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

2024
- 40' research update: Real estate tokenization

2023
- Annual conference: Research insight and market outlook
- 40' research update: CRE lending and CM funding
- 40' research update: Air pollution and real estate

2022
- Annual conference: a new coolaborative path
- Research seminar: Real estate and multiverse

2021
- Annual conference
- Research seminar: Europe residential market analysis
- Research seminar: The new economic order for real estate
- Research seminar: European real estate debt

2020
- Inaugural conference

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

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
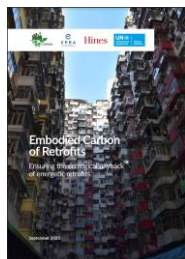
EMBODIED CARBON OF RETROFITS: Ensuring the Ecological Payback of Energetic Retrofits
Posted on 25/09/2023

RESEARCH BRIEF
PD Dr. Marcelo Cajias
M.Sc. Rebecca Restle

INVESTMENT STRATEGY & RESEARCH
The price of clean air – Quantifying air pollution exposure in real estate decisions
PATRIZIA

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
DOWNLOADS

REAL ESTATE ECONOMICS
ORIGINAL ARTICLE | Open Access
Interpretable machine learning for real estate market analysis
Felix Lorenz, Jonas Willwersch, 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

Introduction

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 extent 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
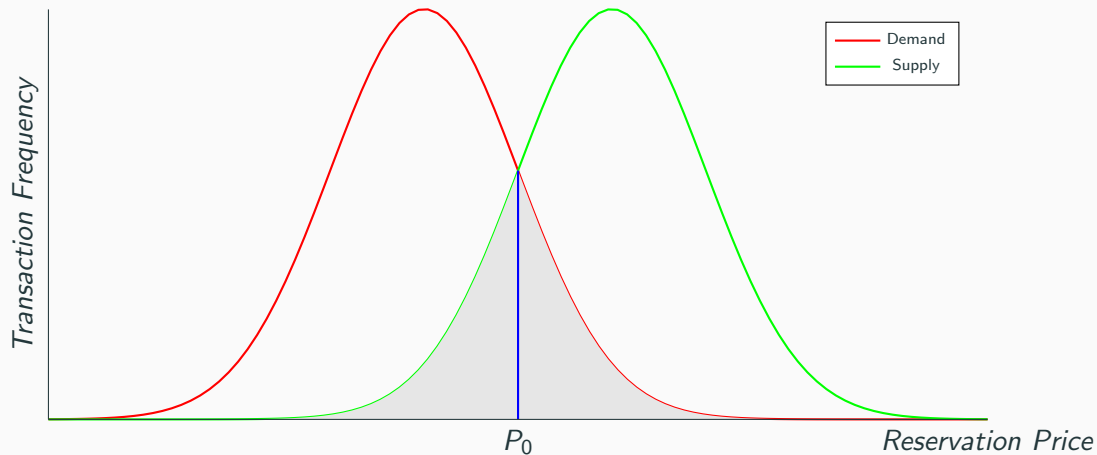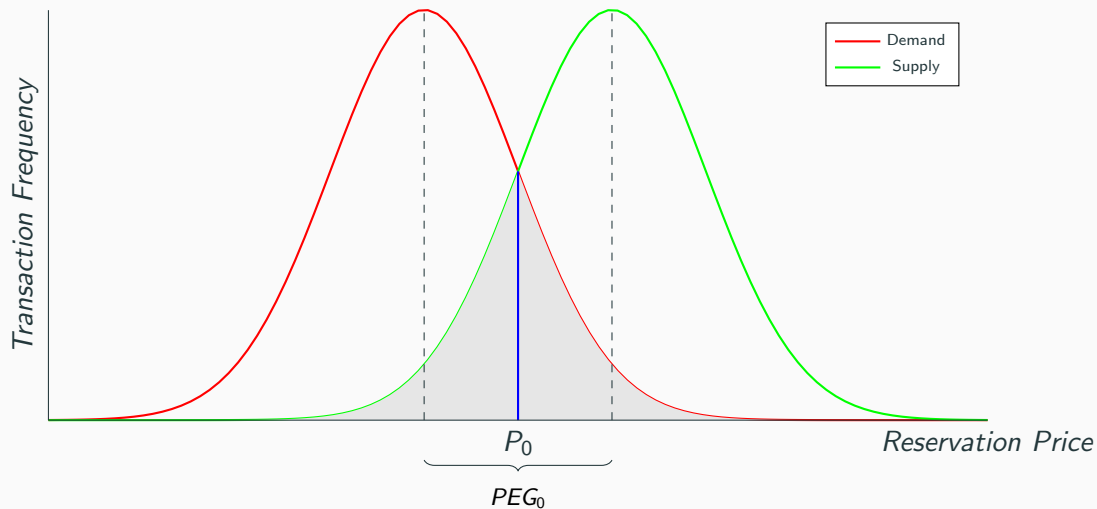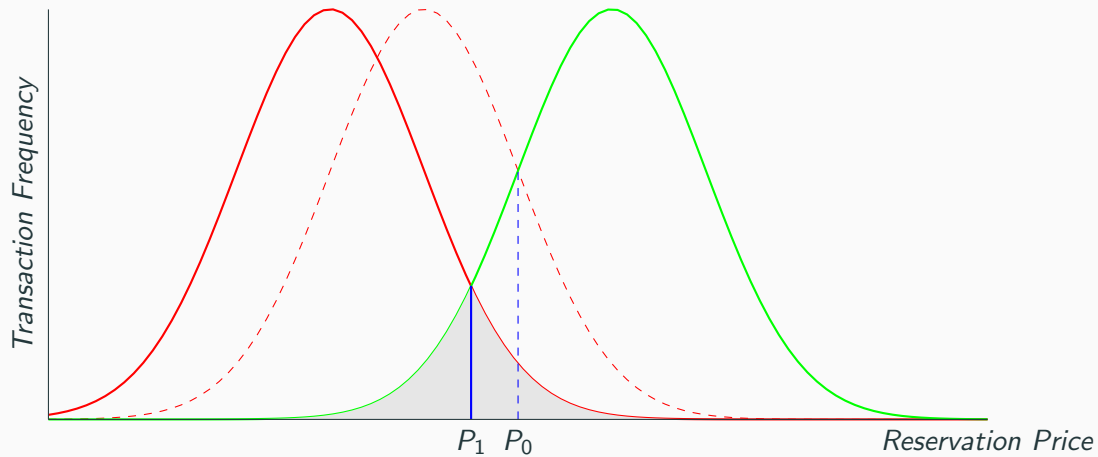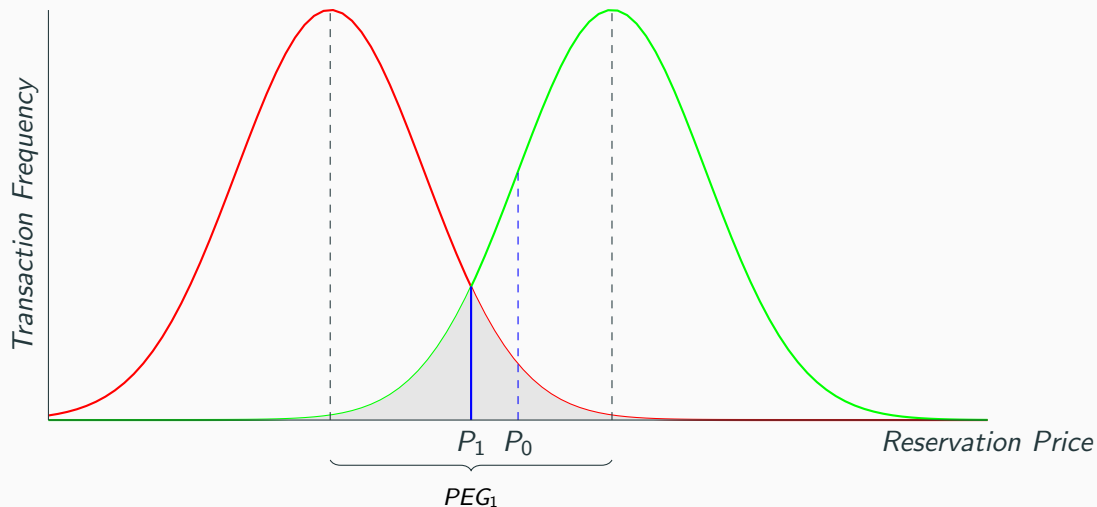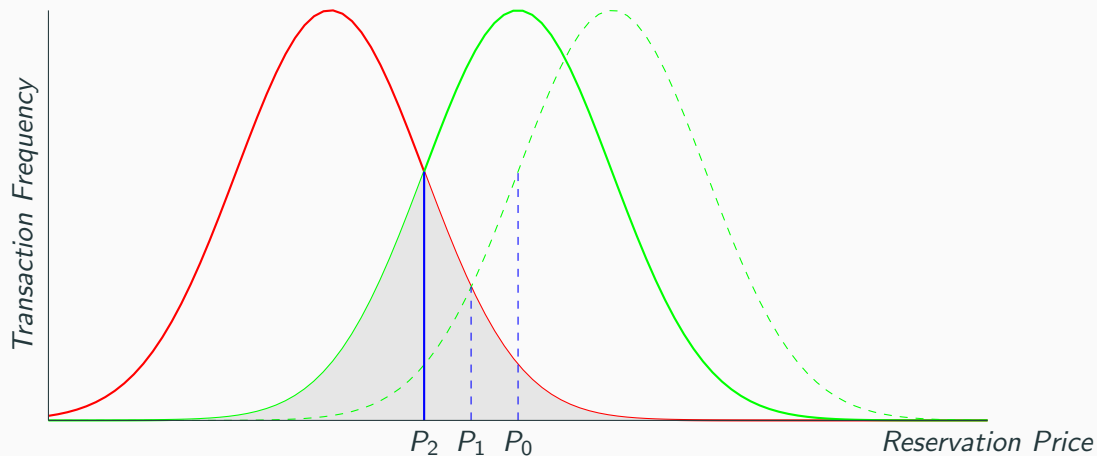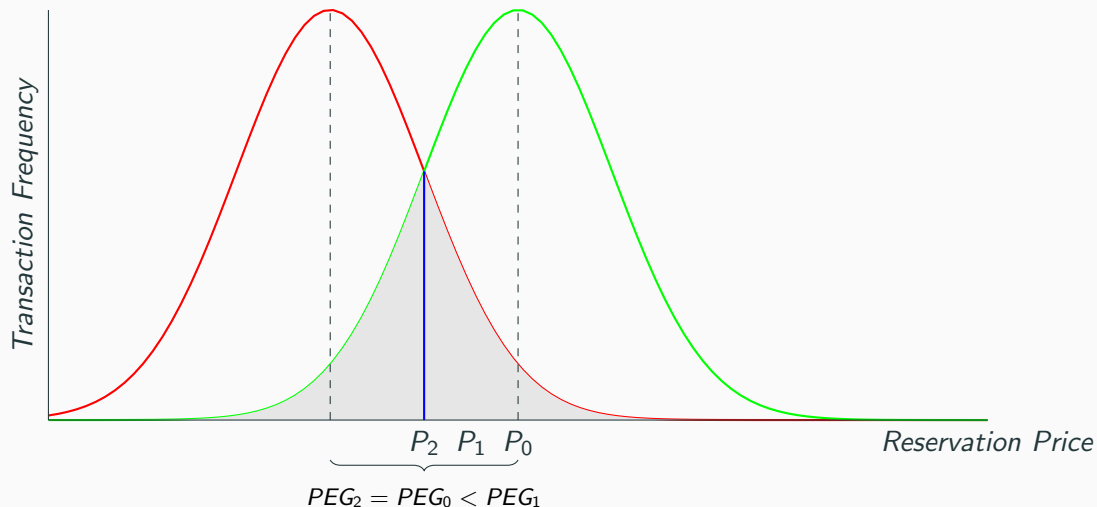
Some econometrics

