OPINION SURVEY INDICATORS:
WHAT CAN THEY TELL US ABOUT COMMERCIAL REAL ESTATE MARKETS[1]

Andrew Kanutin[2], Umberto Grosso[3], Catarina Braga[3]

[2] Senior Team Lead, Monetary and Economic Statistics Division, Directorate General Statistics, European Central Bank.

[3] Research conducted during the ECB Traineeship programme in Directorate General Statistics, European Central Bank.

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Abstract

The European Systemic Risk Board released its Recommendation on closing real estate data gaps in October 2016 in order "(…) to ensure early identification of vulnerabilities that could lead to future financial crises." (European Systemic Risk Board, 2017, p. 1). Similar data are required for the European Central Bank and the Single Supervisory Mechanism to perform analysis on real estate markets. This study attempts to both fill the current gap for all financial stability and macroeconomic analysts of real estate by exploring the data from real estate sentiment surveys such as the "Global Commercial Property Monitor", which is produced and compiled by the Royal Institute of Chartered Surveyors (RICS) as well as to expand the potential set of data used by policymakers to assess the real estate market. In order to assess whether the opinion survey data were useful, a correlation exercise was conducted to examine the relationship between the data and some other macroeconomic indicators. In addition, to try and underpin the correlation analysis a series of Granger causality tests were performed to examine whether RICS series can lead commercial property prices. As a result of this paper, it can be seen that sentiment indicators appear to be able to play an important role in the analysis of real estate markets as early trend indicators and/or as proxy indicators where official statistics are currently not available or updated.

JEL codes: B40, C10, R30

1.   Summary

This paper explores the relationship between the data from the real estate sentiment survey, the "Global Commercial Property Monitor", which is produced and compiled by the Royal Institute of Chartered Surveyors (RICS), and some other macroeconomic indicators related to real estate price indicators.

The paper is structured as follows:

- Section 2 gives an overview of the "Global Commercial Property Monitor" (the full questionnaire is shown in Annex 2);
- Section 3 reports the correlations between the survey and the indicators (both at a European level and at country level) as well as analysing these relationships;
- Section 4 extends the correlation analysis to cover causality;
- Section 5 presents the conclusions.

The main objective of the exercise is to compare the opinion survey data with relevant indicators, which are known to have relationships with the real estate market, in order to test whether the indicators are correlated at European and country levels.

As a preliminary step, European aggregates for the EU and euro area are compiled, given that the RICS provides only national and, in some cases, city aggregates (see Section 2).

In Section 3 and Annex 1 , the charts and the tables present the following standard analysis:

- a correlation chart;
- results of countries' correlation;
- time span showing whether the correlation coefficient is higher when RICS data lead or lag the indicator tested[4];
- the number of days in advance of the dissemination of RICS data compared to the economic/price indicator[5] (when the RICS series could represent the leading indicator).

The main conclusion of the paper is that sentiment indicators such as those supplied by the RICS could potentially play an important role in the analysis of real estate markets and, in particular, act as early trend indicators and proxy indicators where official statistics are currently not available or have not been updated. However, in two cases (IT, AT) this relationship does not seem to hold, suggesting further research is required for these countries.

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[4] Expressed in quarters. The quarter with the highest correlation coefficient is considered.

[5] RICS data are disseminated at T+30, making them very timely compared to commercial property prices, for instance. Again, the quarter with the highest correlation coefficient is considered.

2.   RICS opinion survey dataset[6]

The "Global Commercial Property Monitor" opinion survey explores the sentiment of commercial property occupiers, owners and facility managers, targeting specific indicators such as rent expectations, capital value expectations and the availability of leasable space. The survey questionnaire is based either on forward-looking questions, requesting respondents to identify the direction of change of the indicator when compared with the situation ahead (three months, twelve months and three years) and backward-looking questions covering the three months prior to the responding date. The survey is run by the RICS. It is comprised of 15 questions and the dominant large agencies (around 2,000 companies globally) contribute in key markets across Europe[7].The response rates and the coverage[8] varies from country to country. The survey is voluntary and response levels can vary across time, sectors and countries. Nonetheless the RICS believes that in general the results are robust.

Sub-categories in the dataset

The opinion survey and the dataset are split into sub-categories of commercial property, i.e. office, retail and industrial. There is an additional layer of detail (i.e. prime and secondary properties) for the variables covering rental and capital value expectations.

Geographical coverage and granularity

The "Global Commercial Property Monitor" is currently available for 17 countries in Europe: CZ, DE, IE, GR, ES, FR, HR, IT, CY, HU, NL, AT, PL, RO, UK and CH. The indicators are generally available at national level, although more granular data are currently available for the following cities: Amsterdam, Berlin, Bucharest, Budapest, Dublin, Frankfurt am Main, Lisbon, Milan, Munich, Paris, Prague and Warsaw.

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[6]   The authors would like to thank RICS for free access to the data. This was the only input received from RICS during the production of this analysis.

[7]   Information taken from the RICS website:
      https://www.rics.org/de/news-insight/research/market-surveys/

[8]   E.g. first data point, number of respondents, granularity and geographic coverage.

Historical data, frequency and availability

There is no common start date for the series in the dataset but the majority start in the period between 2008 and 2014. The series are available quarterly and are not seasonally adjusted. The results are usually published around 30 days after the end of the reporting quarter.

Questions in the survey and reporting

Most of the series are expressed as balances (proportion of respondents reporting a rise in a variable, e.g. occupier demand) minus those reporting a fall. For instance, if 30% reported a rise and 5% reported a fall, the net balance would be +25%. Net balance data can range from -100 to +100. The remainder of the variables are expressed either as a percentage of responders, e.g. for the "Types of landlord incentives" indicator, or as quantitative values, e.g. percentage changes for the "12 month average capital value expectations" indicator.

European aggregates and weights

As no European aggregates are provided by the RICS, the European Central Bank (ECB) has compiled these as a weighted average using 2018 GDP at market price for the (then) EU28 and euro area.

RICS data are available for 91.5% of total GDP of the euro area and 89% of total GDP of the EU28. Data from ten countries (CZ, DE, IE, ES, FR, IT, NL, HU, PL, UK) are available from Q1 2008, Austria from Q4 2010, Portugal and Bulgaria from Q3 2013, Croatia and Greece from Q1 2016 and Cyprus from Q1 2018.

3.   Correlation analysis

3.1   Methodology

The purpose of this section is first to examine the correlation of the RICS indicators with economic variables that are known to have a relationship with property prices – differences between the opinion survey data trends and that of the relevant indicator might: (1) suggest an issue with the economic indicator if it is the only variable in which correlations are poor, or (2) suggest issues with the opinion survey data when several known relationships with economic data do not hold. A second aim is to test the relationships between variables and expectations in order to identify potential leading indicators. Furthermore, if a strong relationship can be seen in countries that have both opinion survey data and another real estate variable, the use of opinion survey data as proxy variables for countries where an underlying hard variable is missing could be considered.

For this analysis, the economic variables are examined as year-to-year percentage change series. The opinion survey data are shown in their original format (net balances, percentage changes, etc.).

In Annex 1, summary tables showing the correlation results highlight the main analytical findings. The tables include information on:

- the number of quarters the opinion survey is in advance of/behind the tested variable to reach the highest correlation value: this value is important for establishing whether the opinion survey data could potentially be leading or lagging indicators.
- the number of days in advance of dissemination of RICS data compared to the current economic/price indicator[9] (when the RICS series represents the "leading indicator").

In addition, graphs showing a country-by-country comparison are displayed when correlation coefficients are above 0.4 and only countries with series that start in or after 2011 are considered (accounting for a total of 11 EU Members). The analysis concentrates on price data correlations, which tends to be the most important variable for macroeconomic and prudential analysis. Additional illustrative relationships between the survey data and other relevant variables are then briefly discussed.

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[9]   RICS data are disseminated at T+30, making them very timely compared to commercial property prices, for instance. Once again, the quarter with the highest correlation coefficient is considered.

3.2   Results

3.2.1   Capital value expectations vs commercial property prices

This section presents the correlation between commercial property prices as used in the calculation of the ESCB experimental indicator of commercial property prices by type of building (total market, office, retail and industrial) and capital value expectations from the RICS survey. It is important to highlight that the last data point for commercial property prices used in the analysis varies from country to country, i.e. the last observation for Spain (total market) is Q4 2018 compared to Q3 2019 for Germany. This analysis was produced with data available on 3 February 2020[10]. Each sub-category is illustrated with a illustrative graph. Italy and Austria are not generally displayed as their correlation results are below 0.4. Full results for each country plus the euro area and EU aggregates are presented in Annex 1.

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[10]   At the end of February 2020, MSCI, the provider of commercial property price data for some of the countries in this study announced a methodology change and series revision. As the change was announced after the completion of this study, the data analysed here do not include this revision. For more information about the methodology change see: https://www.msci.com/documents/1296102/1672461/MSCI+Europe+Transaction-linked+Indicators+%28Unfrozen%29+-+Methodology+Change+announcement.pdf.

European aggregates: capital value expectations vs commercial property prices (total market)

The RICS euro area capital value expectations aggregate shows a correlation with the ECB's total aggregate experimental indicator of commercial property prices (CPPs) of 0.934. Furthermore, the expectations series leads the ECB series by two quarters. Considering that the last update of the CPP indicator at euro area level was 157 days after the reporting quarter, this means that the capital value expectations could be used to provide a trend indicator some 307 days in advance.

The EU28 capital value expectations aggregate shows a correlation of 0.857 with the expectations series leading by one quarter[11]. In this case, the capital value expectation gives useful trend indications some 217 days in advance (see Table 3.a of Annex 1, page 35).

Figure 1
Euro area aggregate of capital value expectations: net balance, series shifted two quarters forward* (left-hand scale) vs euro area commercial property prices based on transactions: annual percentage change (right-hand scale)
Category: total market. Correlation: 0.934.
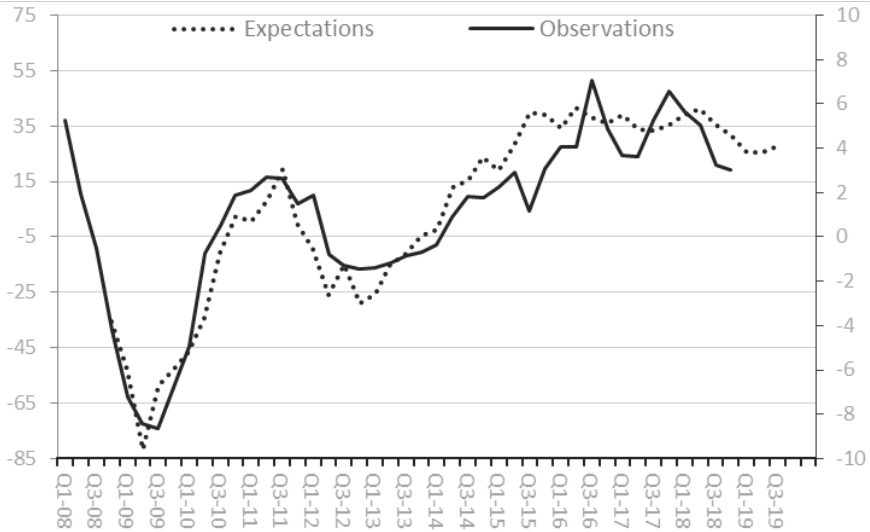
Sources: RICS, national sources and ECB calculations.

* Series shifted by two quarters in line with the highest correlation coefficient.

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[11] The contemporaneous correlation is only marginally lower, at 0.856.

National aggregates: capital value expectations vs commercial property prices (office)

At national level, correlations for office properties are observed between commercial real estate prices and capital value expectations. For example, in the Netherlands (Figure 2) the best match is shown two quarters in advance, with a correlation of 0.88. The question in the survey is forward-looking regarding capital value expectations in the upcoming three months and the higher correlation for most European countries is seen after two or three quarters. IE, ES, FR and NL show correlations of over 0.80 between expectations and office price data whereas Italy and Austria are not displayed as their correlation results are below 0.4. This suggests that capital value expectations could be considered an early trend indicator of commercial property prices. Capital value expectations may be used as an early indicator of CPPs, anticipating the latter by 127 to over 300 days depending on the country (see Table 3.b of Annex 1, page 35).
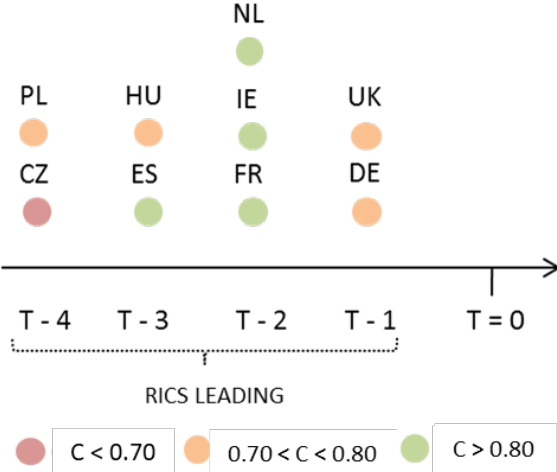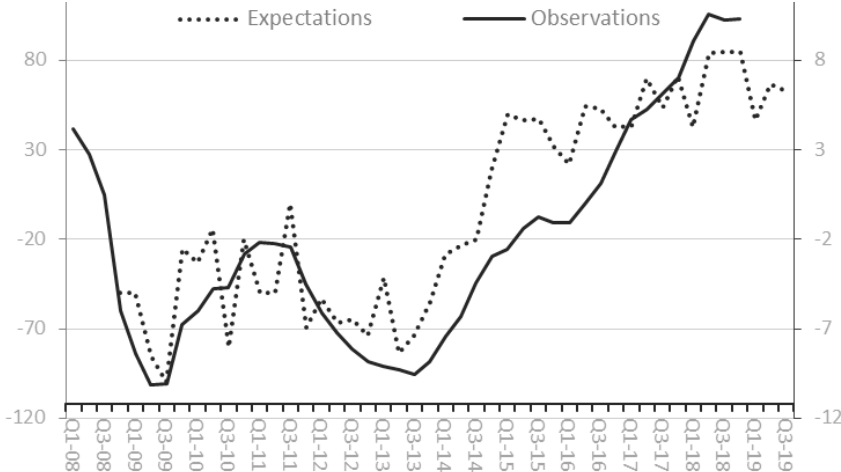

Figure 2

Three-month capital value expectations: net balance, series shifted two quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)

Country: Netherlands. Category: office. Correlation: 0.872.

Sources: RICS, national sources and ECB calculations.

* Series shifted by two quarters in line with the highest correlation coefficient for the Netherlands.

National aggregates: capital value expectations vs commercial property prices (retail)

Overall, capital value expectations for the retail sector show correlation with price indicators with the exception of Austria and Italy, which show no meaningful correlation (IT and AT not displayed), and Germany and the Netherlands, which show poor correlation. Nevertheless, the majority of the countries present correlation that is acceptable (CZ, UK) or good (IE, ES, FR, HU, PL) with expectations leading by two or three quarters. The capital value expectations series may be used to obtain early indicators of retail commercial property prices and in the particular case of Hungary (Figure 3), the RICS series could be considered a proxy variable of the discontinued series currently available to the ECB – the correlation between these two series reaches 0.912 in the overlapping periods. Depending on the country, expectations could show early trend information from 127 to 464 days in advance compared to the current price data used by the ECB (see full data in Table 3.c of Annex 1, page 36).

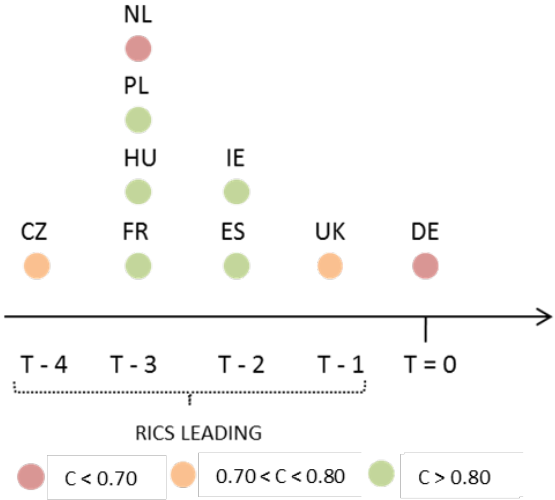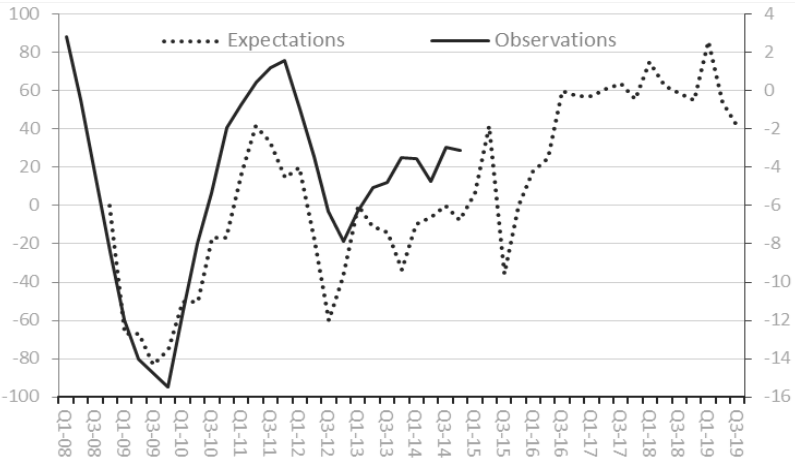**Figure 3**
Three-month capital value expectations of retail properties: net balance, series shifted three quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)
Country: Hungary. Category: retail. Correlation: 0.912.

