RP_{i,t}^s = (\beta_t^b - \beta_t^s) + X_i(\alpha^b - \alpha^s) + (\varepsilon_{i,t}^b - \varepsilon_{i,t}^s).$$

Back to [main](#).

Estimate the following probit:

$$\begin{aligned} S_{i,t}^* &= \gamma_t + X_i\omega + \eta_{i,t}, & \eta_{i,t} &\sim N(0, 1). \\ &= \Pr(S_{i,t} = 1|X_i) = \Phi(\gamma_t + X_i\omega), \end{aligned}$$

The coefficients are estimated up to scale factor σ :

$$\begin{aligned} \hat{\gamma} &= \gamma/\sigma = (\beta_t^b - \beta_t^s)/\sigma, \\ \hat{\omega} &= \omega/\sigma = (\alpha^b - \alpha^s)/\sigma. \end{aligned}$$

Calculate IMRs and plug these in the two sales equations:

$$\begin{aligned} E(P_{i,s}|S_{i,s} = 1) &= \beta_s + X_i\alpha + E(\varepsilon_{i,s}|S_{i,s} = 1), \\ &= \beta_s + X_i\alpha + \sigma_{1,3}\lambda_1 + \sigma_{2,3}\lambda_2, \\ E(P_{i,t}|S_{i,t} = 1) &= \beta_t + X_i\alpha + E(\varepsilon_{i,t}|S_{i,t} = 1), \\ &= \beta_t + X_i\alpha + \sigma_{1,4}\lambda_1 + \sigma_{2,4}\lambda_2. \end{aligned}$$

This results in the following repeat sales equation:

$$P_i^t - P_i^s = \beta_t - \beta_s + (\sigma_{1,4} - \sigma_{1,3})\lambda_s + (\sigma_{2,4} - \sigma_{2,3})\lambda_t + v_i.$$

We estimate the following restricted version:

$$P_{i,t} - P_{i,s} = \beta_t - \beta_s + \sigma_{\varepsilon,\eta}(\lambda_2 - \lambda_1) + v_i, \quad v_i \sim N(0, \sigma_v^2).$$

The conditional expected variance of the pricing errors ($\varepsilon_{i,t}^2$) is:

$$E(\varepsilon_{i,t}^2 | S_{i,t} = 1) = \sigma_\varepsilon^2 - \sigma_{\varepsilon,\eta}^2(\gamma_t + X_i\omega)\lambda_{i,t},$$

where $\sigma_\varepsilon^2 = \text{Var}((\varepsilon_{i,t}^b + \varepsilon_{i,t}^s)/2) = (\sigma_b^2 + \sigma_s^2)/4 = \sigma^2/4$.

Rewriting yields:

$$\hat{\sigma}_\varepsilon^2 = (1/N) \sum_{i=1}^N \left[\hat{\varepsilon}_{i,t}^2 + \hat{\sigma}_{\varepsilon,\eta}^2(\hat{\gamma}_t + X_i\hat{\omega})\hat{\lambda}_{i,t} \right],$$

$$\hat{\sigma} = 2\hat{\sigma}_\varepsilon.$$

From the probit we have $\hat{\gamma} = (\hat{\beta}_t^b - \hat{\beta}_t^s)/\hat{\sigma}$, we also have $\hat{\beta}_t = \frac{1}{2}(\hat{\beta}_t^b + \hat{\beta}_t^s)$
 $\rightarrow \hat{\beta}_t^s = 2\hat{\beta}_t - \hat{\beta}_t^b$:

$$\begin{aligned}\hat{\gamma} &= (\hat{\beta}_t^b - 2\hat{\beta}_t - \hat{\beta}_t^b)\hat{\sigma}, \\ \hat{\beta}_t^b &= \hat{\beta}_t + \frac{1}{2}\hat{\sigma}\hat{\gamma}_t.\end{aligned}$$

Similarly:

$$\hat{\beta}_t^s = \hat{\beta}_t - \frac{1}{2}\hat{\sigma}\hat{\gamma}_t.$$

Back to [main](#).