Econometrics to derive reservation prices and Liquidty Metric

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

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

- Estimate the Bayesian repeat sales model:

$$P_{i,t} - P_{i,s} = \beta_t - \beta_s + \sigma_{\varepsilon,\eta}(\lambda_2 - \lambda_1) + \upsilon_i, \qquad \upsilon_i \sim N(0, \sigma_\upsilon^2)$$
$$\Delta\beta_t = \rho\Delta\beta_{t-1} + \xi_t, \qquad \xi_t \sim N(0, \frac{\sigma_\xi^2}{1-\rho^2}).$$

- 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:

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

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

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

- 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
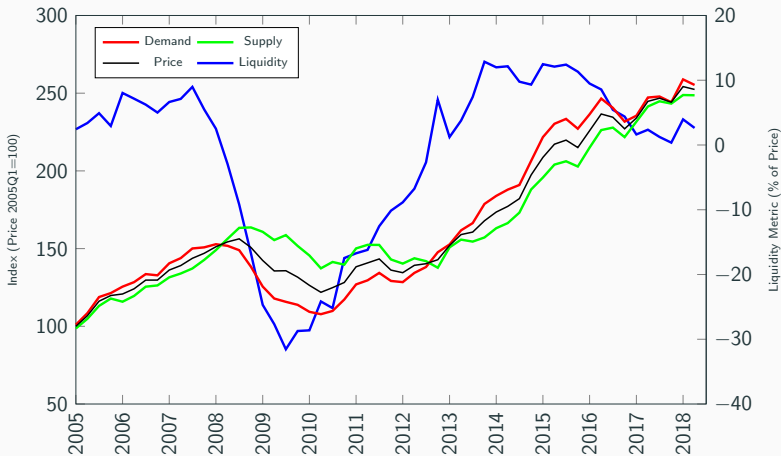
- Demand moves quicker than supply: market liquidity leads price movements
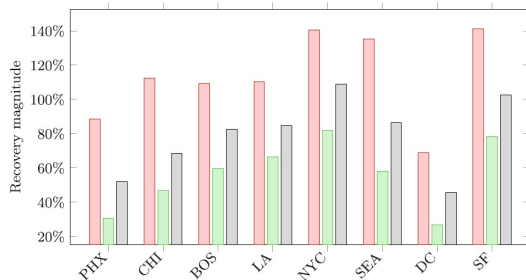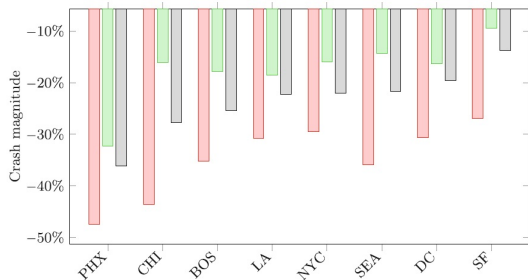
- Demand (red) drops and recovers more strongly than supply (green)
- $\rightarrow$ Procyclical market liquidity

Commonality in (US) price indices
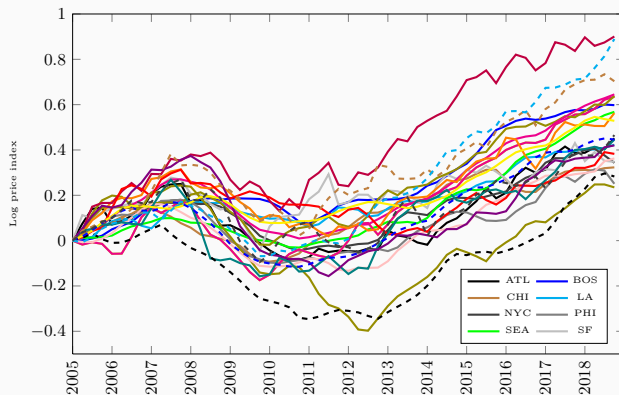
- Prices move similarly...
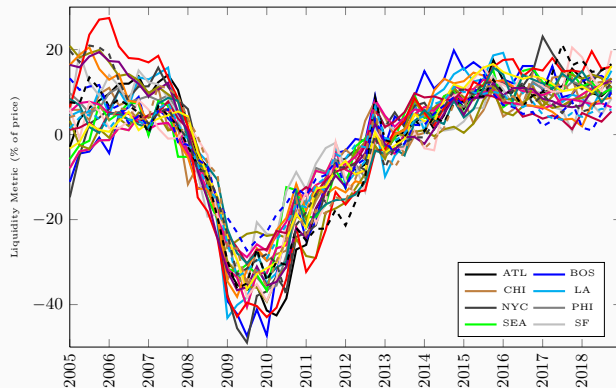
- …but not nearly as much as liquidity!
- Prices are determined by global capital markets + local space markets, market liquidity mostly by capital markets (Van Dijk and Francke, 2021)

Conclusions

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

Fisher, J., D. Gatzlaff, D. Geltner, and D. Haurin (2003). Controlling for the impact of variable liquidity in commercial real estate price indices. *Real Estate Economics 31*(2), 269–303.

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 .

Estimate the following probit:

$$S^*_{i,t} = \gamma_t + X_i\omega + \eta_{i,t}, \qquad\qquad \eta_{i,t} \sim N(0,1).$$
$$= \Pr(S_{i,t} = 1|X_i) = \Phi(\gamma_t + X_i\omega),$$

The coefficients are estimated up to scale factor σ:

$$\hat{\gamma} = \gamma/\sigma = (\beta^b_t - \beta^s_t)/\sigma,$$
$$\hat{\omega} = \omega/\sigma = (\alpha^b - \alpha^s)/\sigma.$$

Calculate IMRs and plug these in the two sales equations:

$$E(P_{i,s}|S_{i,s} = 1) = \beta_s + X_i\alpha + E(\varepsilon_{i,s}|S_{i,s} = 1),$$
$$= \beta_s + X_i\alpha + \sigma_{1,3}\lambda_1 + \sigma_{2,3}\lambda_2,$$

$$E(P_{i,t}|S_{i,t} = 1) = \beta_t + X_i\alpha + E(\varepsilon_{i,t}|S_{i,t} = 1),$$
$$= \beta_t + X_i\alpha + \sigma_{1,4}\lambda_1 + \sigma_{2,4}\lambda_2.$$

Back to .