Sources: RICS, national sources and ECB calculations.

* Series shifted by three quarters in line with the highest correlation coefficient for Hungary.

National aggregates: capital value expectations vs commercial property prices (industrial)

At the national level, with the exception of Austria and Poland, good or acceptable correlations can be seen between commercial industrial real estate prices and capital value expectations. In Spain (Figure 4), the best match is shown two quarters after the date of the survey with a strong correlation coefficient of 0.94. Similarly, the majority of the countries show the highest correlation after two quarters. The correlation results are generally high (CZ, IE, ES, FR, HU, NL). Collectively, this suggests that capital value expectations may be used as an early indicator of industrial property prices, anticipating the latter by 217 to 284 days depending on the country (see Table 3.d of Annex 1, page 37). Germany and Italy are not displayed in the chart because there are no industry commercial property price series (CPPs) available for Germany, and for Italy the correlation result is below 0.4.
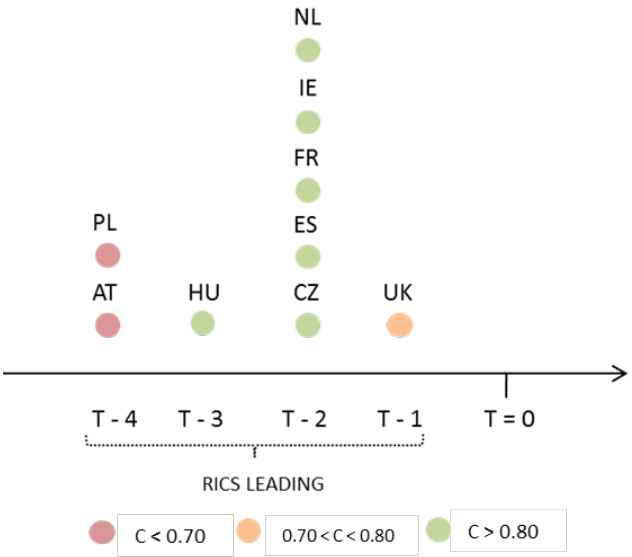
Figure 4
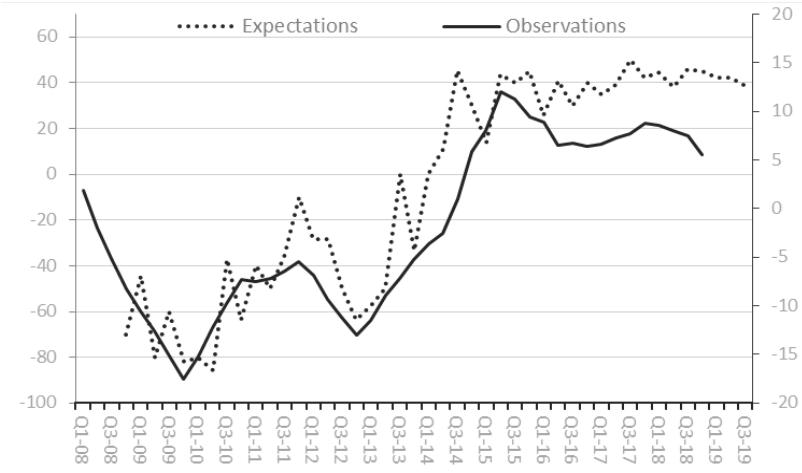**Three-month capital value expectations: net balance, series shifted two quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)**
Country: Spain. Category: industrial. Correlation: 0.94.

Sources: RICS, national sources and ECB calculations.

* Series shifted by two quarters in line with the highest correlation coefficient for Spain.

Conclusion on price indicator relationships

The results suggest a strong relationship in all categories available in the RICS dataset: office buildings, retail buildings, industrial buildings and their aggregates (i.e. total market except residential) both at European and national level. The high correlation coefficients suggest that for the majority of the countries (excluding Italy and Austria) capital value expectations could be used to provide an early overview of commercial real estate market prices.

RICS series are generally one to two quarters ahead of CPPs and considering the delay in the reporting of the latter, trend indicators could be available from around 127 to more than 300 days in advance.

3.2.2   Investment enquiries vs commercial property prices

This section presents the correlation between commercial property prices and the sentiment of investment enquiries in the three months previous to the RICS survey. Investor interest is highly correlated with commercial property prices as when investor interest drops/increases, the price indicator tends to follow. The sentiment of investment enquiries is therefore expected to provide an even earlier trend indicator than capital value expectations.
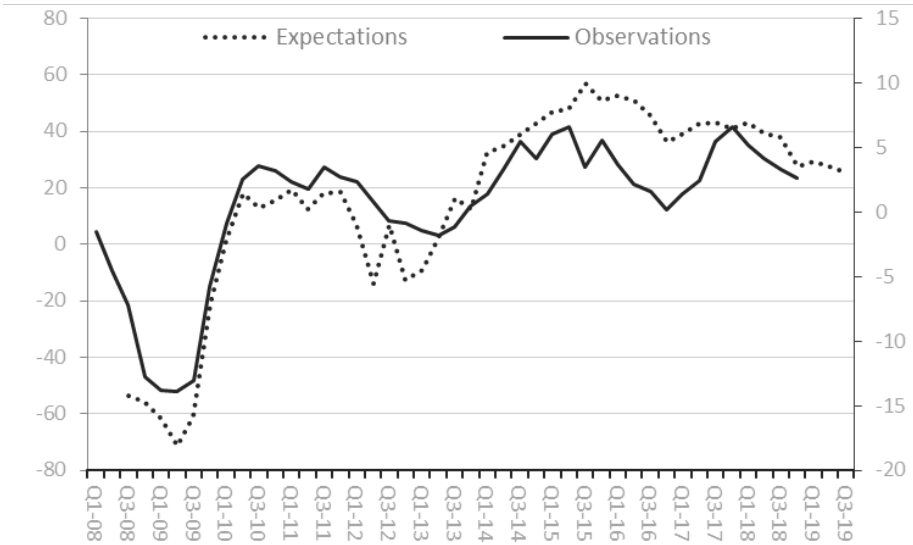
European aggregates: investment enquiries vs commercial property prices (total market)

The euro area aggregate of investment enquiries shows a correlation of 0.942 with the ECB's total aggregate experimental indicator of commercial property prices leading the later by three quarters.

Similarly, the EU28 aggregate of investment enquiries shows a correlation of 0.918 two quarters in advance (Figure 5). The sentiment of investment enquiries can therefore provide a trend indicator of around 307 and 397 days in advance for the EU28 and euro area commercial property price indicator respectively.

This result makes the sentiment of investment enquiries slightly more precise and timely than capital value expectations (see Table 1, page 19).

Figure 5
EU28 aggregate of investment enquiries in the previous three months: net balance, series shifted two quarters forward* (left-hand scale) vs EU28 commercial property prices based on transactions: annual percentage change (right-hand scale)
Category: total market. Correlation: 0.918.

Sources: RICS, national sources and ECB calculations.

* Series shifted by two quarters in line with the highest correlation coefficient.

National aggregates: investment enquiries vs commercial property prices (total market)

At the national level, correlation results of over 0.80 are seen for most countries (see Table 4.a, page 38). Italy and Austria are not displayed in the top right-hand chart because no plausible results are shown. For the majority of the countries, investment enquiries show higher correlation results and lead capital value expectations. Therefore, RICS sentiment can provide early indicators 217 to 487 days in advance compared to commercial property prices.

Figure 6
Investment enquiries in the previous three months: net balance, series shifted four quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)
Country: France. Category: total market. Correlation: 0.907.
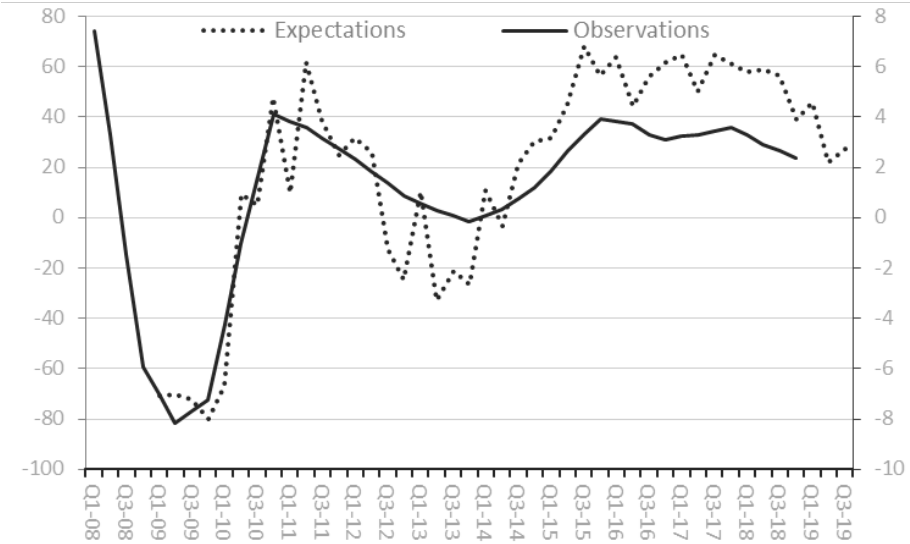
Sources: RICS, national sources and ECB calculations.

* Series shifted by four quarters in line with the highest correlation coefficient.

National aggregates: investment enquiries vs commercial property prices (office)

At the national level, correlations are seen between investment enquiries and commercial real estate prices for office properties in IE, ES, HU, NL UK, whereas Czech Republic and Poland show a low correlation and Italy registers a negative correlation (see Table 4.b, page 39). The tests could not be performed for Germany and Austria due to a lack of price data. Although with lower confidence than in other categories, such as total market and industrial properties, early indicators may be available between 217 and 644 days in advance.
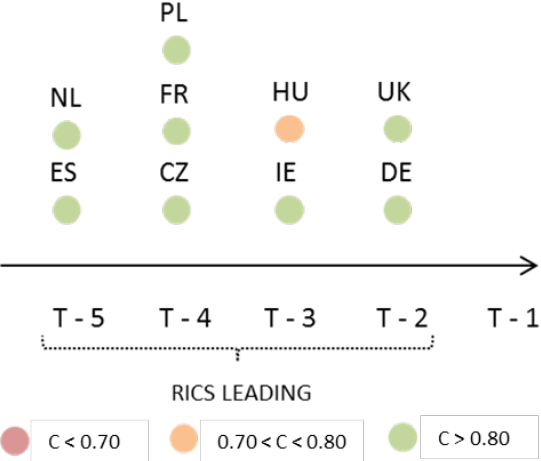

Figure 7

Investment enquiries in the previous three months: net balance, series shifted two quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)

Country: UK. Category: office. Correlation: 0.834.
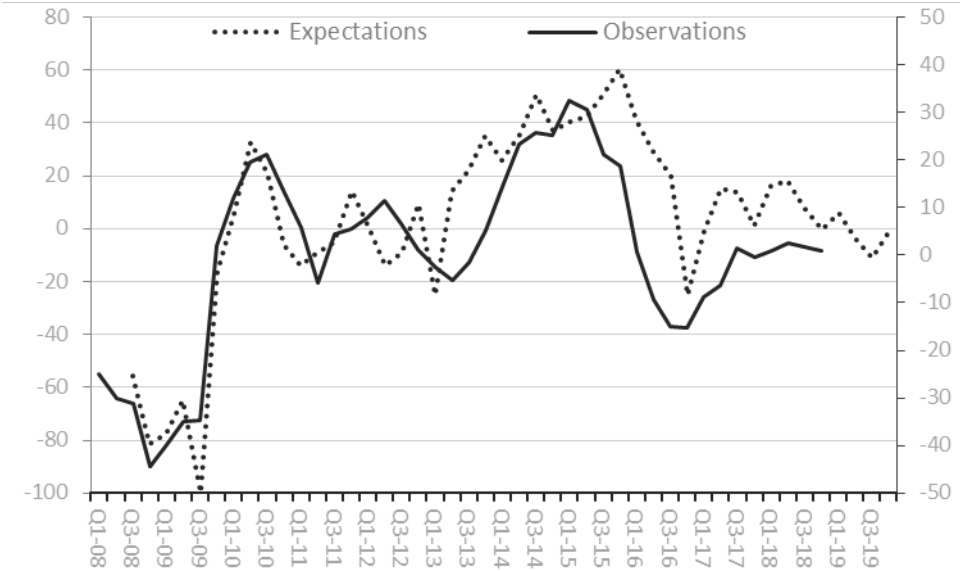
Sources: RICS, national sources and ECB calculations.

* Series shifted by two quarters in line with the highest correlation coefficient.

National aggregates: investment enquiries vs commercial property prices (retail)

At the national level, correlations are seen between industrial property prices and investment enquiries for FR, IE and ES and with lower results for CZ, HU and UK. For the majority of the countries, investment enquiries sentiment leads commercial property prices by four quarters, making it an early trend indicator that is available from 217 to 464 days in advance (see Table 4.c, page 40).
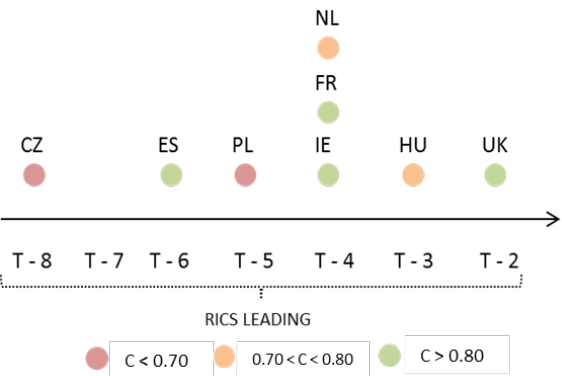

Figure 8

Investment enquiries in the previous three months: net balance, series shifted four quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)

Country: Spain. Category: retail. Correlation: 0.842.
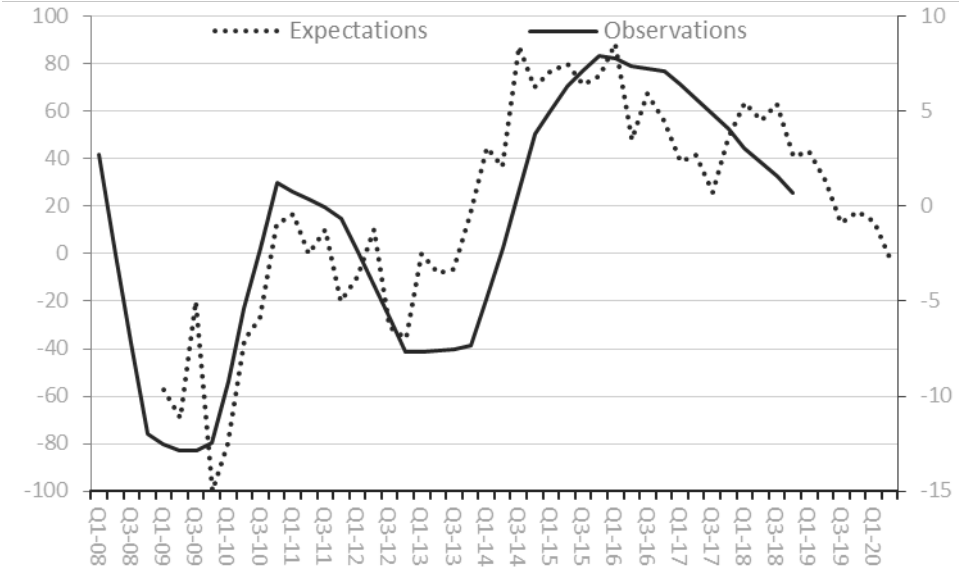
Sources: RICS, national sources and ECB calculations.

* Series shifted by four quarters in line with the highest correlation coefficient.