Estimation

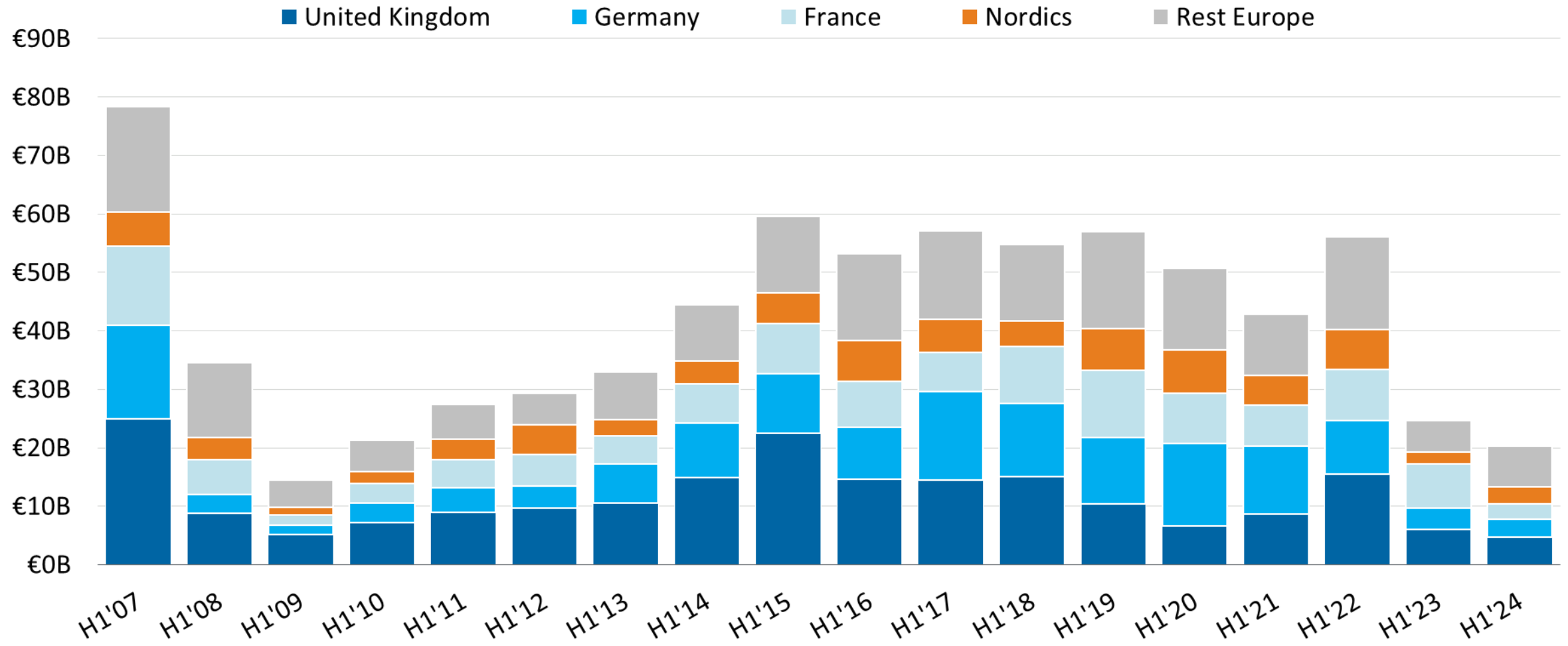
- Two-step approach (Heckman, 1979)
- Probit is estimation by Maximum Likelihood
- Repeat sales model is estimated in Bayesian framework
- MCMC methods, NUTS in RStan (Hoffman and Gelman, 2014)
- Chains=4, Iterations per chain=6000, Warmup=3000

