

# Geographic relative CRE attractiveness index

Cap rate signals for business decisions

Filip Blazheski

- **Cap rate risk premiums can guide the search for attractive CRE investment and lending locations**
- **Vacancy rates, local and national economic data can be used to model cap rate risk premiums**
- **Based on this, San Antonio and Northern New Jersey appear most attractive in the apartment segment**
- **Offices in San Francisco and Minneapolis have the most favorable mix of income, price and fundamentals**
- **Retail CRE appears most attractive in Fort Worth**

Commercial real estate (CRE) is a major asset class in all developed economies. We estimate that in May 2018, the value of all CRE in the U.S. was around \$16.3tn.<sup>1</sup> This figure equals total assets of all commercial banks in the U.S. and stands slightly higher than all mutual fund assets in the country. For small businesses –which create six out of every ten new jobs- real estate assets account for more than 90% of nonfinancial assets and 60% of total assets. The business community depends heavily on CRE as a source of collateral to fund expansion, largely supported by regional and community banks. In fact, commercial banks' exposure to CRE stood at \$1.63tn in 1Q18, representing 18.2% of net loans and leases. Therefore, measures of CRE risk and investment attractiveness are not only important for investors, but also for lenders. This brief presents an indicator of relative attractiveness of multifamily, office and retail CRE across 35 metro areas as well as a national aggregate.

## Cap rates and cap rate risk premiums

CRE investments can be more or less attractive depending on the balance between their income-generating ability and their price, relative to their historical and perceived future risks and alternative investments. The ratio between a CRE's net operating income (NOI) and price is known as capitalization or cap rate. Thus, the cap rate can be thought of as an inverse Price/Earnings ratio<sup>2</sup> or earnings yield. In theory, the cap rate should capture and quantify all aspects of a particular investment's economics. For instance, rents, incentives, vacancy rates, maintenance expenses, amortization and opportunity costs are all reflected in NOI. Meanwhile, the price reflects the cost of capital, growth expectations, risk and real options related to the property. As such, the cap rate is the most succinct and comprehensive indicator of the state of the market. While it is calculated as a ratio of NOI over price, it can also be thought of as a sum of the risk-free long-term interest rate and a risk premium that reflects most if not all relevant risks and growth expectations<sup>3</sup>. Since the long term risk-free interest rate is uniform across the U.S. at any given point in time (customarily proxied by the 10-year Treasury yield), the focus in this analysis is on risk premiums at the metro area level, which contain the information needed to discern one location from another. Furthermore, the focus is on filtered data in order to capture fundamental risks and avoid the noise from shorter-term volatility. This is particularly important in the case of CRE as the investments are by nature mostly long-term.

1: Our estimate assumes a real growth rate of 2% p.a. and uses both Moody's RCA price indices and Florance et al. (2010) estimate of \$9.2tn for all CRE in the U.S. in mid-2009, including owner-occupied property but excluding parking lots. Our estimate is in line with the Savills (2016) estimate of high quality CRE in North America being worth \$13tn

2: Chercachidze and Wheaton (2011)

3: For example, in a low growth market, vacancy rates would tend to be higher, and thus the risk of vacancy and the volatility of rental income would be higher

## Data and modeling approach

The dependent variables are derived from the quarterly cap rate estimates for 35 of the largest metro areas in the country, as well as the aggregate U.S. metro level for the period 1Q07-1Q18, reported by REIS. Since cap rate estimates can be significantly affected by market outliers in a relatively small sample, the quarterly data is filtered using the Hodrick-Prescott filter to extract the underlying trends. To be consistent, this approach is also used on all time-variant input variables. Separately, an analysis of the cyclical components resulting from the filtering process was also conducted in order to identify any information that could be contained in them. Most value was found to be contained in the filtered data.