National aggregates: investment enquiries vs commercial property prices (industrial)

At the national level, with the exception of Czech Republic, correlations are seen between investment enquiries and industrial property prices for IE, ES, FR, NL, PL and UK, although the correlation result is considered acceptable for Czech Republic (see Table 4.d). Italy and Austria show no plausible correlation and are therefore not displayed in the chart. RICS sentiment data can provide early indicators from 217 to 554 days in advance of associated commercial property prices.
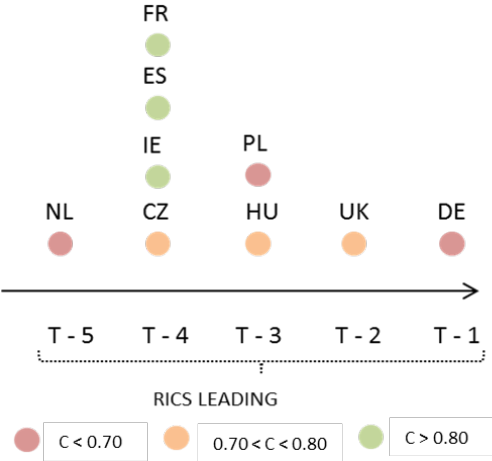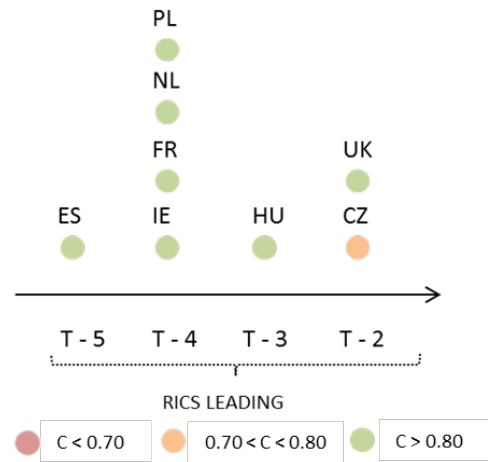

Figure 9

Investment enquiries in the previous three months: net balance, series shifted four quarters forward* (left-hand scale) vs commercial property prices: valuation based, annual percentage change (right-hand scale)

Country: Poland. Category: industrial. Correlation: 0.827.
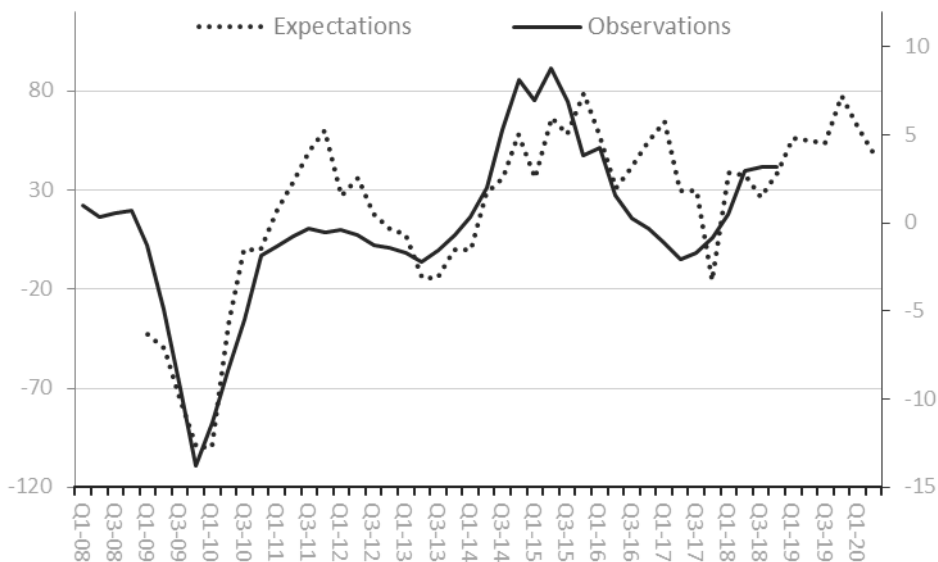
Sources: RICS, national sources and ECB calculations.

* Series shifted by four quarters in line with the highest correlation coefficient.

Conclusion

This section suggests there is a strong relationship between most investment enquiries sentiment data and commercial property prices. Office investment enquiries perform less well but are still acceptable.

Overall, the correlation between investment enquiries sentiment and commercial property prices shows an even a greater lead than capital value expectations although the results are not always higher (see Table 1). Investment enquiries sentiment could potentially provide early trend indicators up to five quarters in advance.

Table 1
Results comparison: investment enquiries vs CPPs and capital value expectations vs CPPs

	Investment enquiries vs CPPs		Capital value expectations vs CPPs	
	All types of commercial properties		*All types of commercial properties*	
	Correlation value	Quarter(s) leading	Correlation value	Quarter(s) leading
EU28	0.918	2	0.873	1
Euro area	0.942	3	0.934	2
CZ	0.803	4	0.787	4
DE	0.840	2	0.774	1
IE	0.825	3	0.894	2
ES	0.898	5	0.921	3
FR	0.907	4	0.888	3
HU	0.790	3	0.866	4
NL	0.817	5	0.903	3
PL	0.874	4	0.830	4
UK	0.81	2	0.729	1

Sources: RICS, national sources and ECB calculations.

3.2.3 Availability of leasable space vs unemployment[12]

In the RICS survey, the closest variable to the vacancy rate, one of the requested variables in the ESRB Recommendation[13], is the sentiment survey covering the <u>availability of leasable space</u> in the previous three months. Earlier analysis has shown that this indicator should increase and decrease in relation to the unemployment rate. This is demonstrated in the following charts, where high correlations are seen both at European and national level.

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[12] In commercial real estate the vacancy rate should ideally strongly correlate with the unemployment curve. Employment is associated with the demand curve.

[13] "Recommendation of 31 October 2016 on closing real estate data gaps (Recommendation ESRB/2016/14)": https://www.esrb.europa.eu/pub/pdf/recommendations/ESRB_2016_14.en.pdf?1be4283e2b6203bbfeefeac8d 3cd8a8f.

European aggregates: availability of leasable space vs unemployment

The euro area availability of leasable space survey aggregate shows a high correlation of 0.926 with year-to-year percentage changes in unemployment (Figure 7).

The EU28 availability of leasable space aggregate shows an even higher correlation of 0.938 with changes in the unemployment rate. In both cases the correlation is contemporaneous.

Figure 10

Euro area aggregate of availability of leasable space in the previous three months (analogous to the vacancy rate sentiment): net balance (left-hand scale) vs unemployment: annual percentage change (right-hand scale).
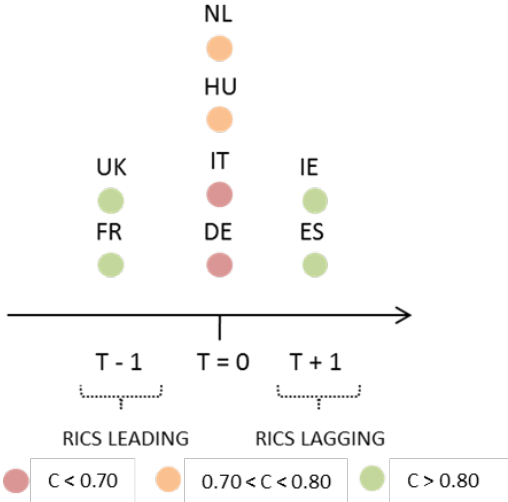
Category: total market. Correlation: 0.926.

Sources: RICS, national sources and ECB calculations.

National aggregates: availability of leasable space vs unemployment

At national level, correlations between vacancy sentiment and year-to-year percentage changes in the unemployment rate are seen for IE, ES, FR, HU, NL and UK (see Table 5 of Annex 1, page 42). There is no evidence (as seen in the previous cases) of leading or lagging trends in the RICS data according to the survey question. Instead, we use the correlation to assess the quality of the vacancy sentiment by comparing it with an indirect indicator such as unemployment. Overall, the quality of the EU and euro area aggregates is higher. Nevertheless, the correlation at national level is acceptable.

Czech Republic, Austria, and Poland are not displayed as their correlation results are below 0.4.

Figure 11
Availability of leasable space in the previous three months: net balance, series shifted one quarter forward* (left-hand scale) vs unemployment rate: annual percentage change (right-hand scale)
Country: France. Category: all types of commercial properties. Correlation: 0.857.

Sources: RICS, national sources and ECB calculations.

* Series shifted by one quarter in line with the highest correlation coefficient for France.

Conclusion

The results suggest a strong relationship between changes in the unemployment rate and vacancy sentiment.

One of the current weaknesses of CRE statistics from official statistical sources is the lack of a vacancy rate indicator and (after further analysis and tests) opinion survey data could be used as a trend indicator in this crucial field. As already mentioned, RICS data are available around 30 days after the reporting quarter, making them much more timely compared to RE statistics.

3.2.4 Rent expectations of commercial properties vs gross domestic product

Because of a lack of suitable data, rent expectations cannot be directly tested with a respective commercial property rent indicator (unlike capital value expectations and price indicators, for instance). Therefore, an indirect correlation test is used. Rents are expected to show correlation with real estate indicators such as the vacancy rate, new supply (which can be seen as loosely analogous to development starts/completions), prices, and with macroeconomic indicators such as inflation and gross domestic product. In this case, annual percentage changes in GDP have been used to test rent expectations.

European aggregates: rent expectations vs gross domestic product

The euro area rent expectations aggregate shows a correlation of 0.87 with GDP while the EU28 availability of leasable space aggregate shows a correlation of 0.728 with GDP. The lower results of the EU28 aggregate are due to the poor correlation of the United Kingdom, which in terms of GDP weight accounts 16.95% for the 17 countries considered in the EU28 aggregate.

Figure 12

Euro area aggregate of rent expectations for next three months: net balance (left-hand scale) vs gross domestic product at market prices: annual percentage change (right-hand scale)

Category: total market. Correlation: 0.87.
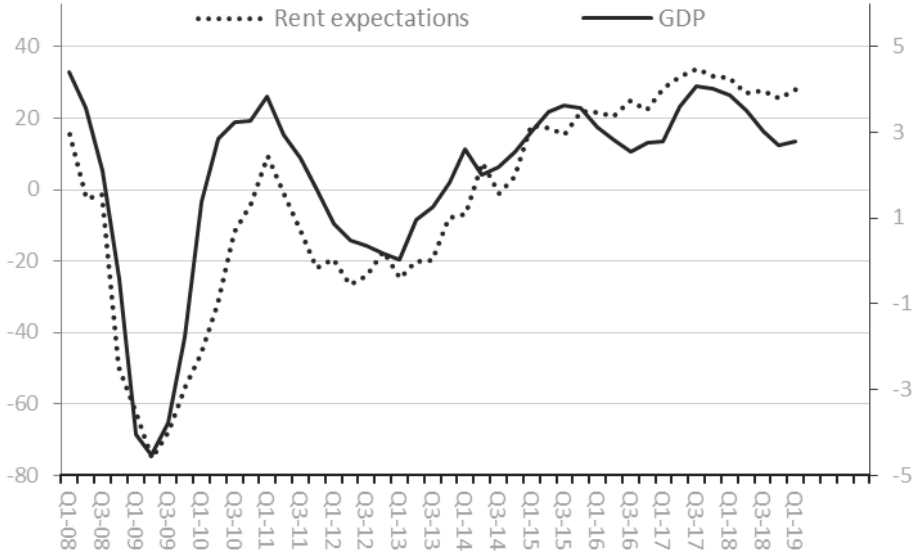
Sources: RICS, national sources and ECB calculations.

National aggregates: rent expectations vs gross domestic product

The correlation tests between rent expectations and GDP show acceptable results for the majority of the countries.

France, Italy (Figure 10) and Poland show their highest correlation coefficients when the series are contemporaneous (see Table 6 of Annex 1, page 43). The Netherlands could be considered the only case in this group to anticipate GDP change, albeit with a correlation of 0.71, while Ireland, Germany and Spain show that rent expectations are correlated with GDP change with a delay of one quarter.
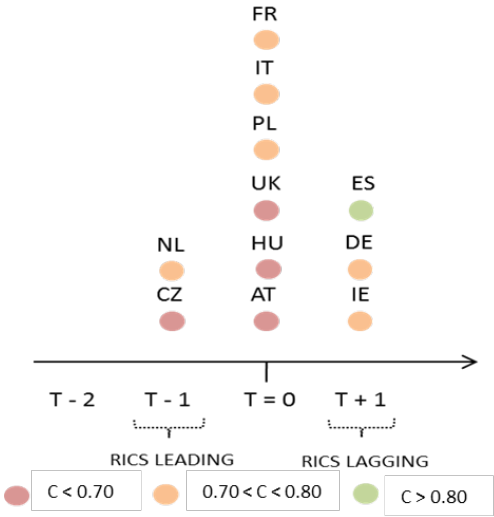
Figure 13

Rent expectations for next three months: net balance (left-hand scale) vs gross domestic product: annual percentage change (right-hand scale).

Country: Italy. Category: total market. Correlation: 0.771.
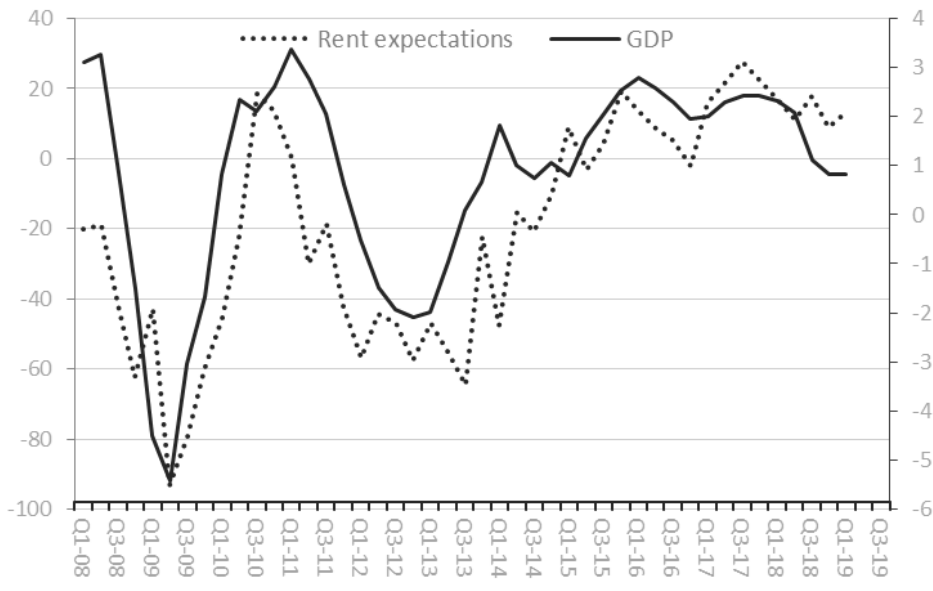
Sources: RICS, national sources and ECB calculations.

Conclusion

Overall, the results are acceptable even if the levels of correlation are not as high as those seen in the previous tests. Nevertheless, with the exception of some outliers, both the European and national aggregates of rent expectations can be considered to be reliable for two reasons:

(1) the expectations correlate well with key macroeconomic indicators;

(2) rent is expected to be one of the most reliable information items provided by property occupiers and facility managers because they have a direct relationship with this indicator (rents are a crucial factor for corporate real estate managers).

3.2.5 Other quality assessment analyses

This section gives an overview of three other correlation pairs. However, in these cases, the economic relationships shown are arguably less clear-cut and therefore the chance of spurious correlation is higher.

As a first test, the development starts sentiment is correlated with unemployment. This correlation, related to availability of leasable space and unemployment, seeks to demonstrate the close link between vacancy rates and new supply (demand/supply in commercial real estate).

Second, new supply sentiment (a proxy for development starts) is expected to be related to the cost of borrowing money for non-financial corporations, i.e. when the cost of capital increases, development starts should change (negatively) with a significant delay (as is the case for the residential real estate market and new developments).

Finally, commercial property prices are tested with the vacancy rate sentiment (a proxy for availability of leasable space) where a negative relationship is expected to be the outcome.

National aggregates: development starts sentiment vs unemployment

In this case, the annual percentage change of the unemployment rate series is correlated with the sentiment of development starts in the previous three months. Theoretically, unemployment should (negatively) correlate with occupancy expectations for commercial properties (Section 3.2.2) and should be similar to the sentiment indicator of development starts because the supply curve (new developments) depends on the demand curve (occupation rate). Overall, development starts sentiment shows high correlations (see Table 7 of Annex 1, page 44). In

the majority of the cases, the RICS series leads by one or two quarters, suggesting that the sentiment indicator may be used as a trend indicator.