The Price Expectations Gap in Action

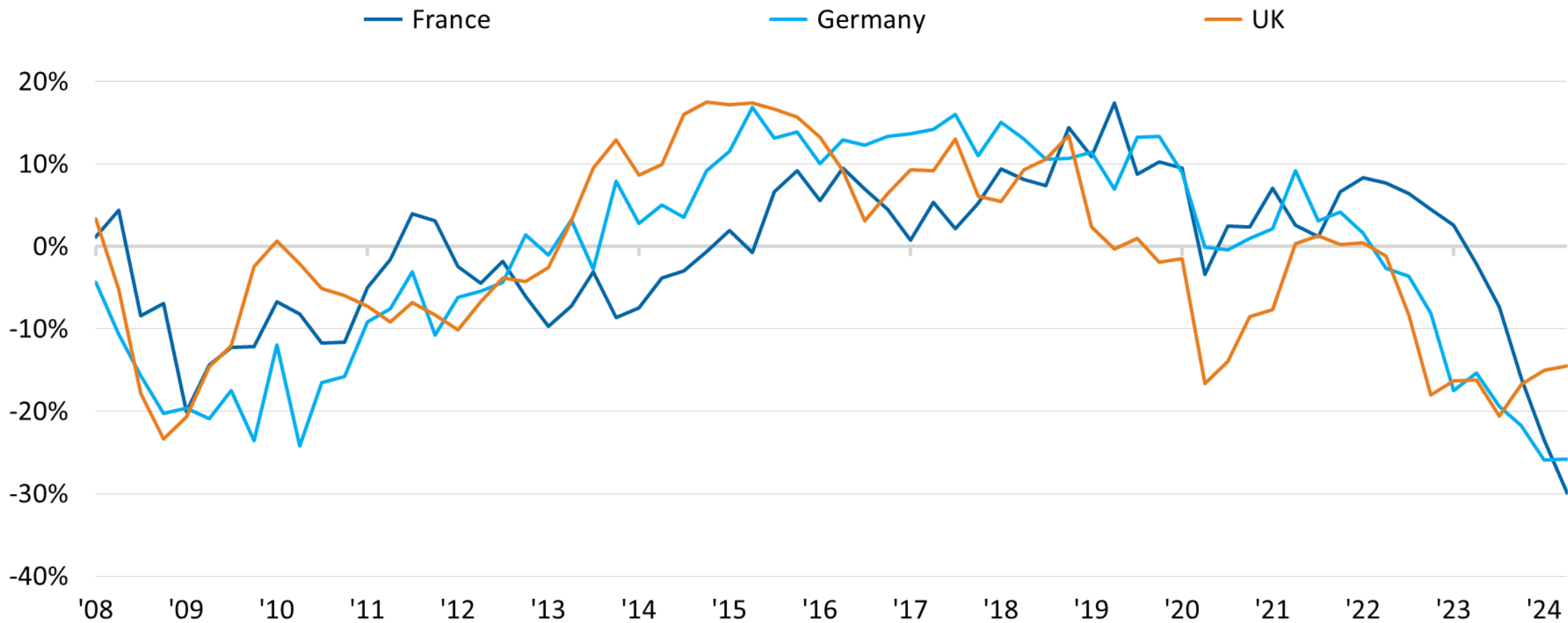
12 September 2024

Tom Leahy, Executive Director, Real Assets Research

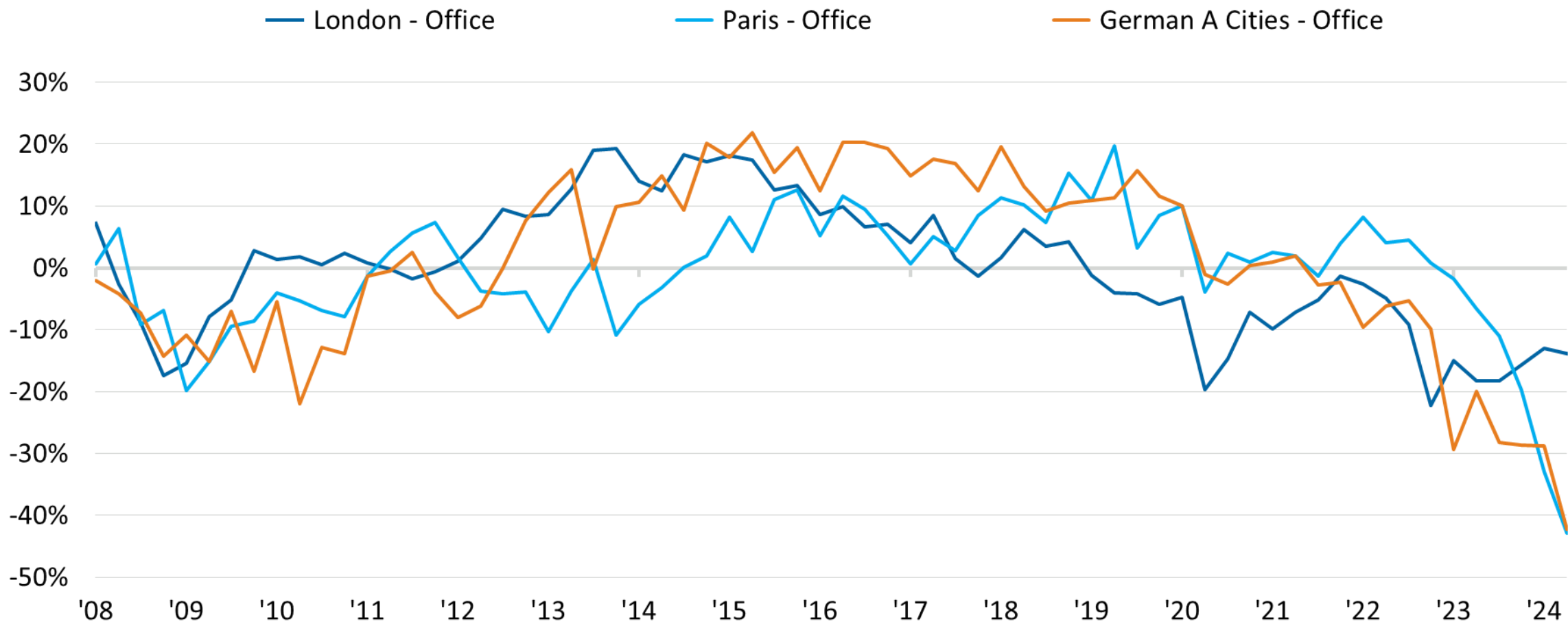
Office investment has plummeted across Europe