This results in the following repeat sales equation:

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

We estimate the following restricted version:

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

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

$$E(\varepsilon_{i,t}^2 | S_{i,t} = 1) = \sigma_\varepsilon^2 - \sigma_{\varepsilon,\eta}^2(\gamma_t + X_i\omega)\lambda_{i,t},$$
$$\text{where } \sigma_\varepsilon^2 = \text{Var}((\varepsilon_{i,t}^b + \varepsilon_{i,t}^s)/2) = (\sigma_b^2 + \sigma_s^2)/4 = \sigma^2/4.$$

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 $\hat{\beta}_t = \frac{1}{2}(\hat{\beta}_t^b + \hat{\beta}_t^s)$
$\rightarrow \hat{\beta}_t^s = 2\hat{\beta}_t - \hat{\beta}_t^b$:

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

Similarly:

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

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
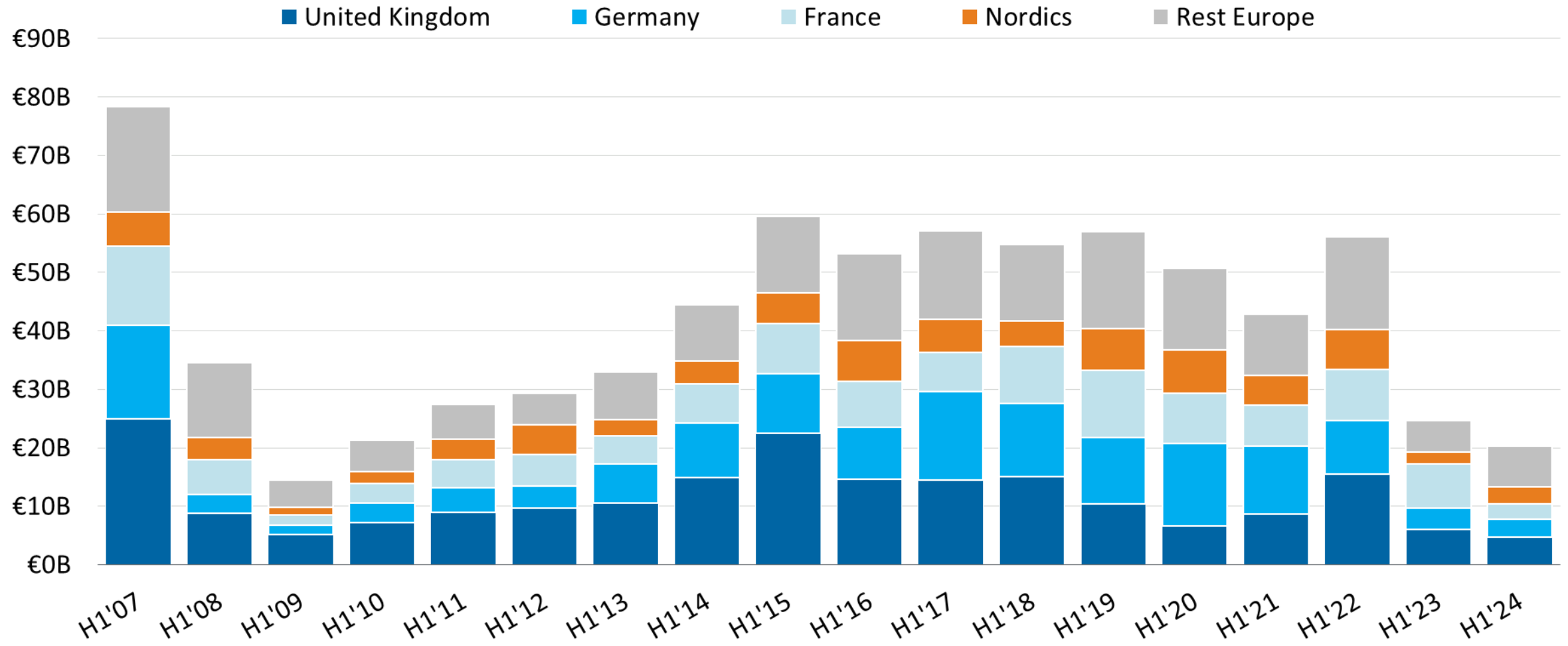
Legend: United Kingdom · Germany · France · Nordics · Rest Europe

Y-axis: €0B, €10B, €20B, €30B, €40B, €50B, €60B, €70B, €80B, €90B

X-axis: H1'07, H1'08, H1'09, H1'10, H1'11, H1'12, H1'13, H1'14, H1'15, H1'16, H1'17, H1'18, H1'19, H1'20, H1'21, H1'22, H1'23, H1'24

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Offices Volumes. All Europe. H1 Only. Transactions €5m+

But how can we quantify the illiquidity in European offices?

Offices. MSCI Price Expectations Gap

Information Classification: GENERAL

But how can we quantify the illiquidity in European offices?