Figure 14

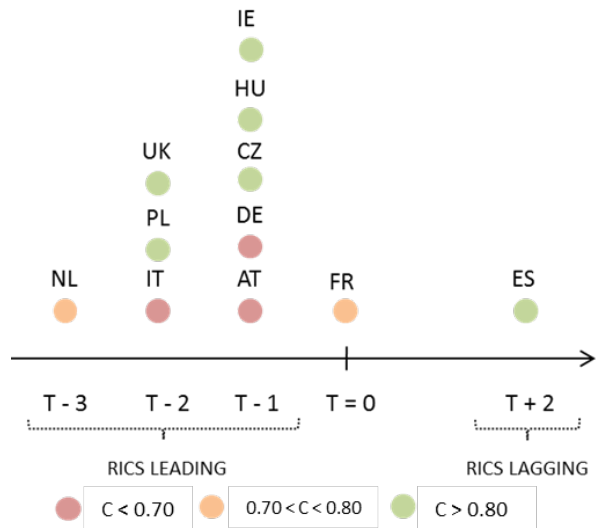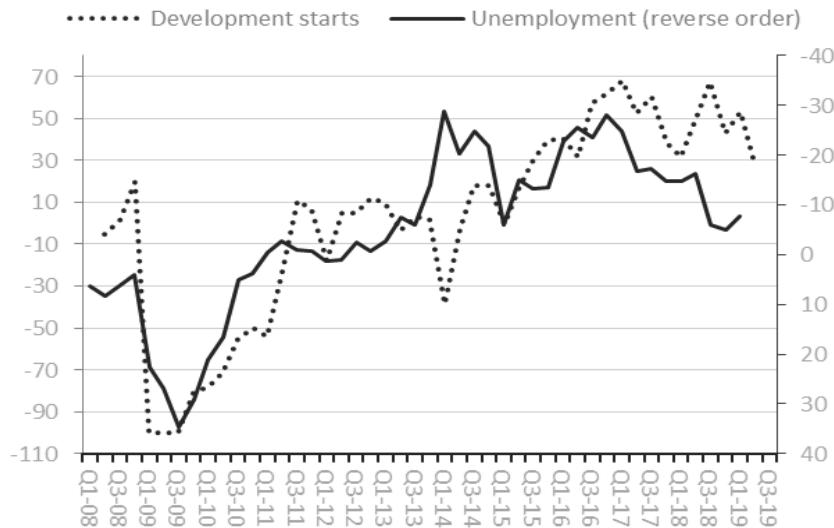**Sentiment of development starts in the previous three months: net balance, series shifted one quarter forward* (left-hand scale) vs unemployment: annual percentage change (reverse order, right-hand scale)**

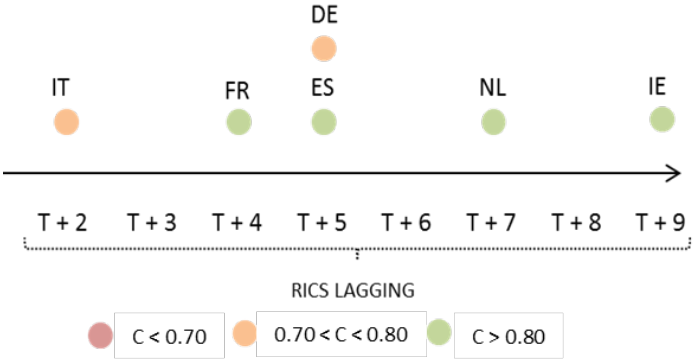**Country: Hungary. Category: total market. Correlation: 0.802.**

Sources: RICS, national sources and ECB calculations.

* Series shifted by one quarter in line with the highest correlation coefficient for Hungary.

National aggregates: sentiment of development starts in the previous three months vs loans to non-financial corporations (for cost of borrowing purposes)

Changes in the cost of borrowing for non-financial corporations are expected to (inversely) correlate with the direction of change in the commencement of new development projects with a lag (this is typical of real estate development due to permits, projects, procurement and, of course, to the macroeconomic environment). For example, in Spain the correlation is 0.858 with the RICS series lagging five quarters compared to the change in the cost of borrowing. The lag ranges from two to nine quarters, although the majority of the sentiment series show their highest match with a five-quarter lag (see Table 8 of Annex 1, page 45). For CZ, HU and PL, statistics on loans to non-financial corporations (for cost of borrowing purposes) are not publicly available, while for Austria the correlation is below 0.4 and therefore not displayed in the chart.

Figure 15

Sentiment of development starts in the previous three months: net balance (left-hand scale) vs loans to non-financial corporations (cost of borrowing purposes): annualised agreed rate (right-hand scale, reverse order)

Country: Spain. Category: total market. Correlation: 0.858.
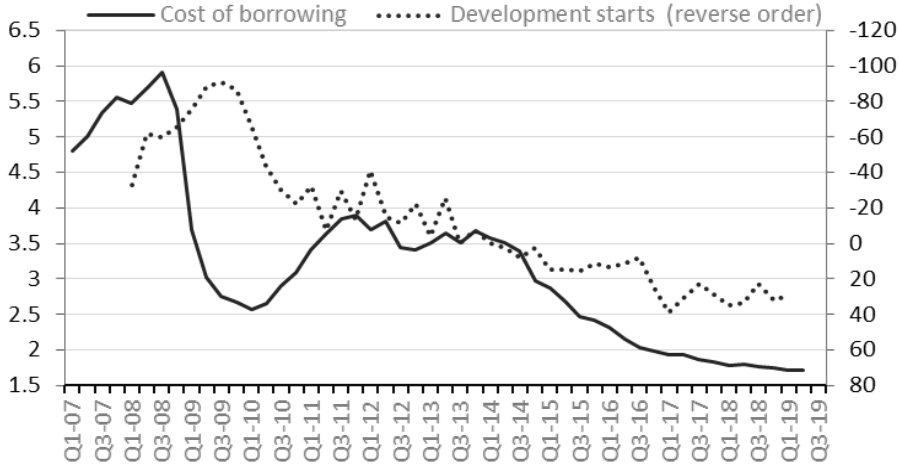
Sources: RICS, national sources and ECB calculations.

National aggregates: availability of leasable space in the previous three months and commercial property prices

Commercial property prices are expected to (negatively) correlate well with the vacancy rate sentiment (i.e. availability of leasable space). Theoretically, the vacancy rate is influenced by demand and should thus influence prices. Although the theoretical relationship between these two indicators is evident, only 45% of the countries show correlation (DE, IE, ES, FR, NL) while the remainder show poor (CZ, HU, PL) or no discernible correlation (IT, AT not displayed). The timeliness of the RICS data allow this series to be consulted as a trend indicator from 37 to over 200 days in advance compared to the price indicator (see Table 9 of Annex 1, page 46).
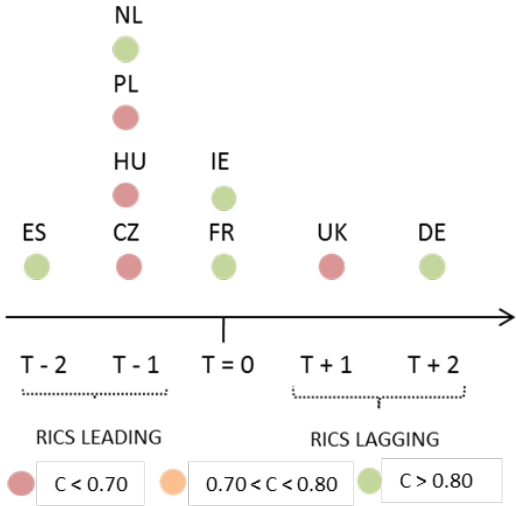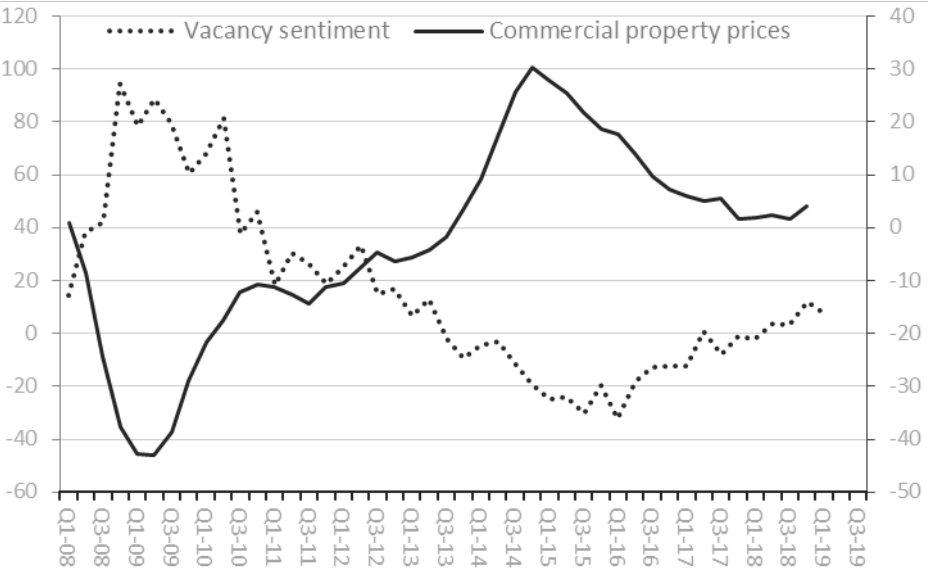

Figure 16

Sentiment of the availability of leasable space in the previous three months: net balance (left-hand scale) vs commercial property prices: annual percentage change (right-hand scale)

Country: Ireland. Category: total market. Correlation: 0.932.

Sources: RICS, national sources and ECB calculations.

4. Causality test

The previous chapter showed that the RICS sentiment survey data may contain relevant information for monitoring developments in the commercial real estate market. However, correlation in itself does not imply that these series have causal relationships. Correlation among the series means only that they are linearly related.

To examine whether this correlation might be spurious, a Granger causality test was carried out. The goal is to identify whether the change in one series (i.e. capital value expectations) leads to a change in the second (i.e. commercial property prices). Establishing a Granger causal link between the series would provide further evidence that RICS data could potentially play an important role in the analysis of real estate markets, particularly as early trend indicators.

4.1 Granger causality test

A formal definition of Granger causality (Granger, C. W. (1969), "Investigating Causal Relations by Econometric Models and Cross-spectral Methods". *Econometrica*, 424-438) would be:

"A time series variable A causes B, if the probability of B conditional on its own past history and the past history of A does not equal the probability of B conditional on its own past history alone. Granger (1980); Maziarz (2015)."

The main rationale behind the Granger causality test is the idea of precedency. Basically, the test will show Granger causality between A and B if past values of these variables are useful to predict values for one of them. The test is widely used in the research community to establish potential causal links and it should suffice for the goal of this study.

The test includes a pairwise comparison, which in this study will be applied as follows:

$$CPP_{c,t} = \alpha + \sum \beta \, CPP_{c,t-m} + \sum \gamma \, RESX_{c,t-m} + u_{c,t} \text{ (i)}$$

$$RESX_{c,t} = \alpha + \sum \beta \, RESX_{c,t-m} + \sum \gamma \, CPP_{c,t-m} + u_{c,t} \text{ (ii)}$$

CPP: $Commercial\ property\ price\ indicator$

$RESX$: $RICS\ indicator$

c: $country$

t: $time$

m: $number\ of\ lags$

Granger causality is confirmed if the results are significant (in this study, Granger causality is considered "*significant*" if p-value ≤ 10%). The null hypotheses for the equations are:

(i)   changes in RICS series do not Granger cause changes in commercial property prices;

(ii)   changes in commercial property prices do not Granger cause changes in RICS series.

As previously explained, the main goal of this exercise is to identify whether the RICS series can be used as a leading indicator for commercial property prices. Therefore, special attention is given to equation (i) and the result showed below refers to the second equation.

4.2   Results: RESX vs CPP

The results below were obtained after running the Granger causality test. Data from RICS (capital value expectations and investment enquiries) were tested against the respective commercial property price indicator, observing the country (or aggregate) and different types of properties. The commercial property prices were analysed predominantly based on available valuation data and expressed annual percentage changes. The RICS series chosen for capital value expectations is a three-month forward indicator and the investment enquiries reflect the perception of the last three months. The lags used to perform the test are the same as those found in the correlation analysis.

The results are expressed in terms of p-value and the different colours have the following meanings:

Green: strong evidence of Granger causality between the RICS indicator and price indicator (p-value ≤ 0.05).

Orange: sufficient evidence of Granger causality between the RICS indicator and the price indicator (0.05 > p-value ≤ 0.10).

Red: no evidence of Granger causality between the RICS indicator and the price indicator (p-value > 0.10).

Italy was not included in the test as it showed negative correlations for all the indicators below, which is already an indication that the series runs independently.

Table 2

Summary of Granger causality test results for RESX vs CPP

	EU Area	EU 28	CZ	DE*	IE	ES	FR	HU	NL	AT	PL	UK
All types of commercial properties Capital value expectations – Price indicator	0.00	0.01	0.00	0.68	0.00	0.00	0.00	0.03	0.00	***	0.00	0.05
Office properties Capital value expectations – Price indicator	****	****	0.03	0.81	0.01	0.00	0.00	0.02	0.00	***	0.02	0.02
Retail properties Capital value expectations – Price indicator	****	****	0.01	0.49	0.00	0.02	0.00	0.00	0.01	***	0.00	0.04
Industrial properties Capital value expectations – Price indicator	****	****	0.01	**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
All types of commercial properties Investment enquiries – Price indicator	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.09	0.00	***	0.00	0.00
Office properties Investment enquiries expectations – Price indicator	****	****	0.53	**	0.00	0.00	0.00	0.01	0.00	***	0.52	0.00
Retail properties Investment enquiries expectations – Price indicator	****	****	0.17	0.11	0.01	0.00	0.00	0.00	0.00	***	0.09	0.00
Industrial properties Capital value expectations – Price indicator	****	****	0.01	**	0.00	0.00	0.00	0.00	0.00	***	0.00	0.00

Notes: Prices expressed as transaction value, hybrid terms. ** Series missing. *** No test performed due to a lack of correlation. **** Price series not available.

In the charts below, the results obtained in the Granger causality test are crossed with the correlation for different types of properties in the capital value expectations and investment enquiries indicators. The colour scheme follows the same rule as above and the area inside the dashed rectangle is the Granger causality evidence area. Therefore, the areas of greatest interest are the upper part of the graph (high correlation) and inside the dashed area (evidence of Granger causality).

Figure 17

Correlation and causality test results (RESX vs CPP) for capital value expectations and commercial property prices

a.   **All properties**

b.   **Office properties**

c.   **Retail properties**

d.   **Industrial properties**

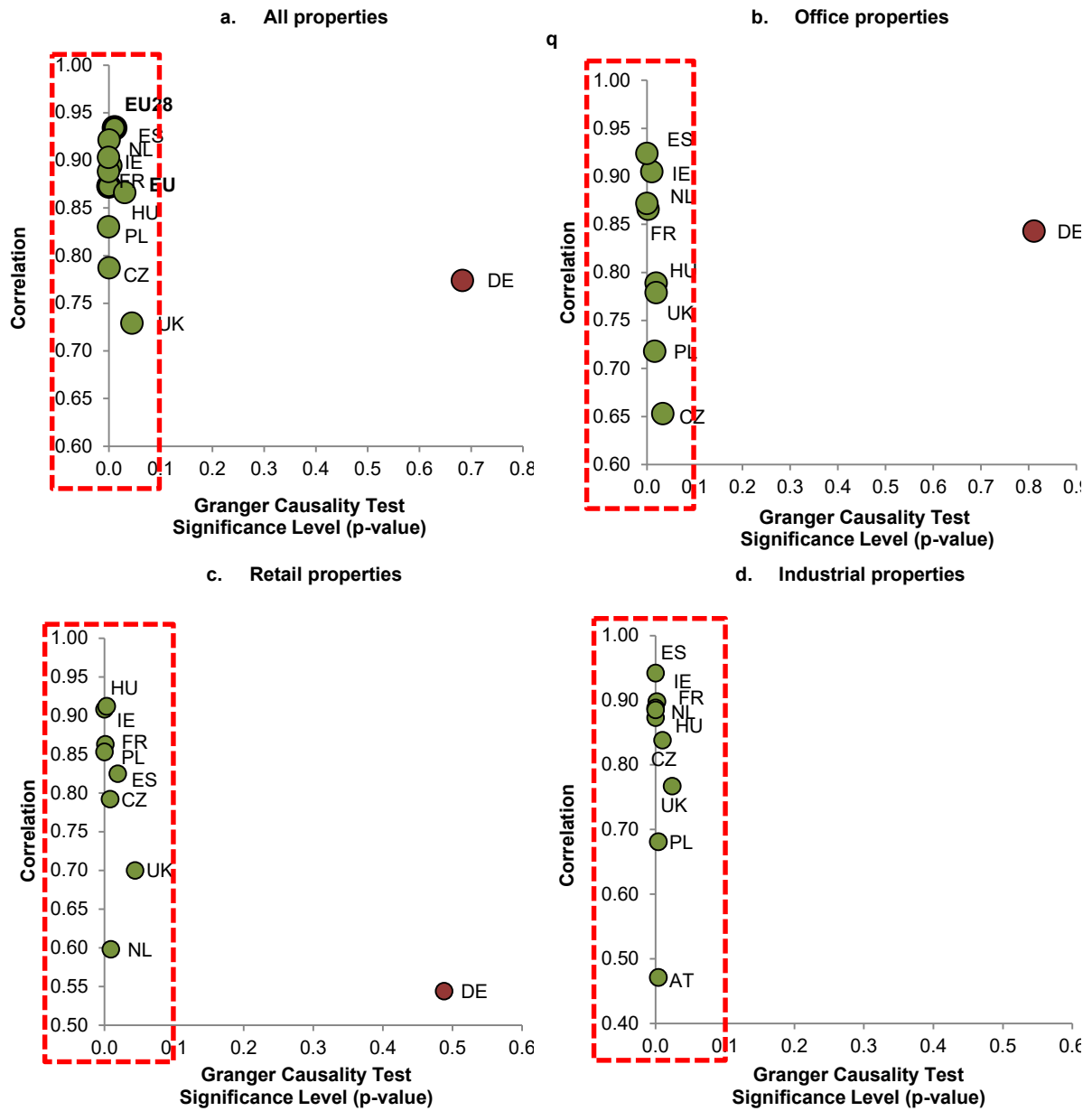**Figure 18**

Correlation and causality test results (RESX vs CPP) for investment enquiries and commercial property prices