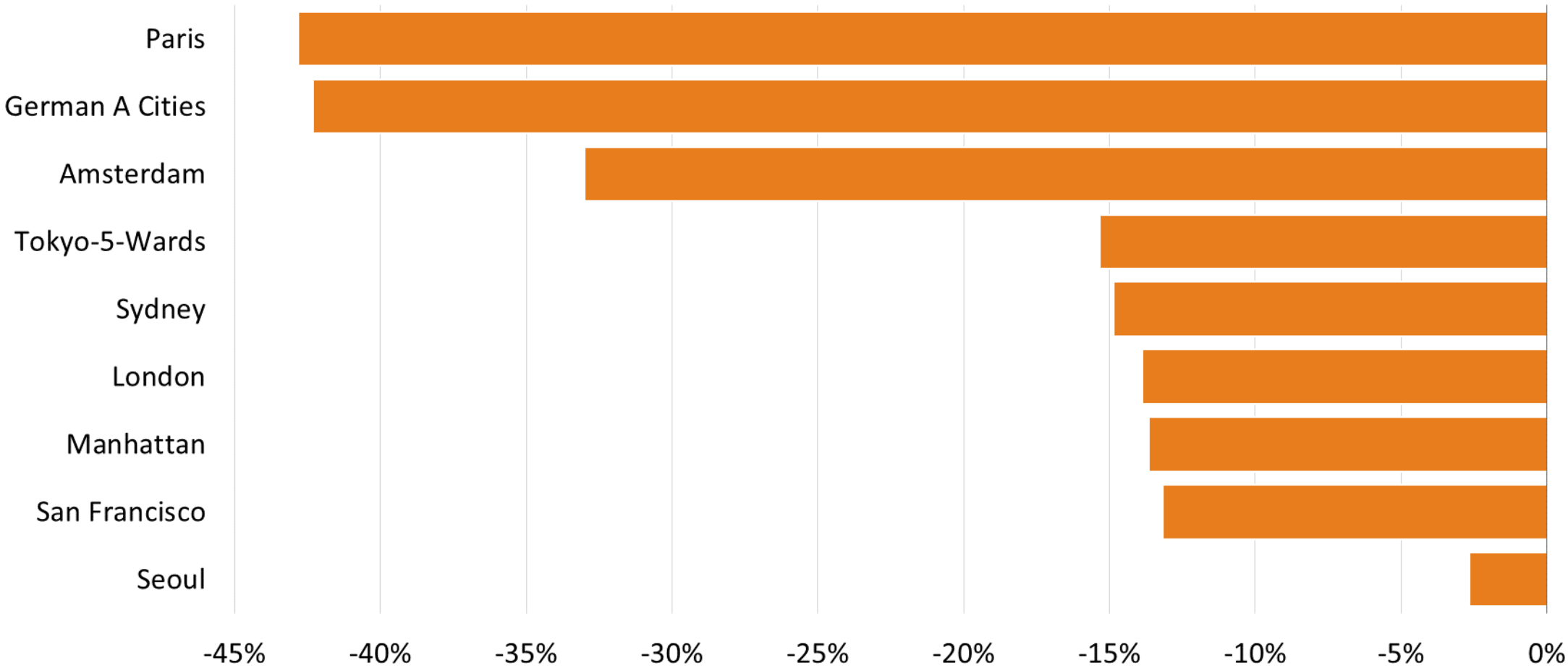
But how can we quantify the illiquidity in European offices?