Legend: London - Office, Paris - Office, German A Cities - Office

Offices. MSCI Price Expectations Gap

Information Classification: GENERAL
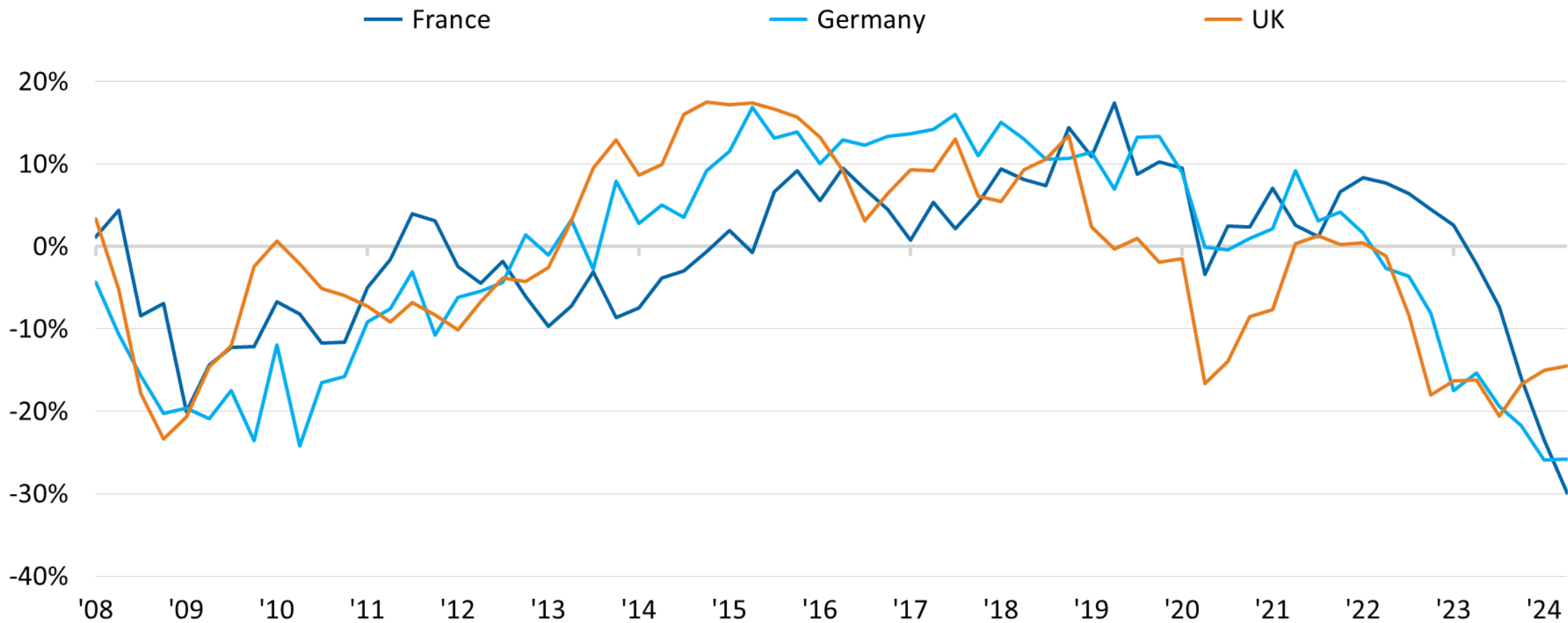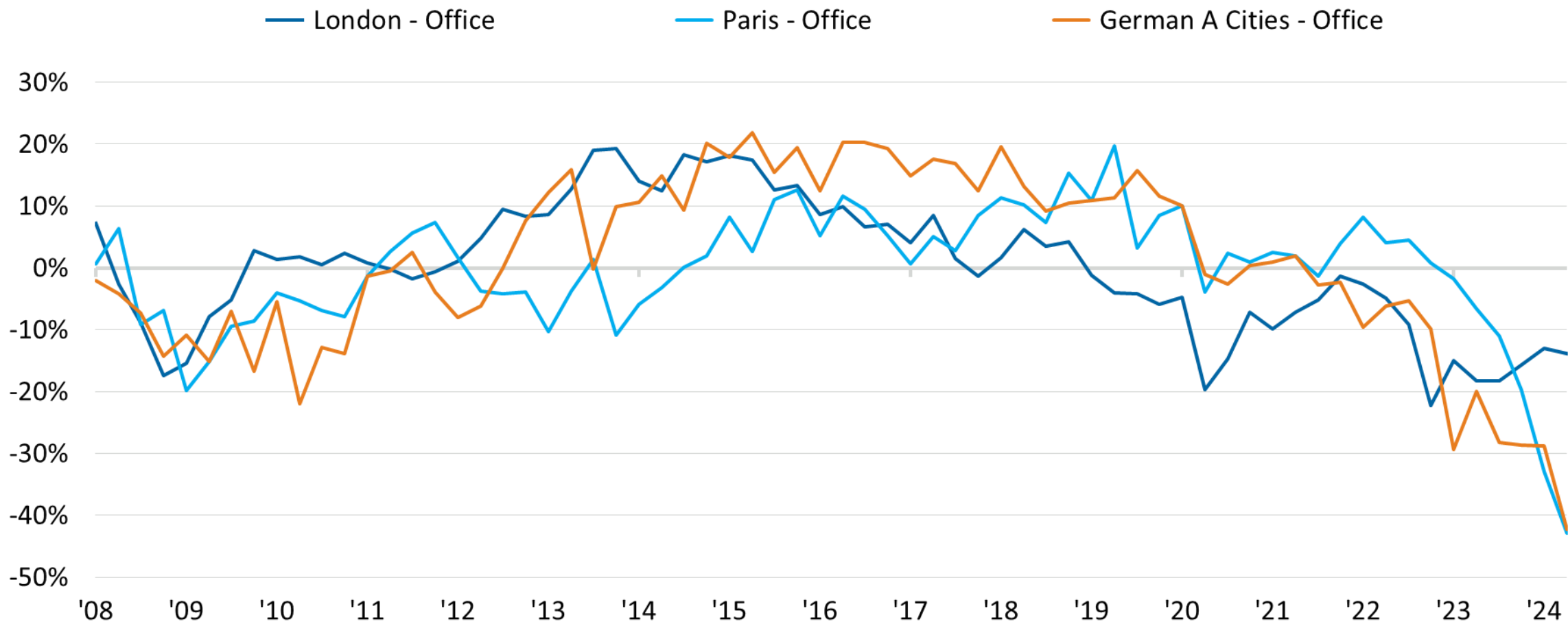
How does this compare to other global office markets?
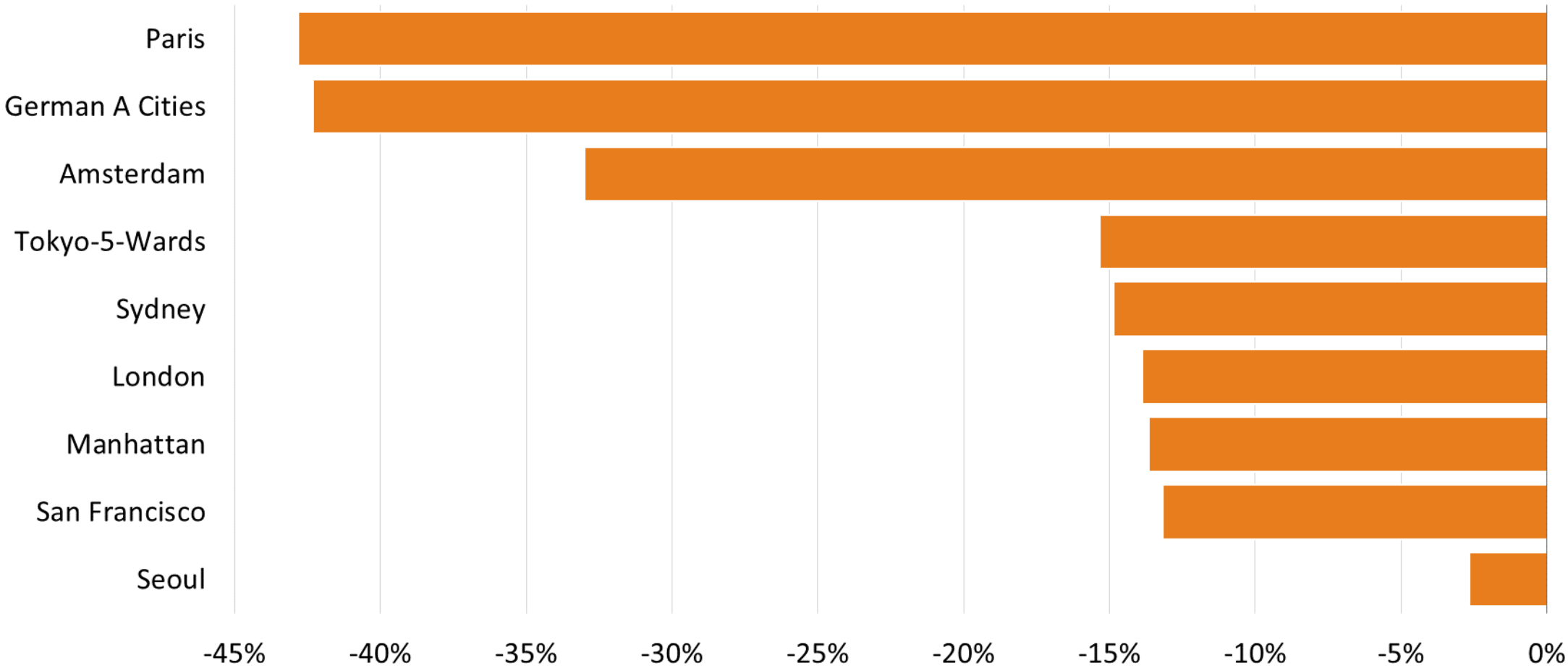
How is office liquidity faring vs. other asset classes