a. All properties

b. Office properties

c. Retail properties

d. Industrial properties
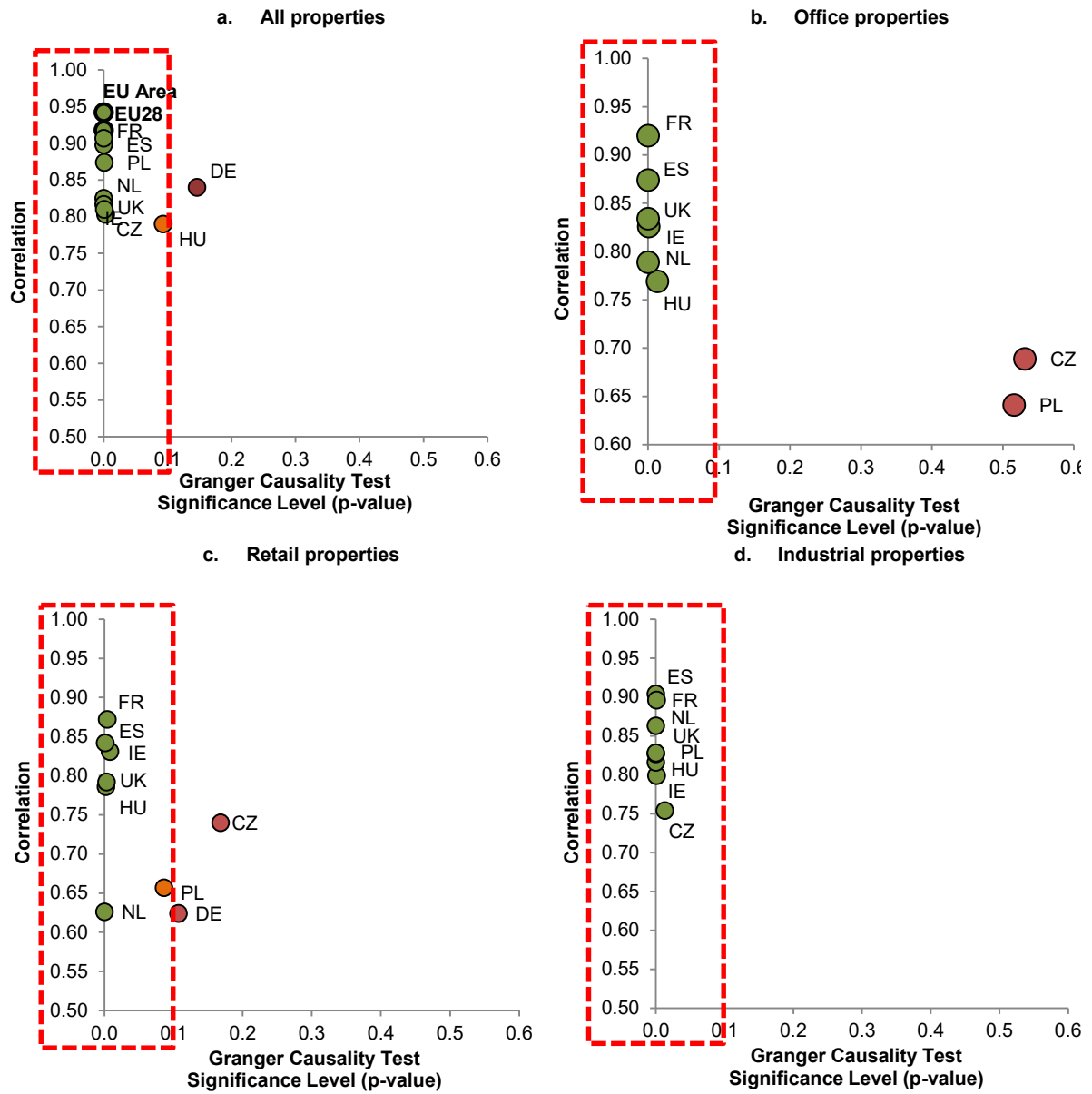
4.3   Conclusions RESX vs CPP Granger causality test

This exercise shows relatively good evidence of Granger causality between the RICS series and rice indicators. The results, combined with those shown in the correlation section, indicate that the RICS series leads the price series and can be used as an early trend indicator.

In some cases, for example in Germany, the results obtained displayed poor Granger causality evidence. This particular outcome could indicate that either the series are contemporaneous for the country concerned or that there is a potential data issue. These results may require further research.

5. Conclusions

The correlation analysis in Section 3, supported by the first Granger causality results in Section 4, suggests that opinion survey data may contain relevant information for monitoring developments in the commercial real estate market. The correlation tests gave rise to different results depending on the countries and the variables considered.

Table 3
Summary table (highest correlation values shown)

	ES	IE	FR	NL	UK	HU	DE	CZ	PL	IT	AT
All types of commercial properties Capital value expectations - Price indicator	0.92	0.89	0.89	0.90	0.73	0.87	0.77	0.79	0.83	nc	0.32
Office properties Capital value expectations - Price indicator	0.92	0.91	0.87	0.87	0.78	0.79	0.84	0.65	0.72	nc	0.37
Retail properties Capital value expectations - Price indicator	0.83	0.91	0.86	0.60	0.70	0.91	0.54	0.79	0.85	nc	nc
Industrial properties Capital value expectations - Price indicator	0.94	0.90	0.89	0.89	0.77	0.87	-	0.84	0.68	nc	0.47
All types of commercial properties Investment enquiries - Price indicator	0.90	0.83	0.91	0.82	0.81	0.79	0.84	0.80	0.87	nc	0.36
All types of commercial properties Availability of leasable space - Unemployment	0.89	0.87	0.86	0.75	0.90	0.71	0.60	0.29	nc	0.68	0.28
All types of commercial properties Availability of leasable space - CRE prices	0.91	0.93	0.83	0.85	0.67	0.57	0.87	0.29	0.26	nc	nc
All types of commercial properties Rent expectations - Gross Domestic Product	0.90	0.71	0.70	0.71	0.61	0.59	0.78	0.63	0.69	0.77	0.62
All types of commercial properties Development starts - (-) Cost of borrowing	0.86	0.83	0.87	0.86	-	-	0.75	-	-	0.78	0.24
All types of commercial properties Development starts - (-) Unemployment	0.93	0.88	0.79	0.75	0.92	0.80	0.47	0.82	0.85	0.68	0.40

Notes: The following rules were applied in Table 2: (i) countries are sorted from left to right in descending order by their average correlation result, (ii) nc : non-plausible correlation, (iii) - : series missing, (iv) the countries in red font did not show Granger causality when comparing investment enquiries or capital value expectations against price indicators.

The analysis suggests that:

- A first cluster, including Ireland, Spain, France, Hungary, the Netherlands, UK, EU28 and euro area aggregates, shows high correlation results across the tests undertaken. Similarly, with the exception of Ireland (for investment enquiries but not for capital values), the series were shown to be Granger causal. In the majority of cases, the RICS series perform in line with economic theory, as either contemporaneous or leading indicators and therefore, leveraging on the timeliness of the RICS data, analysts could exploit the opinion survey as an early trend indicator. In addition, RICS data could be considered as a viable alternative when CRE data are thus far unavailable.

- A second group of countries, including Czech Republic, Germany and Poland, shows lower correlations, as well as lower but acceptable Granger causality (RICS vs CPP-only comparison), except for Germany which shows no Granger causality. In particular, lower correlation results are found with variables such as availability of leasable space.

- Italy and Austria cannot be classified in any of the previous groups as their behaviour is unique:
  - Italy shows no acceptable correlation between capital value expectations/investment enquiries and CRE prices. Nevertheless, if the time interval 2011-2013, i.e. the main aftermath of the financial crisis, is excluded from the analysis of retail properties, increasing correlation results are found.
  - No high correlation is found for Austria, either for capital value expectations or for the remainder variables. In this particular case, a quality assessment of the RICS data and further consideration of any potential idiosyncrasies of the Austrian market are needed.

While further research is required, an initial assessment for Austria seems to indicate a relatively poor response rate in the country. If smoothed results are taken, for instance converting data to half-year averages, correlations improve somewhat. However, this appears to reduce the leading properties of the data. This is not necessarily bad news, as even with a contemporaneous correlation and smoothing the RICS opinion survey, data are generally available prior to the publication of the price indicator.

As a result of this paper, it can be seen that sentiment indicators such as those supplied by RICS can play an important role in the analysis of real estate markets and, in particular, act as early trend indicators and proxy indicators where official statistics are not currently available or have not been updated. Further research might therefore be warranted to assess the practicalities of covering missing country information either with similar national surveys, or using other means.

6.   Bibliography

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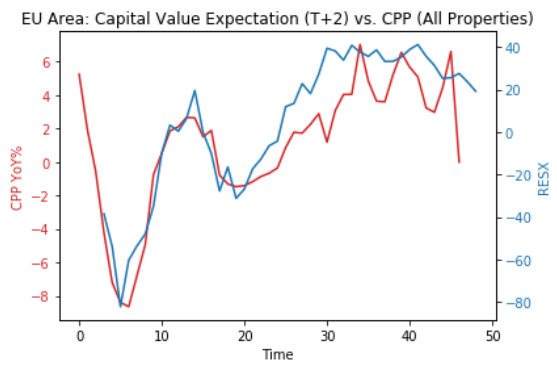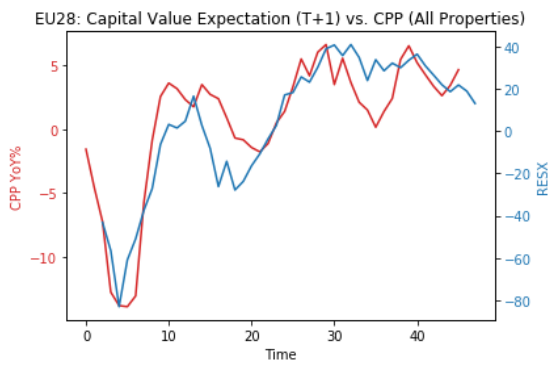
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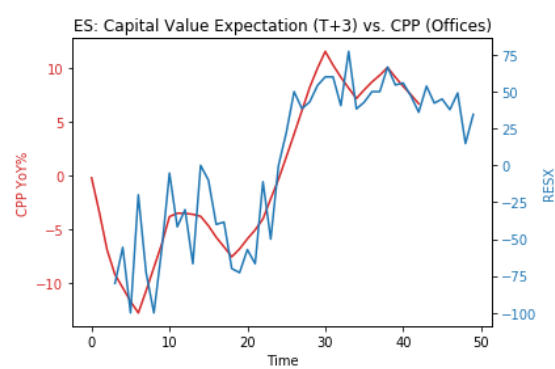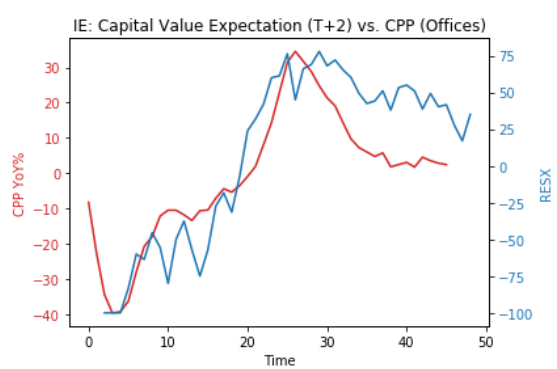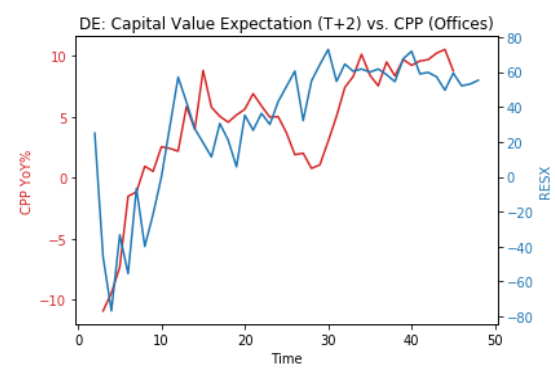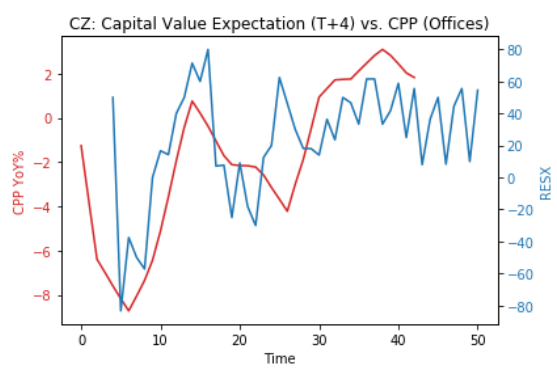
Annex 1 – Detailed results

Table 4.a					
Capital value expectations vs commercial property prices (total market)					
Country	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator[14]
EU28	0.857	T-1	From 2008	157	217 days
Euro area	0.934	T-2	From 2008	157	307 days

EU28: Capital Value Expectation (T+1) vs. CPP (All Properties)

EU Area: Capital Value Expectation (T+2) vs. CPP (All Properties)

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[14] This column reports the number of days in advance trend indicator (based on expectations) is available compared to the commercial property prices. It considers the quarter with the highest match, e.g. EU28 shows the highest correlation value when the RICS series leads by one quarter. Therefore, the calculation is as follows:

157 days *(CPPs are available 157 days after the reporting quarter)* + 90 days *(RICS leading by one quarter)* - 30 days *(RICS data are available 30 days after the reporting quarter)* = 217 days

Table 4.b					
Capital value expectations vs commercial property prices (office)					
Country	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
CZ	0.653	T-4	From 2008	134	-
DE**	0.843	T-2	From 2008	67	217 days
IE	0.905	T-2	From 2008	67	217 days
ES	0.924	T-3	From 2008	134	374 days
FR	0.866	T-2	From 2008	134	284 days
IT***	Negative correlation	-	From 2008	122	-
HU	0.789	T-3	From 2008	134	374 days
AT	No correlation	-	From Q410	134	-
NL	0.872	T-3	From 2008	67	307 days
PL	0.718	T-4	From 2008	134	464 days
UK	0.779	T-1	From 2008	67	127 days

Notes: With the exception of Germany and Italy, capital value based on valuations has been tested with capital value expectations. Only the countries with relevant time series have been compared (countries with observations starting later than 2011 have not been taken into account). ** Transaction value, hybrid. *** Transaction value, transaction based.
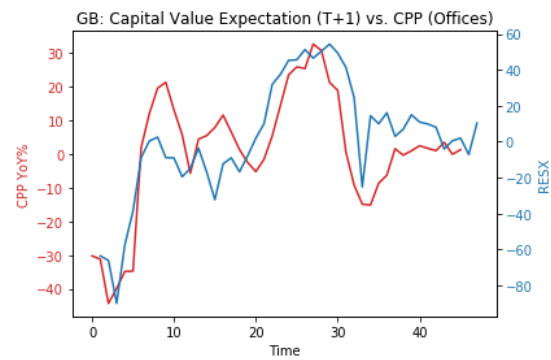

CZ: Capital Value Expectation (T+4) vs. CPP (Offices)

DE: Capital Value Expectation (T+2) vs. CPP (Offices)