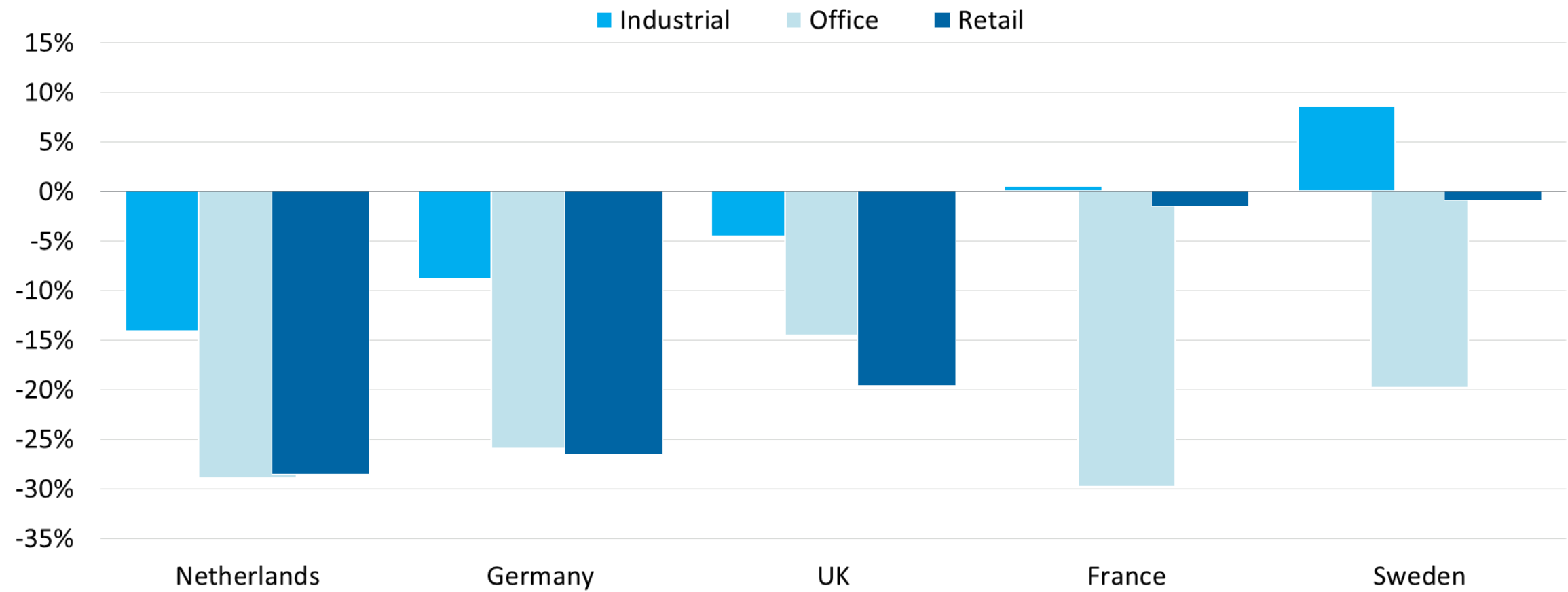
But how can we quantify the illiquidity in European offices?