The trend risk premiums are modeled in a panel data setting with a GLS random effects regression using both national and regional economic data and dummies that capture between-panel differences. The model and variables are presented in Table 1. Multiple regressions were run for each segment: apartments, offices and retail, and the specification was modified if there was a possibility to exclude any independent variables that did not add much value in the presence of other variables. Thus, multicollinearity and suspect coefficient signs were avoided. Both the original and the final specifications are presented in the model parameter tables for each of the segments. In any case, the estimates do not change significantly between the original and the final specifications, and the conclusions remain the same.

Table 1. Regression model structure and variables

$$RP_{i,t} = \alpha + \beta_1 EMPL_{i,t} + \beta_2 EMPL^2_{i,t} + \beta_3 UNEMPL_{i,t} + \beta_4 VAC_{i,t} + \beta_5 RS_t + \beta_6 ST_t + \beta_7 LT_t + \beta_8 VIX_t + \sum_{i=1}^{39} DUMMY_i + \epsilon_{i,t}$$

RP – Risk premium, trend	LT - 10-year treasury yield, trend
EMPL - Change in metro area payroll employment, trend	VIX - S&P VIX, trend
UNEMPL – Level of metro area unemployment, trend	DUMMY - Metro area dummies
VAC – Metro area vacancy rate, trend	$\epsilon$ – Error term
RS - Change in national retail sales, trend	i – Metro area identifier
ST - 2-year treasury yield, trend	t – Time identifier

Source: BBVA Research

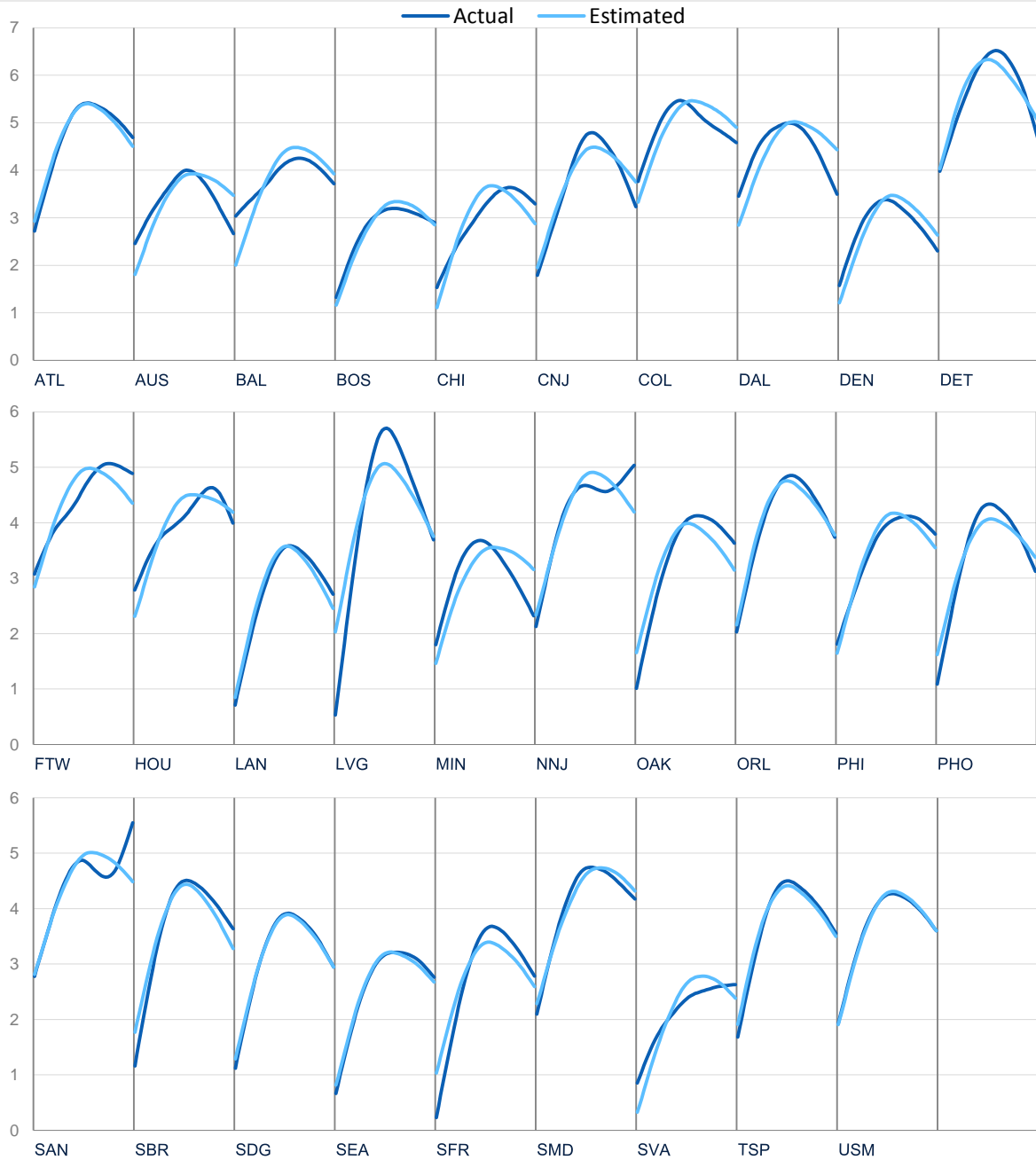
An analysis of the residuals can help identify metro areas where the risk premium deviates significantly from the estimate. The degree of deviation is an indicator of attractiveness vs. risk, as the residual is expected to be mean reverting. In essence, when the actual cap rate premium is higher than the estimated, i.e. the residual is above zero, the cap rate itself is higher than the fundamentals-based one, implying that CRE prices are attractive and the risk level is relatively lower. The opposite is the case when the actual premium is lower than the estimated, in which case the level of attractiveness is lower and the level of risk is higher.