IE: Capital Value Expectation (T+2) vs. CPP (Offices)

ES: Capital Value Expectation (T+3) vs. CPP (Offices)

FR: Capital Value Expectation (T+2) vs. CPP (Offices)

HU: Capital Value Expectation (T+3) vs. CPP (Offices)

NL: Capital Value Expectation (T+3) vs. CPP (Offices)

PL: Capital Value Expectation (T+4) vs. CPP (Offices)

GB: Capital Value Expectation (T+1) vs. CPP (Offices)
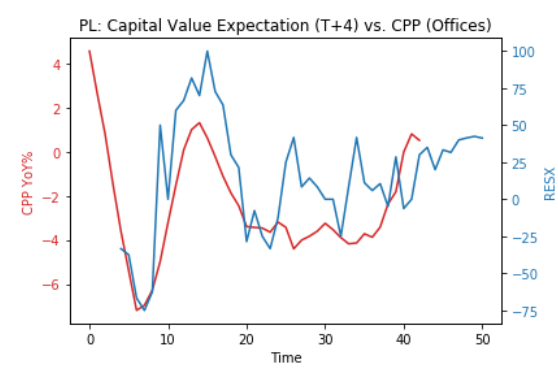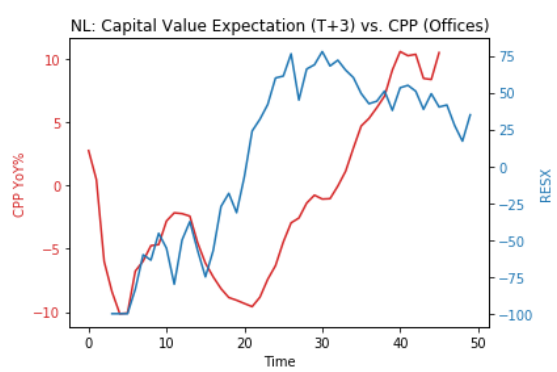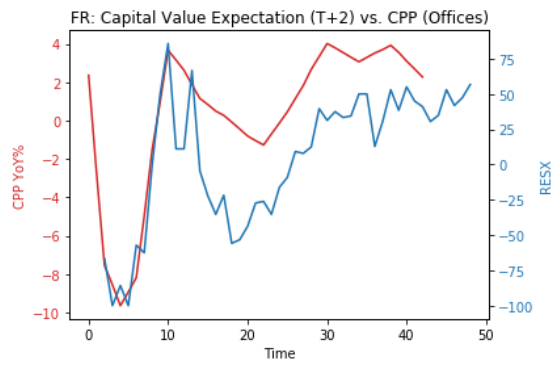
Table 4.c					
Capital value expectations vs commercial property prices (retail)					
Country	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
CZ	0.792	T-4	From 2008	134	464 days
DE**	0.544	T=0	From 2008	67	37 days
IE	0.908	T-2	From 2008	67	217 days
ES	0.825	T-2	From 2008	134	284 days
FR	0.863	T-3	From 2008	134	374 days
IT***	Poor correlation from 2012 to 2014	-	From 2008	122	-
HU****	0.912	T-3	From 2008	-	-
AT	Negative correlation	-	From Q410	134	-
NL	0.598	T-3	From 2008	67	307 days
PL	0.853	T-3	From 2008	134	374 days
UK	0.7	T-1	From 2008	67	127 days

Notes: With the exception of Germany and Italy, capital value based on valuations has been tested with capital value expectations.* Transaction value, hybrid. *** Transaction value, transaction based. **** The commercial property price series of retail properties ends in 2014.
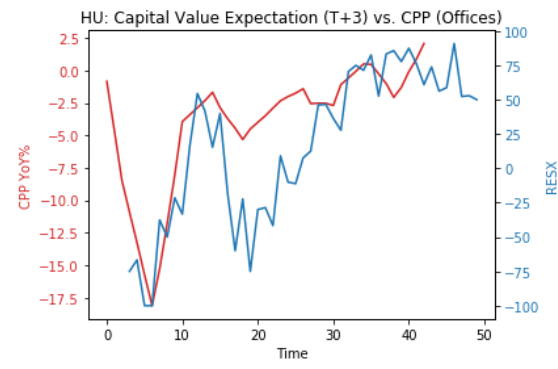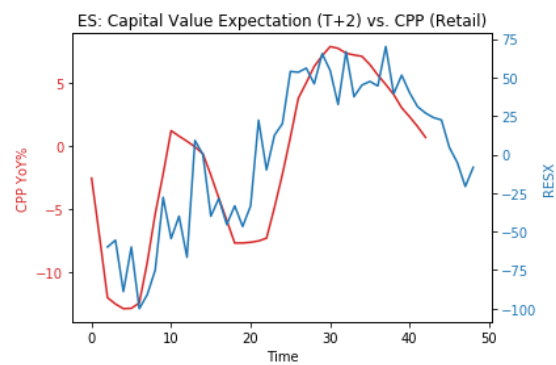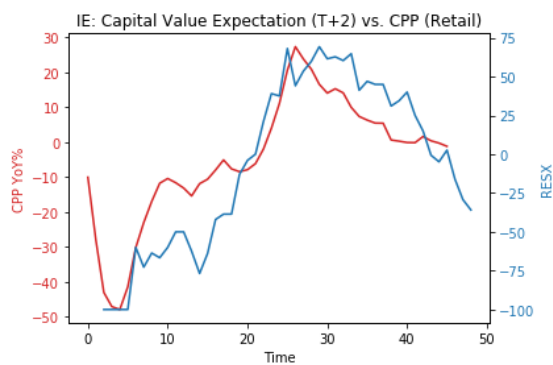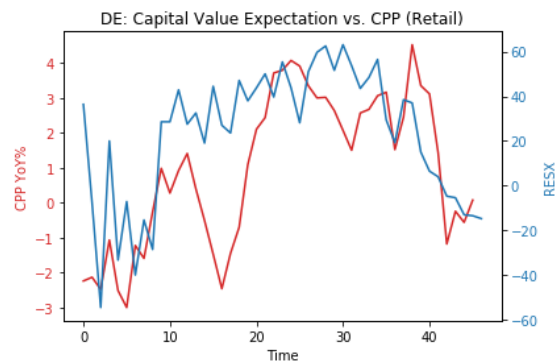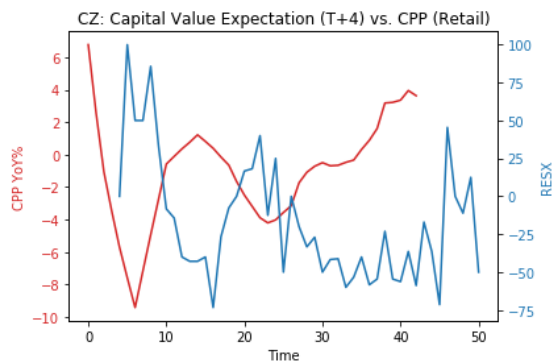

CZ: Capital Value Expectation (T+4) vs. CPP (Retail)

DE: Capital Value Expectation vs. CPP (Retail)

IE: Capital Value Expectation (T+2) vs. CPP (Retail)

ES: Capital Value Expectation (T+2) vs. CPP (Retail)

FR: Capital Value Expectation (T+3) vs. CPP (Retail)

HU: Capital Value Expectation (T+3) vs. CPP (Retail)

NL: Capital Value Expectation (T+3) vs. CPP (Retail)

PL: Capital Value Expectation (T+3) vs. CPP (Retail)

GB: Capital Value Expectation (T+1) vs. CPP (Retail)

Table 4.d					
Capital value expectations vs commercial property prices (industrial)					
Country	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
CZ	0.838	T-2	From 2008	134	284 days
DE	Series missing	-	-	-	-
IE	0.898	T-2	From 2008	67	217 days
ES	0.942	T-2	From 2008	134	284 days
FR	0.888	T-2	From 2008	134	284 days
IT***	Negative correlation	T-3	From 2008	122	-
HU	0.873	T-3	From 2008	>500	>740 days
AT	0.471	T-4	From Q410	134	-
NL	0.885	T-2	From 2008	67	217 days
PL	0.681	T-4	From 2008	134	-
UK	0.767	T-1	From 2008	67	127 days

Notes: With the exception of Italy, capital value based on valuations has been tested with capital value expectations. *** Transaction value, transaction based.

HU: Capital Value Expectation (T+3) vs. CPP (Industrial)

NL: Capital Value Expectation (T+2) vs. CPP (Industrial)

PL: Capital Value Expectation (T+4) vs. CPP (Industrial)

GB: Capital Value Expectation (T+1) vs. CPP (Industrial)
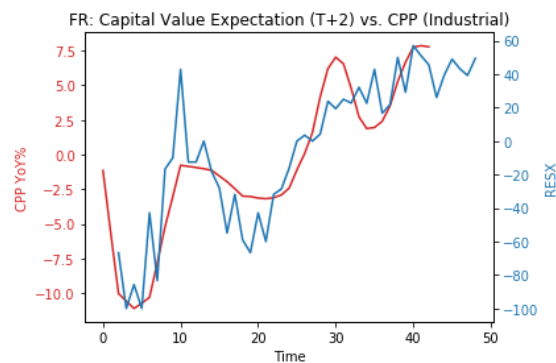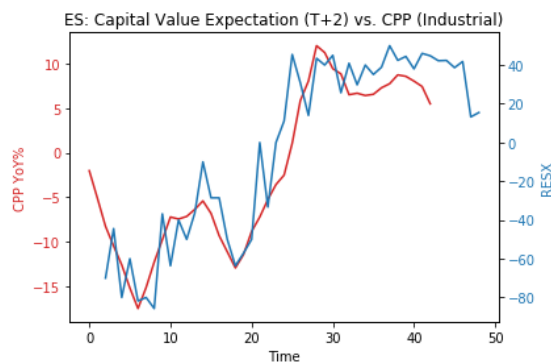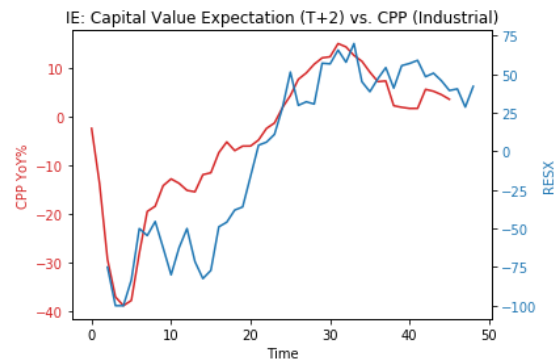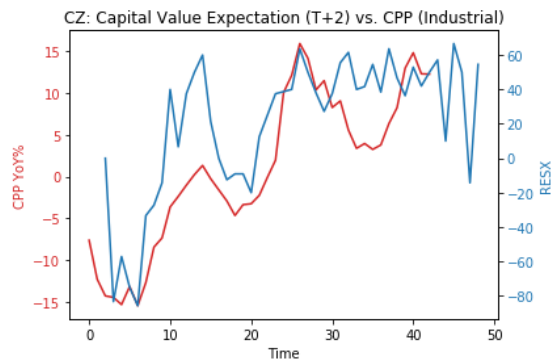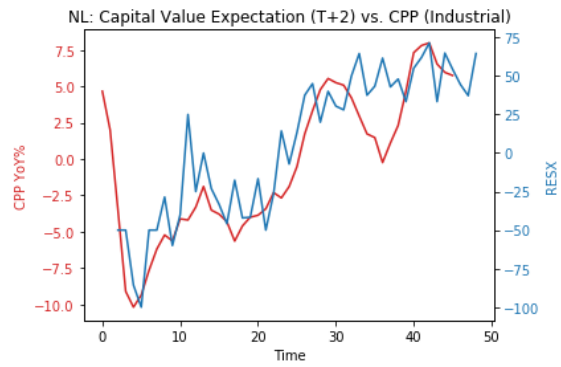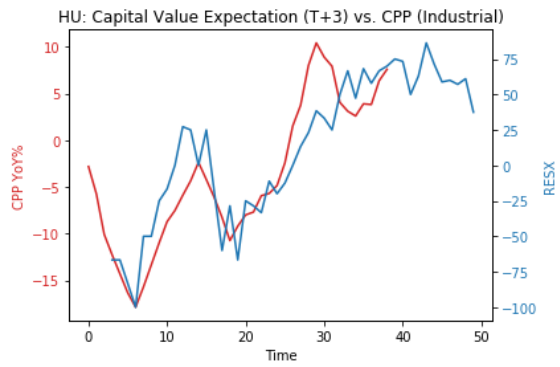
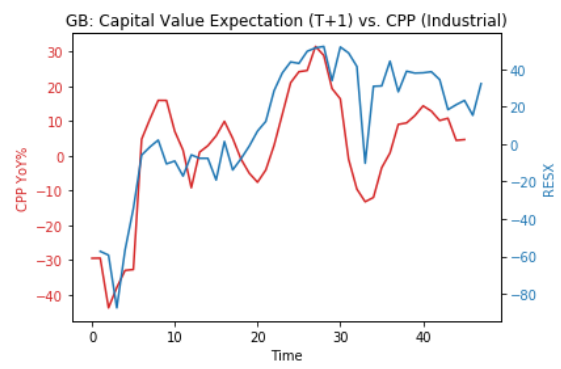| Table 5.a					
Investment enquiries vs commercial property prices (total market)					
Country / Region	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
EU 28	0.918	T-2	From 2008	157	307 days
Euro area	0.942	T-3	From 2008	157	397 days
CZ	0.803	T-4	From 2008	134	464 days
DE**	0.840	T-2	From 2008	67	217 days
IE	0.825	T-3	From 2008	67	307 days
ES	0.898	T-5	From 2008	134	554 days
FR	0.907	T-4	From 2008	134	464 days
IT***	Negative correlation	-	From 2008	122	-
HU	0.790	T-3	From 2008	134	374 days
AT	No correlation	-	From Q410	-	-
NL	0.817	T-5	From 2008	67	487 days
PL	0.874	T-4	From 2008	134	464 days
UK	0.81	T-2	From 2008	67	217 days

Notes: With the exception of Germany and Italy, capital value based on valuations has been tested with investment enquiries. Only countries with relevant time series have been compared (countries with observations starting later than 2011 have not been taken into account). ** Transaction value, hybrid. *** Transaction value, transaction based.