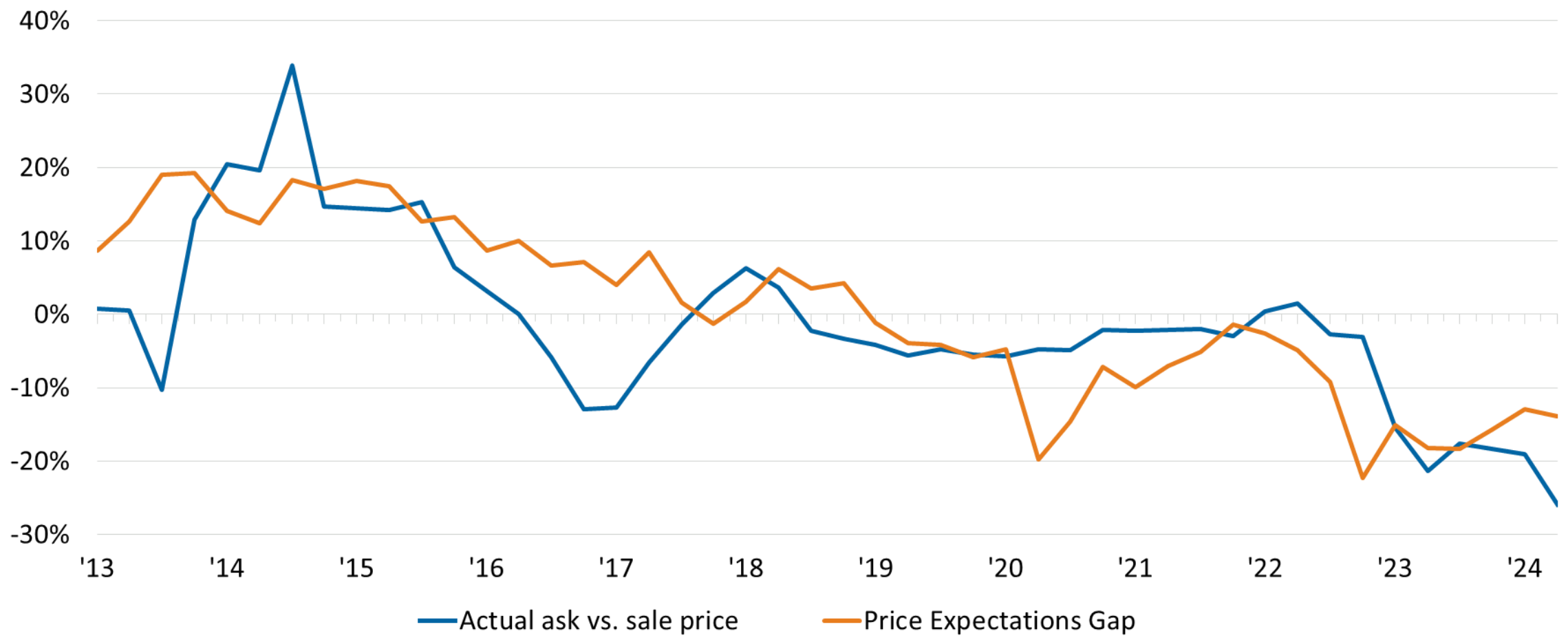
How does this compare to other global office markets?



How is office liquidity faring vs. other asset classes



Does it reflect 'actual' market conditions in London?



For example...