## Results and findings

### Apartments

The regression estimates are presented in Figure 1. Most explanatory variables are significant, as presented in Table 2. The coefficients have the expected signs in the final specification. The residual estimates for 1Q18 are presented in Figure 2. They show that while the trend risk premiums are mostly within a band of  $\pm 50$ bps, there are also several outliers. The metro area that stands out the most is San Antonio, where the risk premium is more than 100bps higher than the estimate based on economic fundamentals. This indicates that apartments in San Antonio are likely underpriced and the investments there are more attractive compared to other locations. On the other hand, the trend risk premiums in Dallas, Austin and Minneapolis are significantly lower than their estimates, indicating that apartments in these metro areas may be overpriced, and thus the investments could be riskier.

Figure 1. Apartment cap rate risk premiums, trend 1Q07-1Q18 (%)



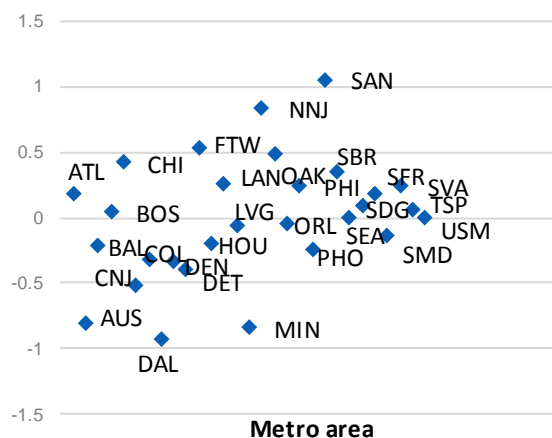
Source: BBVA Research

Table 2. Model parameters and significance levels

Dependent variable: Apartment risk premium trend				
Expl. variable <sup>4</sup>	Specification 1: R2 (overall) = 0.9438		Specification 2: R2 (overall) = 0.9315	
	Coefficient	p> Z	Coefficient	p> Z
EMPL	1.577	0.000		
EMPL <sup>2</sup>	-0.317	0.000		
UNEMPL	0.274	0.000	0.200	0.000
VAC	0.081	0.000	0.031	0.006
RS	-0.584	0.000	-0.289	0.003
ST	0.662	0.000	-0.024	0.749
LT	-2.143	0.000	-1.058	0.000
VIX	0.069	0.000	-0.011	0.296