EU28: Investment Enquiries (T+2) vs. CPP (All Properties)

EU Area: Investment Enquiries (T+3) vs. CPP (All Properties)

CZ: Investment Enquiries (T+4) vs. CPP (All Properties)

DE: Investment Enquiries (T+2) vs. CPP (All Properties)

IE: Investment Enquiries (T+3) vs. CPP (All Properties)

ES: Investment Enquiries (T+5) vs. CPP (All Properties)

FR: Investment Enquiries (T+4) vs. CPP (All Properties)

HU: Investment Enquiries (T+3) vs. CPP (All Properties)

NL: Investment Enquiries (T+5) vs. CPP (All Properties)

PL: Investment Enquiries (T+4) vs. CPP (All Properties)

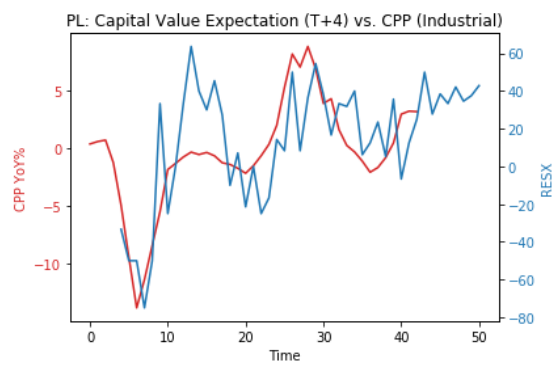GB: Investment Enquiries (T+2) vs. CPP (All Properties)
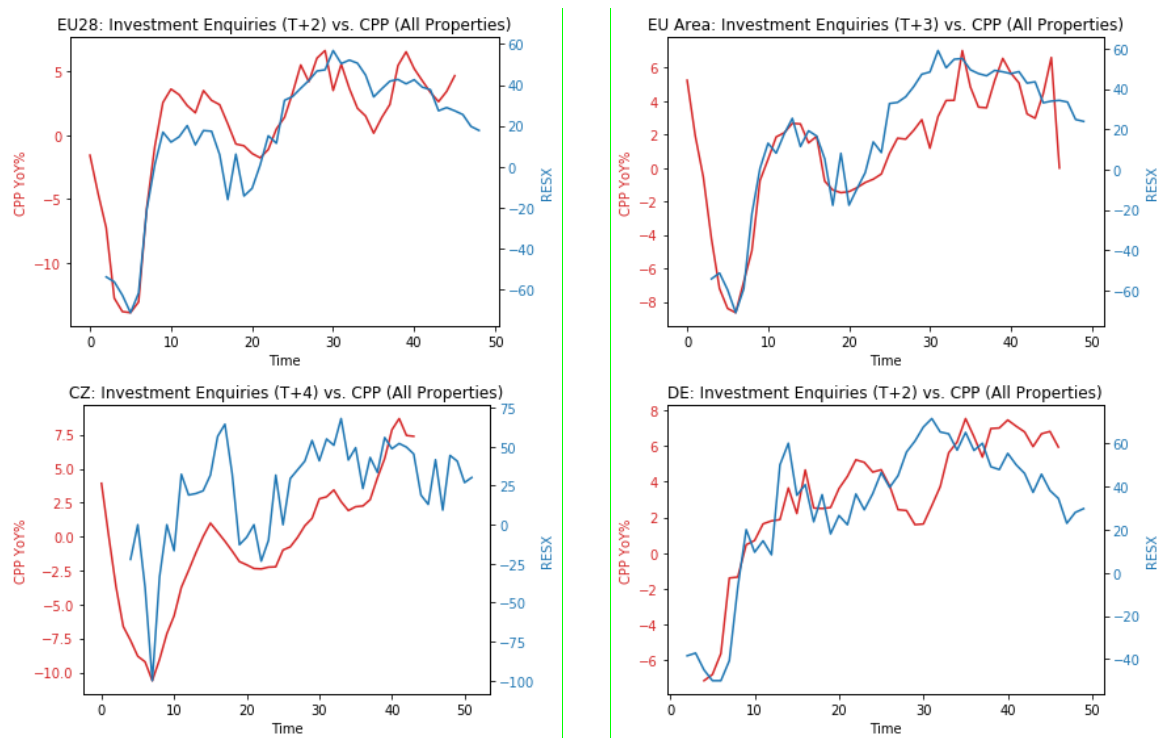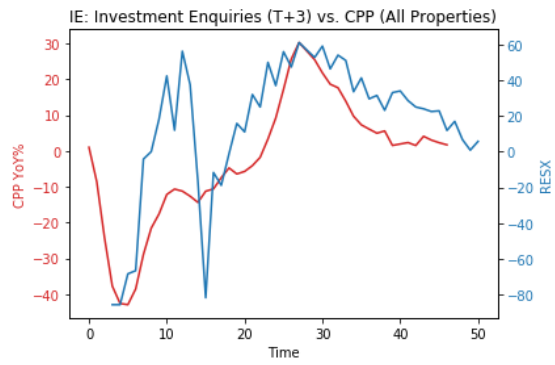
Table 5.b					
Investment enquiries vs commercial property prices (office)					
Country / Region	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
CZ	0.689	T-8	From 2008	134	-
DE	Series missing		From 2008	67	-
IE	0.826	T-4	From 2008	67	397 days
ES	0.874	T-6	From 2008	134	644 days
FR	0.920	T-4	From 2008	134	464 days
IT***	Negative correlation	-	From 2008	122	-
HU	0.769	T-3	From 2008	134	374 days
AT	Series missing	-	From Q410	-	-
NL	0.789	T-4	From 2008	67	397 days
PL	0.641	T-5	From 2008	134	554 days
UK	0.834	T-2	From 2008	67	217 days

Notes: With the exception of Italy, capital value based on valuations has been tested with investment enquiries. Only countries with relevant time series have been compared (countries with observations starting later than 2011 have not been taken into account). *** Transaction value, transaction based.

HU: Investment Enquiries (T+3) vs. CPP (Offices)
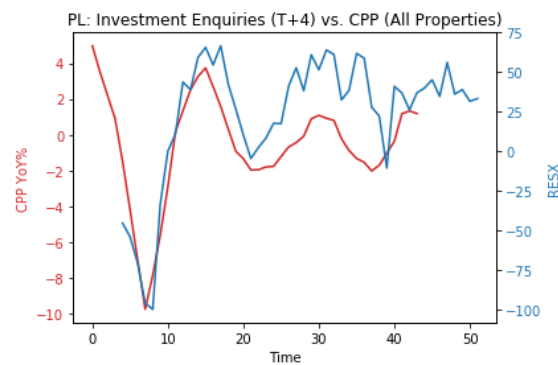
NL: Investment Enquiries (T+4) vs. CPP (Offices)

PL: Investment Enquiries (T+5) vs. CPP (Offices)

GB: Investment Enquiries (T+2) vs. CPP (Offices)
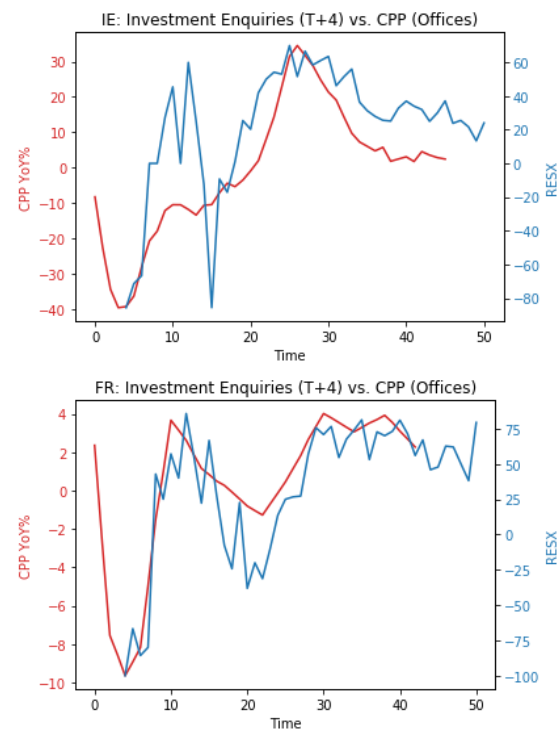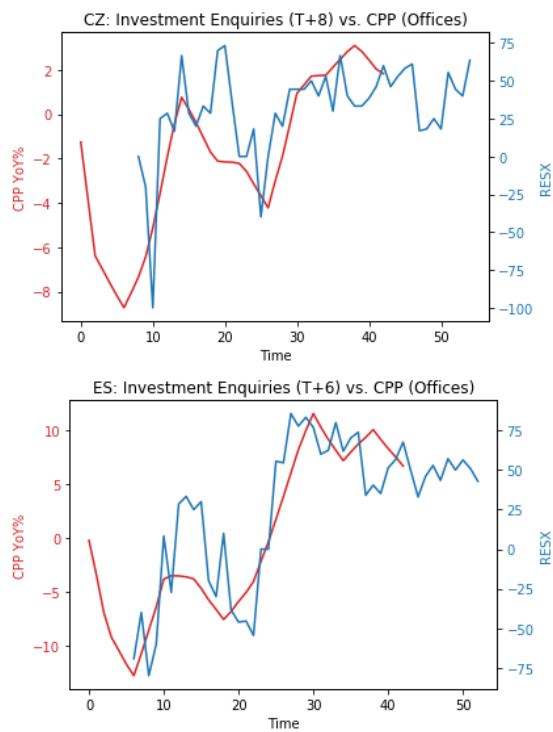
Table 5.c					
Investment enquiries vs commercial property prices (retail)					
Country / Region	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
CZ	0.740	T-4	From 2008	134	464 days
DE**	0.624	T-1	From 2008	67	-
IE	0.831	T-4	From 2008	67	397 days
ES	0.842	T-4	From 2008	134	464 days
FR	0.872	T-4	From 2008	134	464 days
IT***	Negative correlation	-	From 2008	122	-
HU	0.786	T-3	From 2008	134	374 days
AT	No correlation	-	From Q410	-	-
NL	0.626	T-5	From 2008	67	487 days
PL	0.657	T-3	From 2008	134	374 days
UK	0.792	T-2	From 2008	67	217 days

Notes: With the exception of Germany and Italy, capital value based on valuations has been tested with investment enquiries. Only countries with relevant time series have been compared (countries with observations starting later than 2011 have not been taken into account). ** Transaction value, hybrid. *** Transaction value, transaction based.
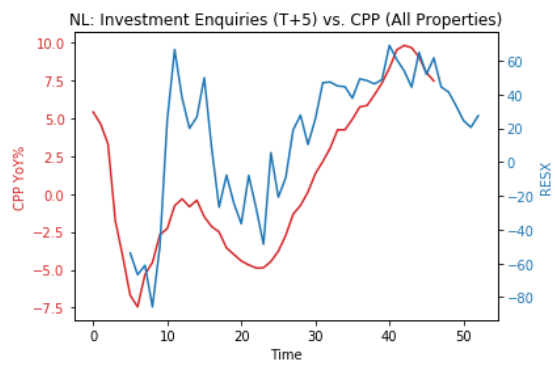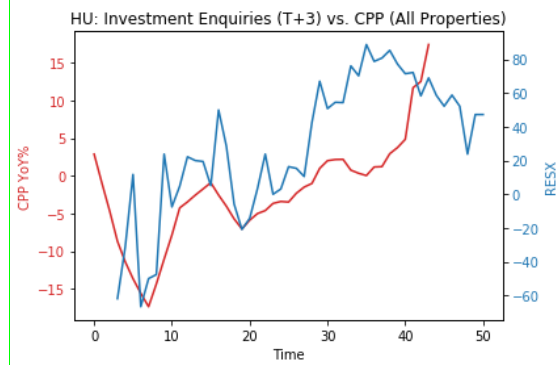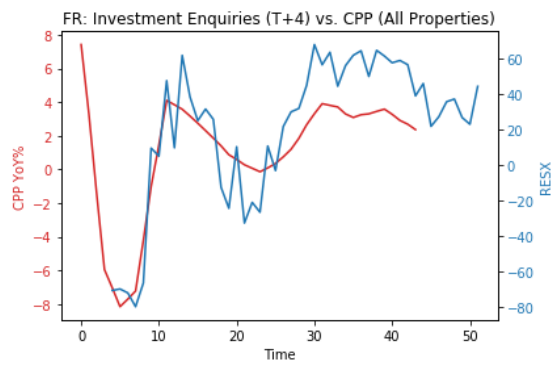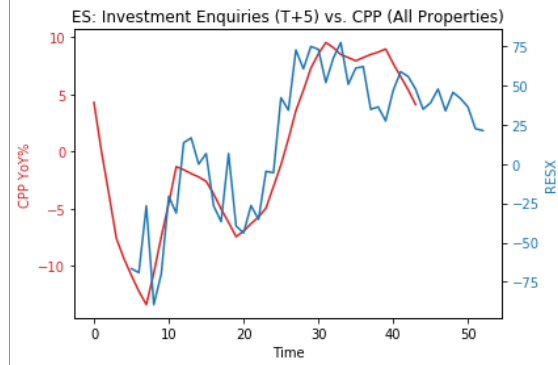
FR: Investment Enquiries (T+4) vs. CPP (Retail)

HU: Investment Enquiries (T+3) vs. CPP (Retail)

NL: Investment Enquiries (T+5) vs. CPP (Retail)

PL: Investment Enquiries (T+3) vs. CPP (Retail)

GB: Investment Enquiries (T+2) vs. CPP (Retail)
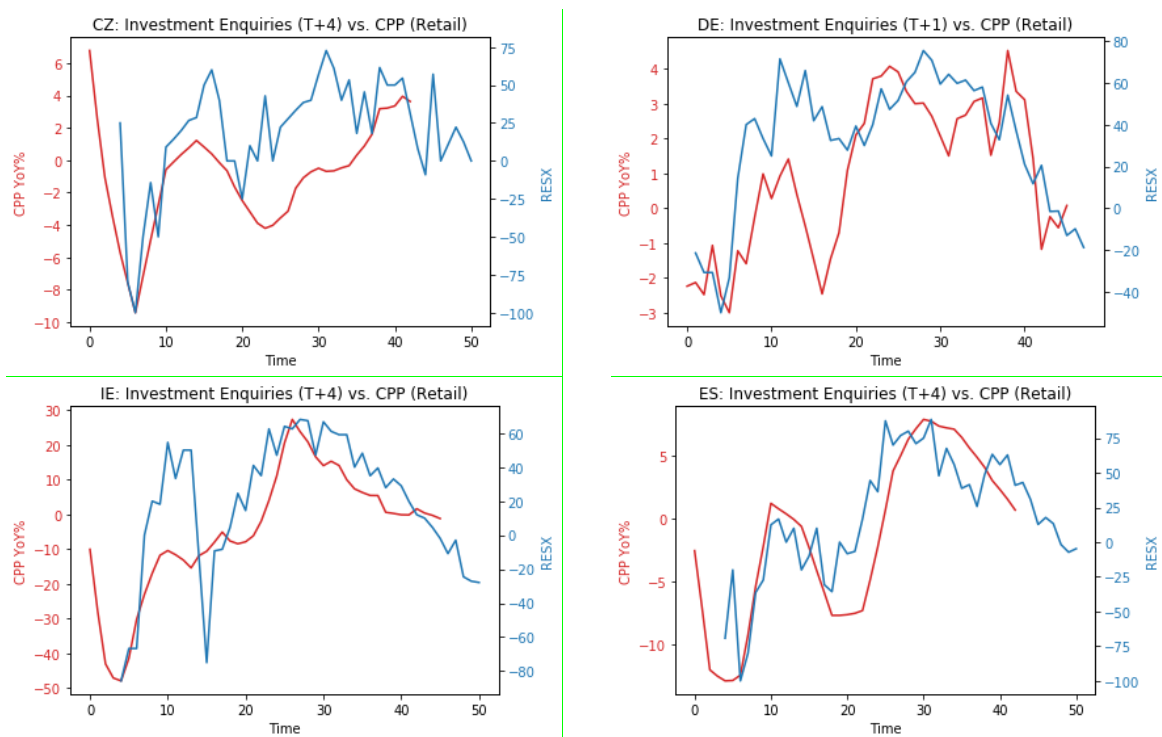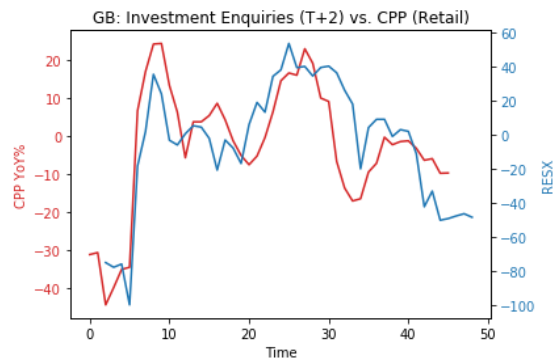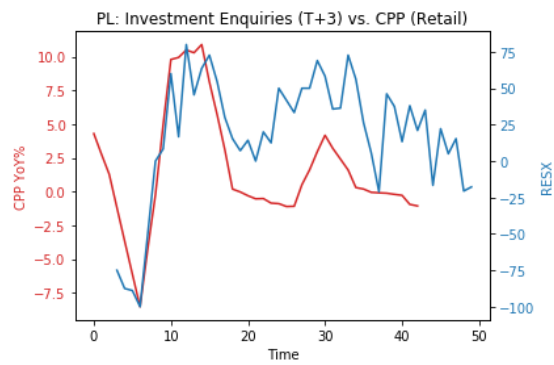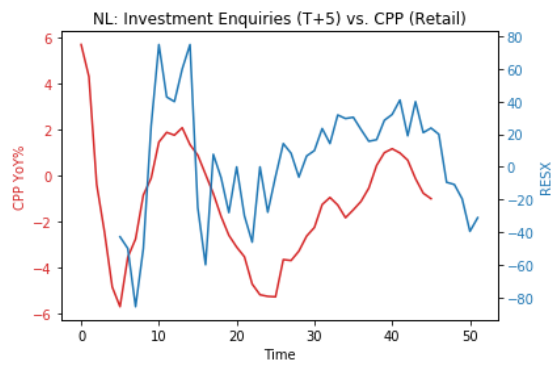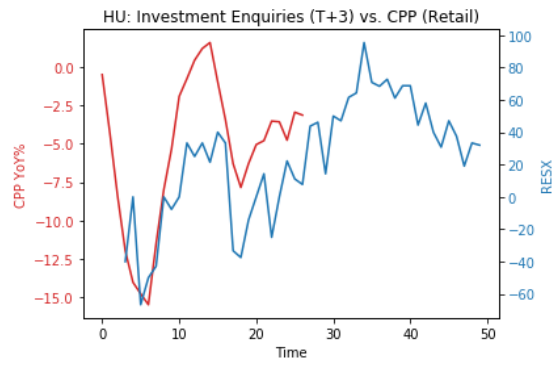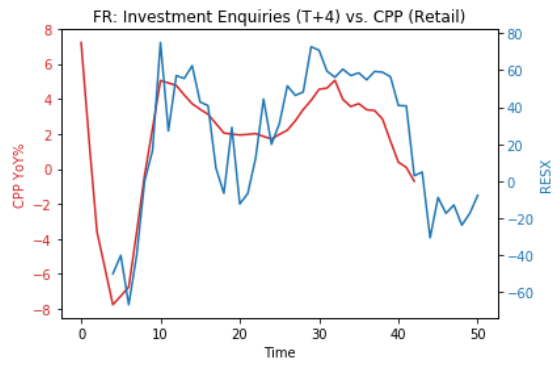
Table 5.d					
Investment enquiries vs commercial property prices (industrial)					
Country / Region	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator
CZ	0.754	T-2	From 2008	134	284 days
DE	Series missing		From 2008	67	
IE	0.799	T-4	From 2008	67	397 days
ES	0.904	T-5	From 2008	134	554 days
FR	0.896	T-4	From 2008	134	464 days
IT***	Negative correlation	-	From 2008	122	-
HU	0.816	T-3	From 2008	134	374 days
AT	No correlation	-	From Q410	-	-
NL	0.863	T-4	From 2008	67	397 days
PL	0.827	T-4	From 2008	134	464 days
UK	0.828	T-2	From 2008	67	217 days