New London House

6 London St London, London EC3R 7 GBR

7,941 m² cbd office owned by Whitbread

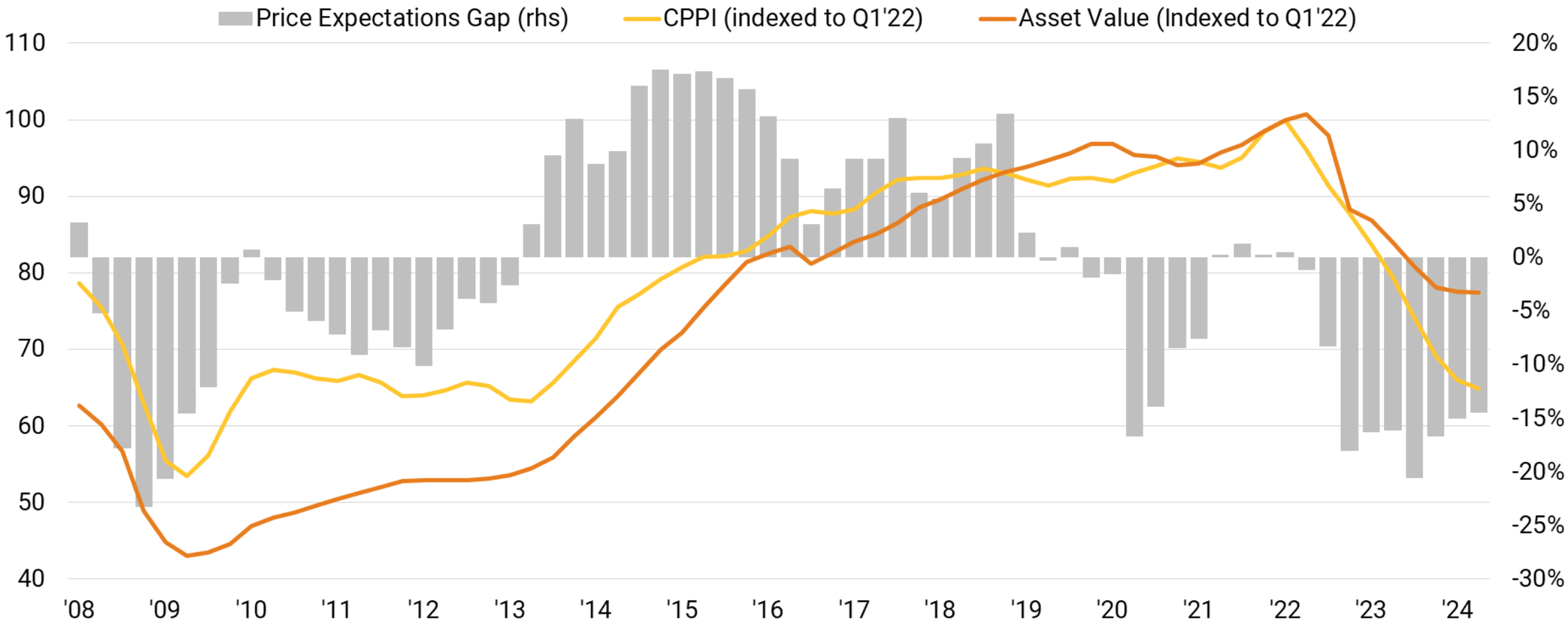
As of September 6, 2024

Property History - 4 Events

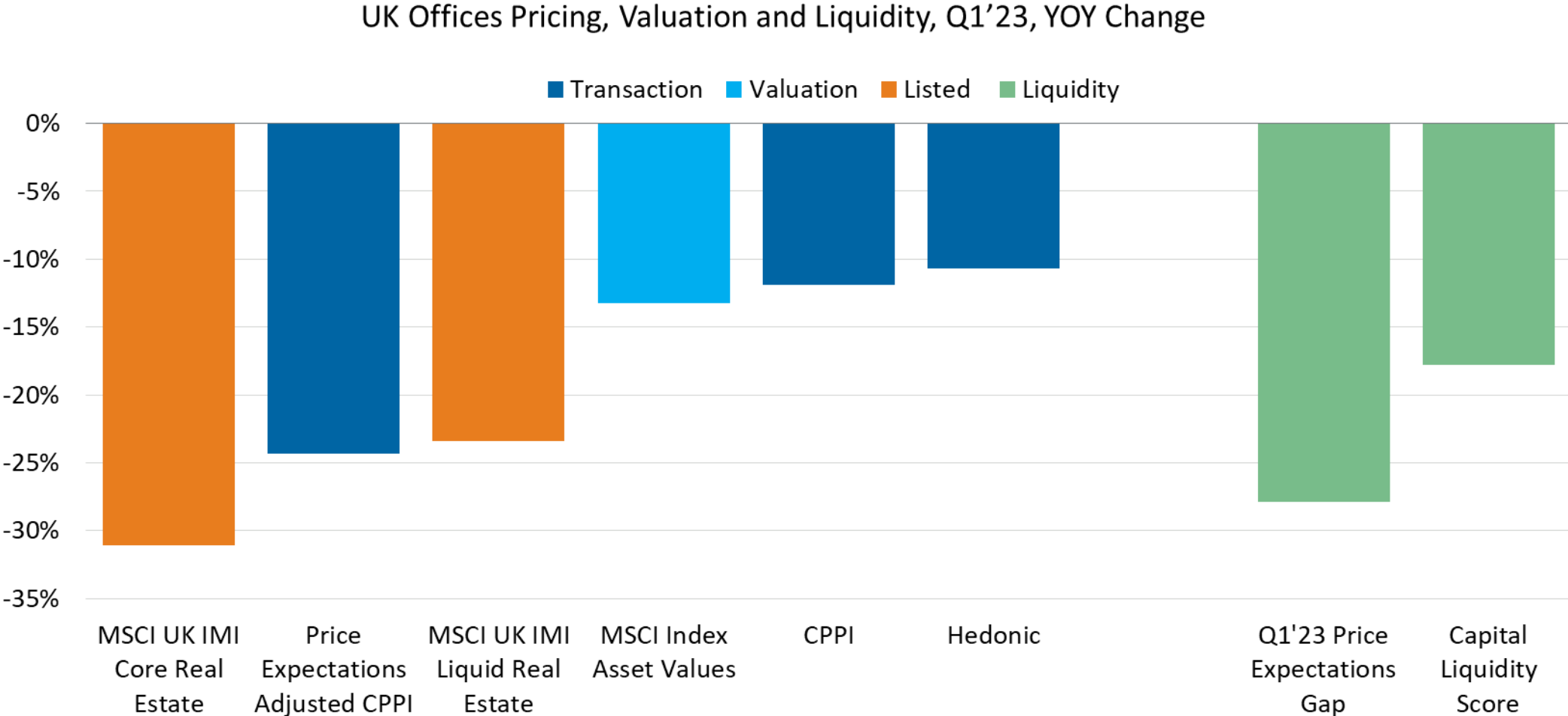
Transaction Date Prop Type	M ² /Units Year Blt/Reno #Bldgs /Flrs	Price (£) £/M ² /Units Cap Rate	 Owner/Buyer  Broker  Seller  Broker  Lender(loan amt)	Comments
Sale Sep '23 Office	7,941 m ² 1975/1993 1 bldg/13 flrs	£56,500,000 <small>confm'd</small> £7,115 /m ² 4.2% in place	 Whitbread from  Orchard Street Invt Mgmt OBO St James's Place Wealth by  Cushman & Wakefield	Office - CBD property; street retail; to be Commercial- Hotel; prior sale: May-15 (£50.4m); planned Redevelopment: hotel;Frame Real Estate advised buyer.; [More]
Terminated Apr '23 Office	7,941 m ² 1975/1993 1 bldg/13 flrs	£70,000,000 <small>approx</small> £8,815 /m ²	 Orchard Street Invt Mgmt OBO St James's Place Wealth by  Cushman & Wakefield	Office - CBD property; street retail; Tenants: DAS Legal Expenses, Regus; prior sale: May-15 (£50.4m);