Source: BBVA Research

Figure 2. Residual estimates 1Q18, apartments

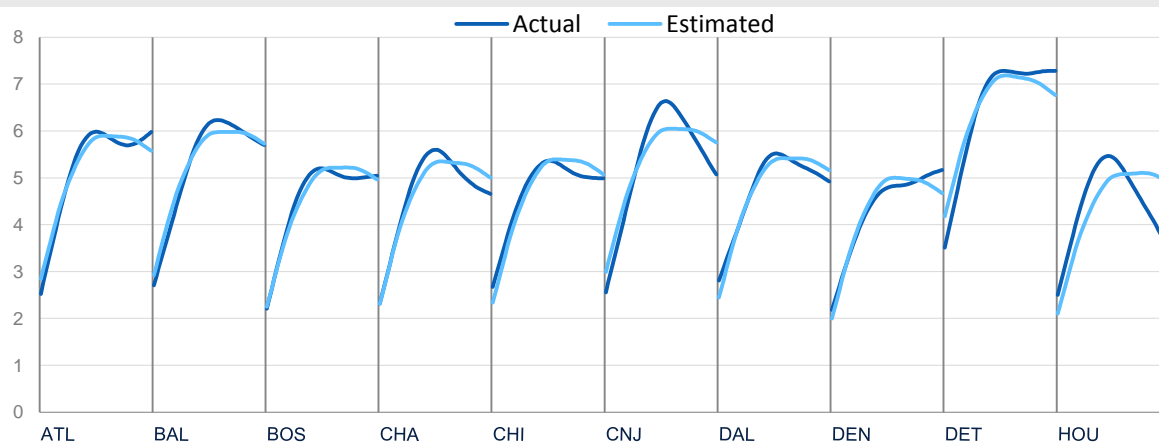


Source: BBVA Research

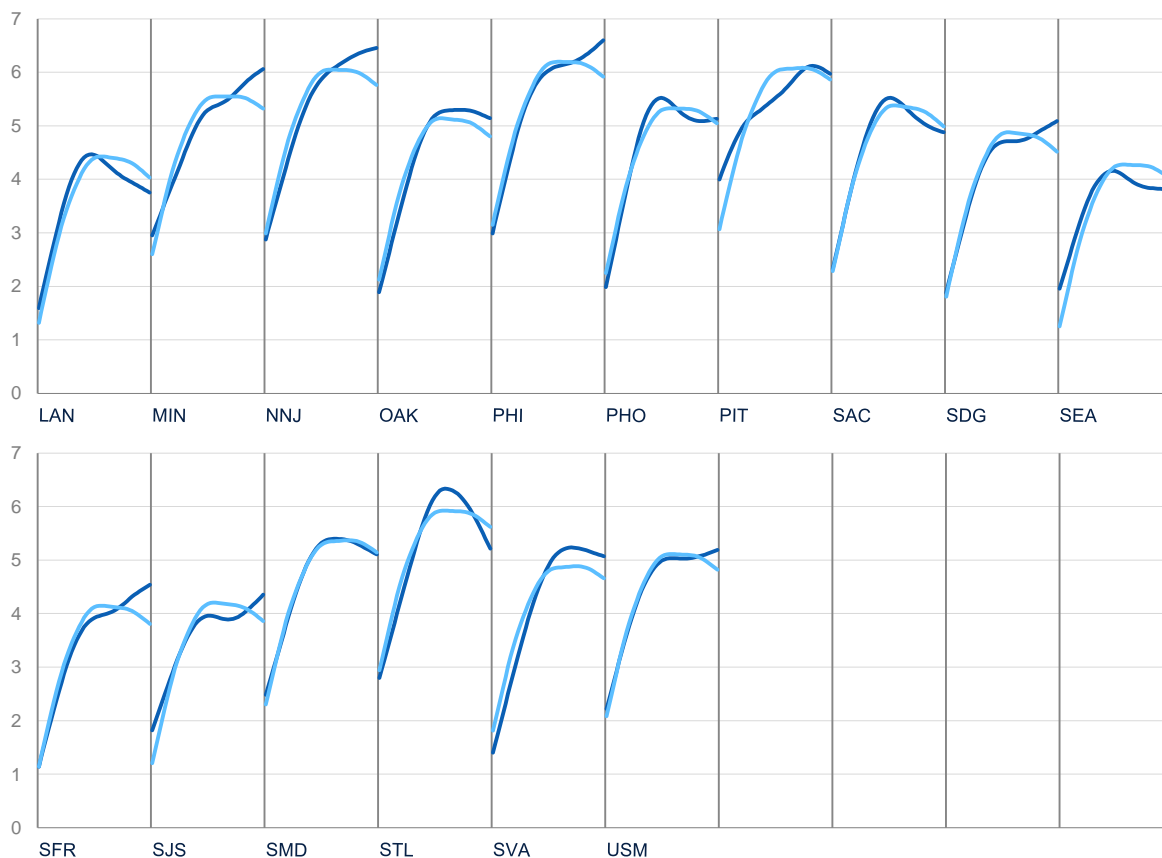
## Offices

The estimates for offices are presented in Figure 3 and the results are presented in Table 3. The explanatory variables have the expected signs and are significant, except for vacancy rates, which is likely due to the stronger correlation between unemployment and office vacancy rates. An analysis of the residuals points out to the metro areas where the risk premium deviates significantly from the estimate. In this case, the most significant outlier is Houston. With the actual risk premium almost 150bps below the fundamentals-based estimate, prices of office CRE in Houston seem to be higher than warranted. This is likely a result of the slow adjustment of prices after the significant increase in completions in 2013-2016 and the oil and gas industry