MSCI Price Expectations Gap. Q2'24

Information Classification: GENERAL
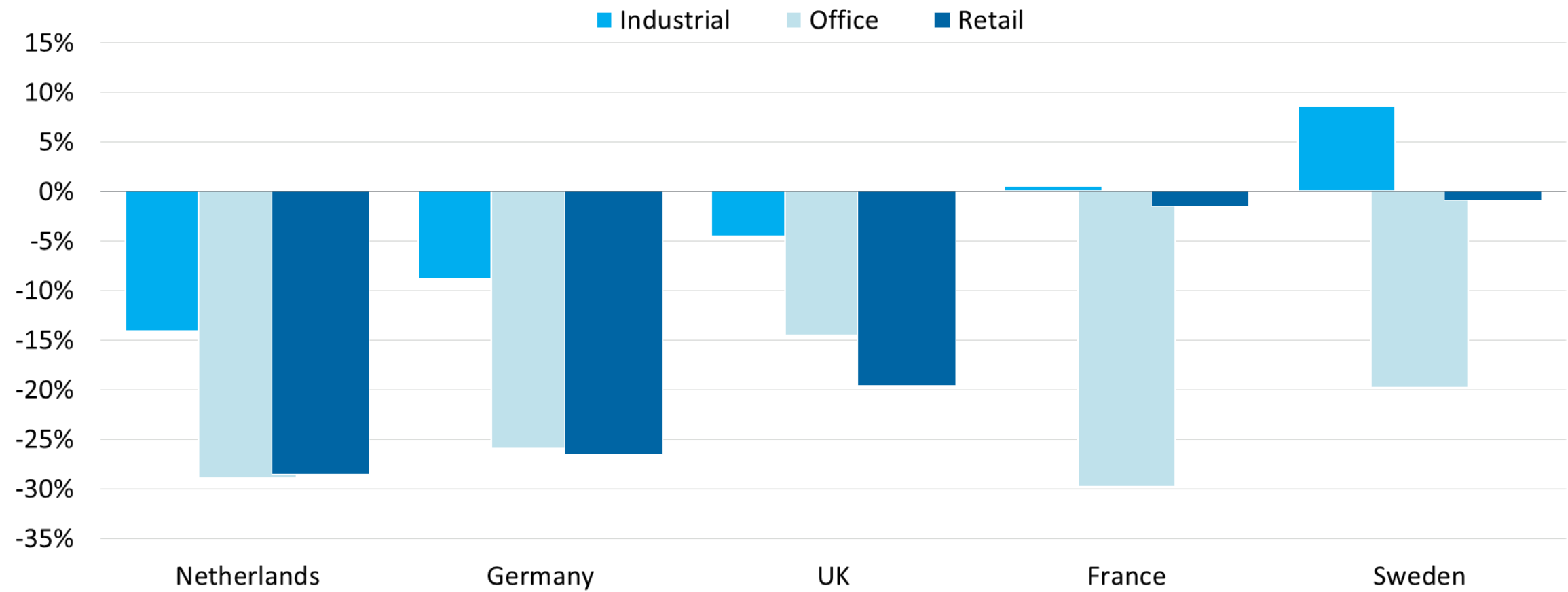
Does it reflect 'actual' market conditions in London?