Sale May '15 Office	7,941 m ² 1975/1993 1 bldg/13 flrs	£50,400,000 <small>confm'd</small> £6,347 /m ² 5.9% in place	 Orchard Street Invt Mgmt OBO St James's Place Wealth from  Aberdeen by  JLL	64% occ.;Office - CBD property; street retail; Tenants: HSB Engineering Insurance, Canopus; partial interest (50%); prior sale: Jun-07 (£58.1m); price reflects 100% valuation; [More]
Sale Jun '07 Office	7,941 m ² 1975/1993 1 bldg/13 flrs	£58,100,000 <small>confm'd</small> £7,317 /m ²	 Invista Real Estate OBO St James's Place Wealth by  BH2 ; JLL from  Landsec by  King Sturge	65% occ.;Office - CBD property; street retail; Tenants: AON; partial interest (50%); price reflects 100% valuation;

Office	1 bldg/13 flrs			
Sale May '15 Office	7,941 m ² 1975/1993 1 bldg/13 flrs	£50,400,000 <small>confm'd</small> £6,347 /m ² 5.9% in place	 Orchard Street Invt Mgmt OBO St James's Place Wealth from  Aberdeen by  JLL	64% occ.;Office - CBD property; street retail; Tenants: HSB Engineering Insurance, Canopus; partial interest (50%); prior sale: Jun-07 (£58.1m); price reflects 100% valuation; [More]
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UK offices – note the different outcome between Covid and current downturn



Adding the price expectations gap gives us multiple views on how a market is performing



Questions

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