Notes: With the exception of Italy, capital value based on valuations has been tested with investment enquiries. Only countries with relevant time series have been compared (countries with observations starting later than 2011 have not been taken into account). *** Transaction value, transaction based.
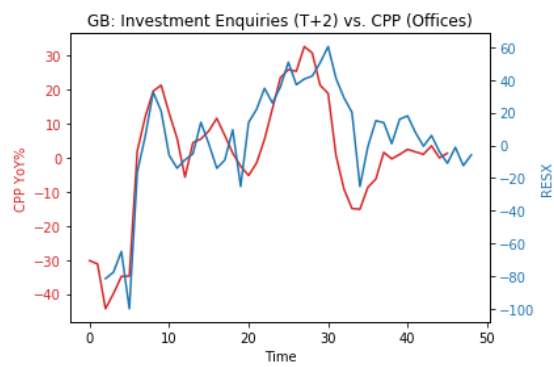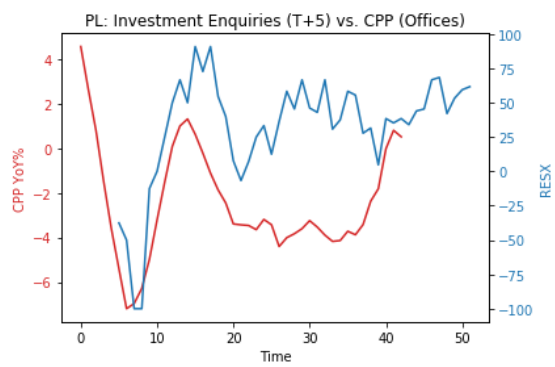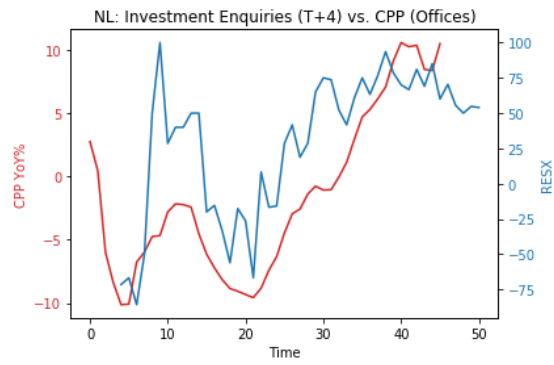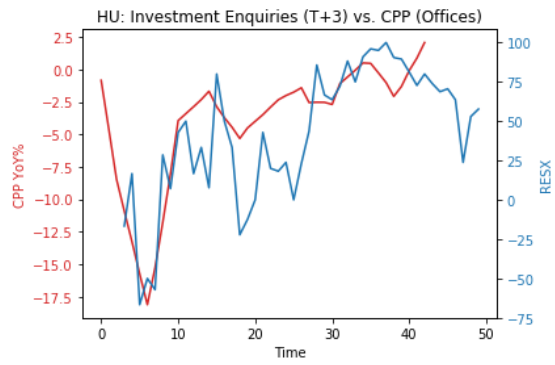
HU: Investment Enquiries (T+3) vs. CPP (Industrial)

NL: Investment Enquiries (T+4) vs. CPP (Industrial)

PL: Investment Enquiries (T+4) vs. CPP (Industrial)

GB: Investment Enquiries (T+2) vs. CPP (Industrial)
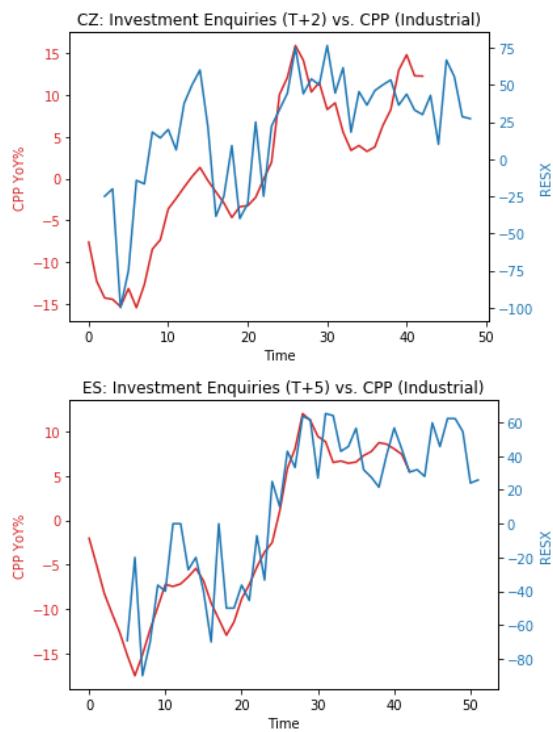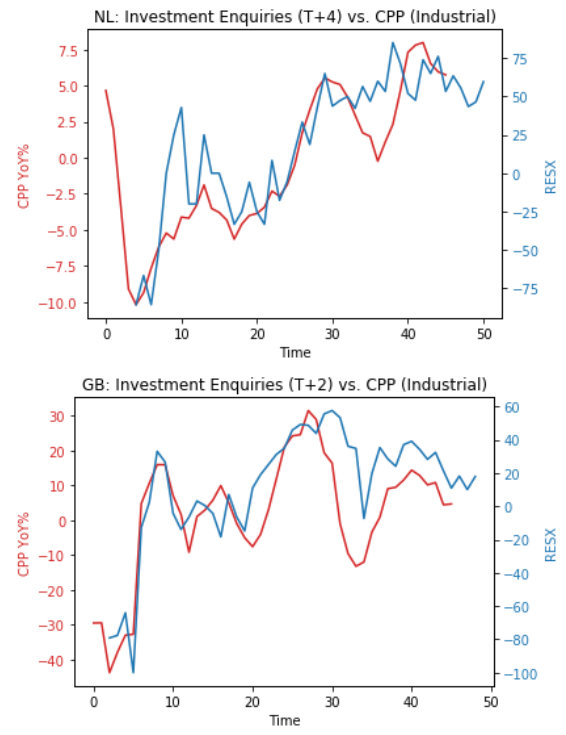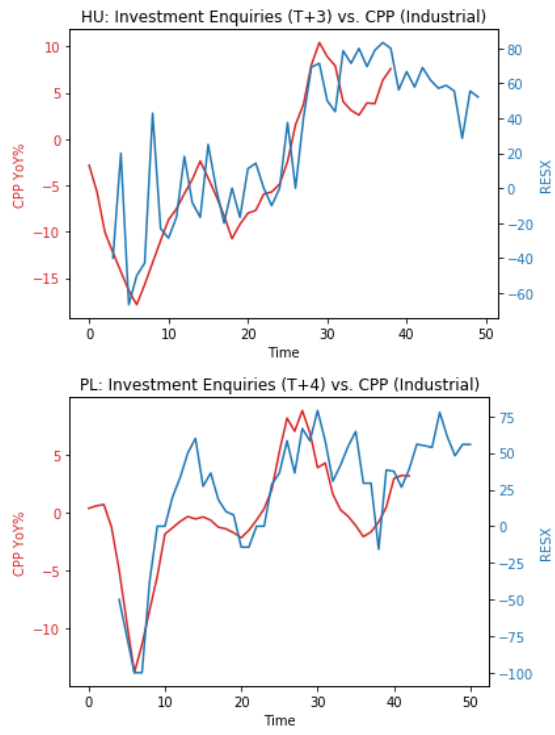
Table 6			
Availability of leasable space vs unemployment			
Country / Region	Correlation value	Quarter difference	Start of RICS series
EU28	0.938	T=0	From 2008
Euro area	0.926	T=0	From 2008
CZ	No correlation	-	From 2008
DE	0.60	T=0	From 2008
IE	0.873	T+1	From 2008
ES	0.89	T+1	From 2008
FR	0.857	T-1	From 2008
IT	0.677	T=0	From 2008
HU	0.713	T=0	From 2008
AT	No correlation	-	From Q410
NL	0.752	T=0	From 2008
PL	Negative correlation	-	From 2008
UK	0.897	T-1	From 2008

Table 7					
Rent expectations of commercial properties vs gross domestic product					
Country / Region	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to GDP
EU28	0.728	T=0	From 2008	67	37 days
Euro area	0.87	T=0	From 2008	67	37 days
CZ	0.633	T-1	From 2008	61	-
DE	0.778	T+1	From 2008	45	RICS lagging
IE	0.713	T+1	From 2008	73	RICS lagging
ES	0.899	T+1	From 2008	30	RICS lagging
FR	0.699	T=0	From 2008	59	29 days
IT	0.771	T=0	From 2008	61	31 days
HU	0.593	T=0	From 2008	64	-
AT	0.616	T=0	From Q410	59	-
NL	0.709	T-1	From 2008	44	104 days
PL	0.69	T=0	From 2008	63	33 days
UK	0.611	T=0	From 2008	40	10 days

Table 8			
Development starts sentiment vs unemployment			
Country	Correlation value	Quarter difference	Start of RICS series
CZ	-0.824	T-1	From 2008
DE	-0.47	T-1	From 2008
IE	-0.881	T-1	From 2008
ES	-0.925	T+2 (or T=0)	From 2008
FR	-0.791	T=0	From 2008
IT	-0.678	T-2	From 2008
HU	-0.802	T-1	From 2008
AT	-0.4	T-1	From Q410
NL	-0.753	T-3	From 2008
PL	-0.852	T-2	From 2008
UK	-0.921	T-2	From 2008

Table 9			
Development starts sentiment and loans to non-financial corporations (cost of borrowing purposes)			
Country	Correlation value	Quarter difference	Start of RICS series
CZ	Series missing		
DE	-0.748	T+5	From 2008
IE	-0.829	T+9	From 2008
ES	-0.858	T+5	From 2008
FR	-0.866	T+4	From 2008
IT	-0.775	T+2	From 2008
HU	Series missing		
AT	-0.235	T+5	From Q410
NL	0.860	T+7	From 2008
PL	Series missing		
UK	Series missing		

Notes: In this test, the results containing the RICS series as the leading indicator were not considered (where they exist).

Table 10					
Availability of leasable space vs commercial property prices					
Country	Correlation value	Quarter difference	Start of RICS series	Last update of commercial property prices (days after Q)	RICS results in advance compared to price indicator[15]
CZ	-0.289	T-1	From 2008	134	-
DE	-0.867*	T+2	From 2008	67	RICS lagging
IE	-0.932	T=0	From 2008	67	37 days
ES	-0.906	T-2	From 2008	134	284 days
FR	-0.834	T=0	From 2008	134	104 days
IT**	No correlation (+)		From 2008	122	-
HU	-0.571	T-1	From 2008	134	-
AT	No correlation (+)		From Q410	134	-
NL	-0.853	T-1	From 2008	67	127 days
PL	-0.259	T-1	From 2008	134	-
UK	-0.673	T+1	From 2008	67	RICS lagging

Notes: Capital value, transaction based. ** Correlation tested between RICS series and MSCI hybrid indicator and between RICS series and TVAL indicator of Banca d'Italia. Both indicators show no correlation with the opinion survey data.

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[15] This column reports the number of days in advance a trend indicator (based on expectations) could be available compared to commercial property prices. It considers the quarter with the highest match, e.g. EU28 shows the highest correlation value when the RICS series leads by one quarter. Therefore the calculation is as follows:

67 days *(CPPs are available after the reporting quarter)* + 90 days *(RICS leading by one quarter)* – 30 days *(RICS data are available after the reporting quarter)* = 127 days

Annex 2

Questionnaire

1. Occupier demand. *How has demand changed in the last three months compared to the previous three months, in terms of the quantity of space leased and sold to occupiers?*

	Up	No change	Down
Office			
Industrial			
Retail			

2. Availability of real estate for occupation. *How has available space for occupation changed over the last three months compared to the previous three months for the leasing market?*

	Up	No change	Down
Office			
Industrial			
Retail			

3. Inducements

   a. Inducements to take leases. *How has the typical value of any incentive packages to new tenants changed in your area during the last three months compared to the previous three-month period?*

	Up	No change	Down
Office			
Industrial			
Retail			

   b. Inducement types. *What are the most common forms of inducement offered in your market?*

Reverse premium payment to tenant	
Landlords contribution to works	
Rent-free period	

4. Rental expectations in the next three months. *How do you expect rents for the following categories to change in the next three months?*

	Up	No change	Down
Office			
Industrial			
Retail			

5. Rental expectations for the next 12 months. *How do you expect rents for the following categories to change in the next 12 months?*

	+25, +30 %	+20, +25 %	+15, +20 %	+10, +15 %	+5, +10 %	0, +5 %	No change	0, -5 %	-5, -10 %	-10, -15 %	-15, -20 %	-20, -25 %	-25, -30 %
Prime office													
Prime industrial													
Prime retail													
Secondary office													
Secondary industrial													
Secondary retail													

6. Rental expectations in the next three years. *What do you expect the average annual growth rate in rents will be over the next three years in the region you operate in?*

	+25, +30 %	+20, +25 %	+15, +20 %	+10, +15 %	+5, +10 %	0, +5 %	No change	0, -5 %	-5, -10 %	-10, -15 %	-15, -20 %	-20, -25 %	-25, -30 %
Prime office													
Prime industrial													
Prime retail													
Secondary office													
Secondary industrial													
Secondary retail													

7. Investment enquiries

    a. Number of investment enquiries. *How has the number of investment enquiries per property changed over the last three months?*

	Up	No change	Down
Office			
Industrial			
Retail			

    b. Investment enquiries from foreign buyers. *How has the level of investment enquiries changed during the last three months for foreign buyers?*

	Up	No change	Down
Office			
Industrial			
Retail			

8. Supply availability (for sale*). How has available space for sale changed during the last three months in the region you operate in?*

	Up	No change	Down
Office			
Industrial			
Retail			

9. Supply pipeline. *How has the level of new development starts changed during the last three months in the region you operate in?*

	Up	No change	Down
Office			
Industrial			

Retail			

10. Capital value expectations in the next three months. *How do you expect capital values to change in the next three months?*

	Up	No change	Down
Office			
Industrial			
Retail			

11. Capital values expectations in the next 12 months. *How do you expect capital values for the following categories to change in the next 12 months?*

	+25, +30 %	+20, +25 %	+15, +20 %	+10, +15 %	+5, +10 %	0, +5 %	No change	0, -5 %	-5, -10 %	-10, -15 %	-15, -20 %	-20, -25 %	-25, -30 %
Prime office													
Prime industrial													
Prime retail													
Secondary office													
Secondary industrial													
Secondary retail													

12. Capital values expectations in the next three years. *What do you expect the average annual growth rate in capital values to be over the next three years in the region you operate in?*

	+25, +30 %	+20, +25 %	+15, +20 %	+10, +15 %	+5, +10 %	0, +5 %	No change	0, -5 %	-5, -10 %	-10, -15 %	-15, -20 %	-20, -25 %	-25, -30 %
Prime office													
Prime industrial													
Prime retail													
Secondary office													
Secondary industrial													
Secondary retail													

13. Credit conditions. *How do you perceive general credit conditions have changed over the last three months in the region you operate in?*

Improved significantly	
Improved slightly	
No change	
Deteriorated slightly	
Deteriorated significantly	

14. Current market valuations. *What is your sense of current market valuations in the area you work?*[16]

15. Property cycle. *What stage of the property cycle do you believe the market in which you operate in is currently at?*[17]

In addition, two composite indicators are calculated:

- occupier sentiment, which is the unweighted average of occupier demand, landlord inducements and three-month rent expectations;

- investment sentiment, which is the unweighted average of investment enquiries, supply availability and three-month capital value expectations.

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[16] Very cheap, cheap, fair value, expensive, very expensive

[17] Early downturn, mid-downturn, bottom of the cycle, early recovery, mid-upturn, peak