Actual ask vs. sale price — **Price Expectations Gap**

London Offices. Average recorded gap between asking and sale prices for sold assets vs. MSCI modelled bid-ask spread

Information Classification: GENERAL

MSCI
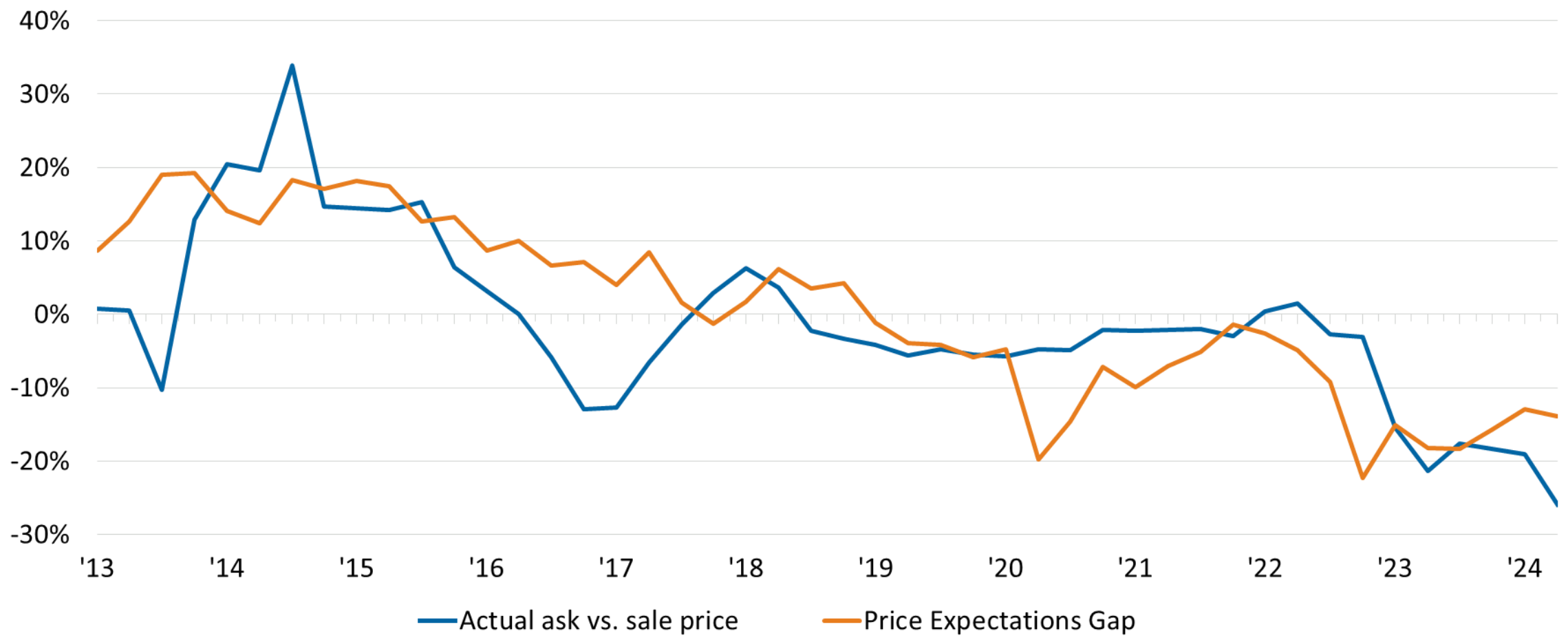
For example...

New London House

6 London St London, London EC3R 7 GBR

FIND PEERS | VIEW SURVEILLANCE | CLIMATE VALUE-AT-RISK REPORT

7,941 m² cbd office owned by Whitbread

Property History - 4 Events

Transaction / Date / Prop Type	M²/Units / Year Blt/Reno / #Bldgs /Flrs	Price (£) / £/M²/Units / Cap Rate	O Owner/Buyer ↔ Broker / S Seller ↔ Broker / $ Lender(loan amt)	Comments	
Sale Sep '23 Office	7,941 m² 1975/1993 1 bldg/13 flrs	£56,500,000 confm'd £7,115 /m² 4.2% in place	O Whitbread from S 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 m² 1975/1993 1 bldg/13 flrs	£70,000,000 approx £8,815 /m²	S 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 m² 1975/1993 1 bldg/13 flrs	£50,400,000 confm'd £6,347 /m² 5.9% in place	O Orchard Street Invt Mgmt OBO St James's Place Wealth from S Aberdeen by ↔ JLL	64% occ.;Office - CBD property; street retail; Tenants: HSB Engineering Insurance, Canopius; partial interest (50%); prior sale: Jun-07 (£58.1m); price reflects 100% valuation;	[More]
Sale Jun '07 Office	7,941 m² 1975/1993 1 bldg/13 flrs	£58,100,000 confm'd £7,317 /m²	O Invista Real Estate OBO St James's Place Wealth by ↔ BH2 ; JLL from S Landsec by ↔ King Sturge	65% occ.;Office - CBD property; street retail; Tenants: AON; partial interest (50%); price reflects 100% valuation;	

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UK offices – note the different outcome between Covid and current downturn

UK Offices. CPPI vs. Asset Value vs. Price Expectations.

Information Classification: GENERAL
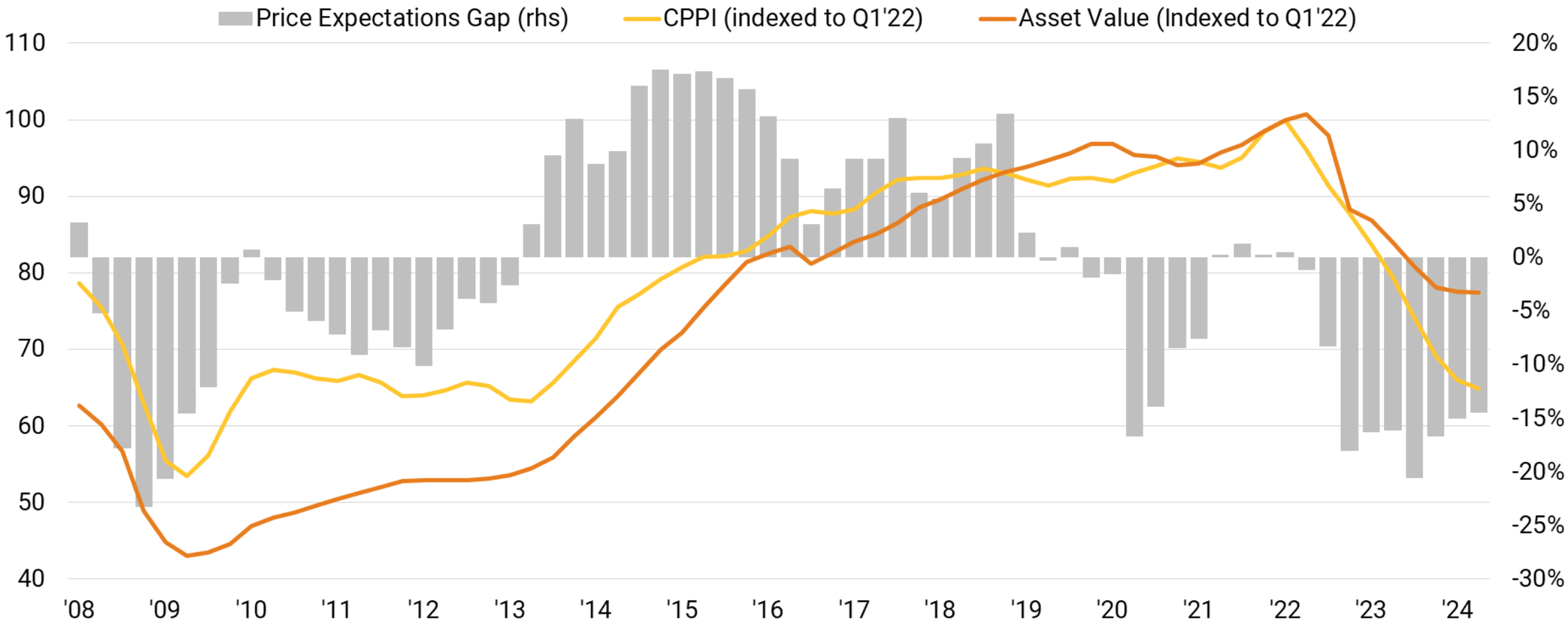
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Adding the price expectations gap gives us multiple views on how a market is performing
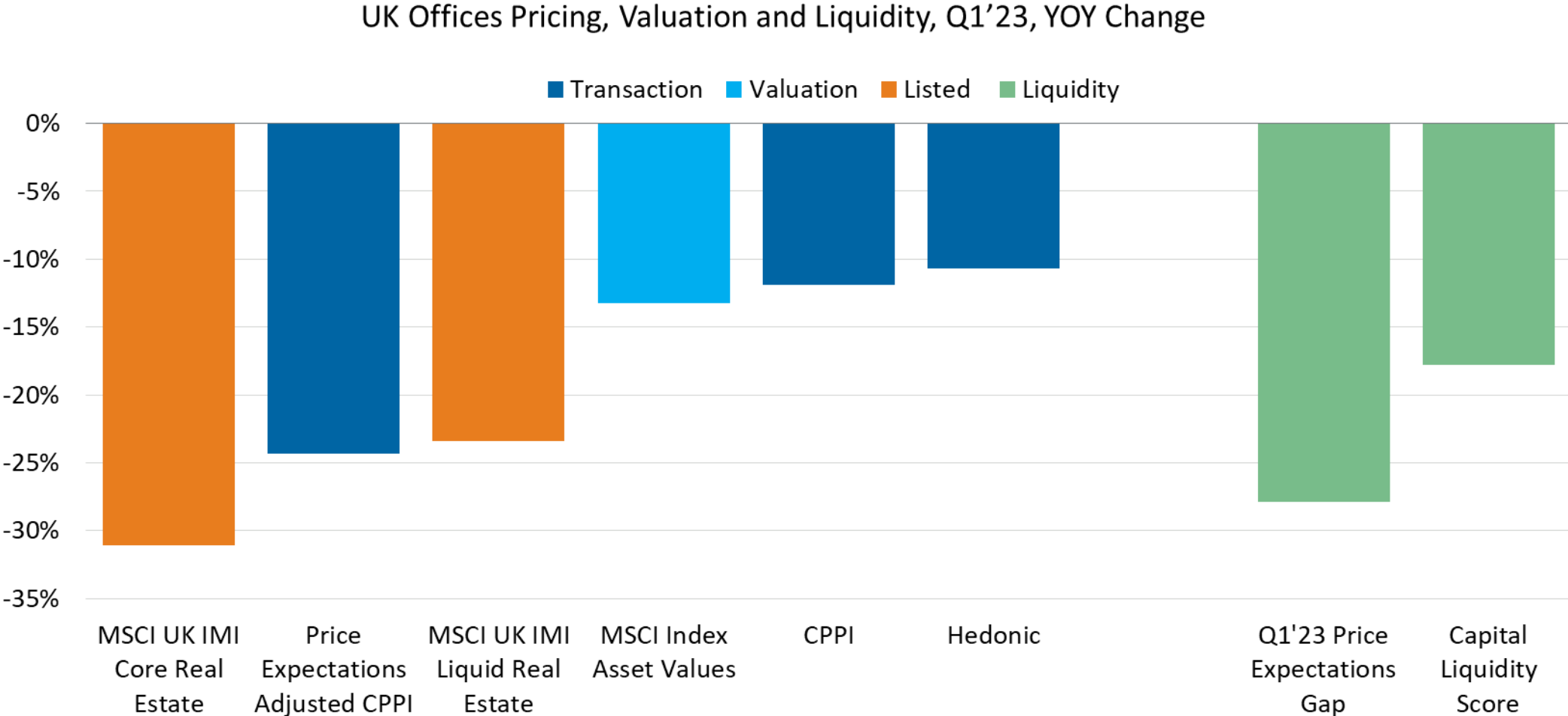
UK Offices Pricing, Valuation and Liquidity, Q1'23, YOY Change

Legend: Transaction, Valuation, Listed, Liquidity

UK Offices, Q1'23, YOY Change

Information Classification: GENERAL

Questions

THANK YOU

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