recession of 2015-2016, to which Houston was particularly exposed. With office employment in Houston increasing at a solid pace once again, and with a lower number of new completions, we expect the market to regain its equilibrium in the coming period. From an investor perspective, Minneapolis, Northern New Jersey, San Francisco and Philadelphia appear to be the most attractive.

Figure 3. Office cap rate risk premiums, trend 1Q07-1Q18 (%)



4: Dummy variable information available upon request



Source: BBVA Research

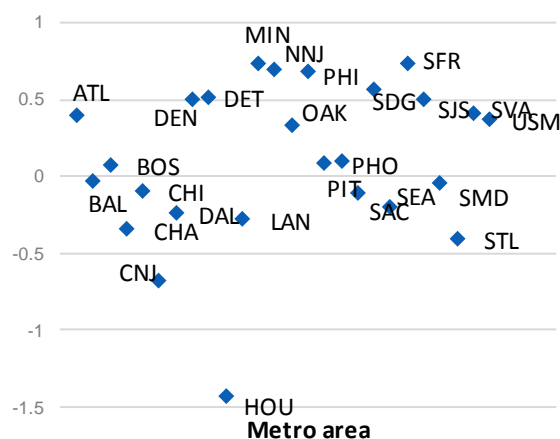
Table 3. Model parameters and significance levels

**Dependent variable: Office risk premium trend**

Expl. variable <sup>5</sup>	Specification 1: R2 (overall) = 0.9451		Specification 2: R2 (overall) = 0.9411	
	Coefficient	p> Z	Coefficient	p> Z
EMPL	1.408	0.000		
EMPL <sup>2</sup>	-0.546	0.000		
UNEMPL	0.053	0.005	0.051	0.003
VAC	-0.006	0.480	0.004	0.638
RS	0.248	0.026		
ST	0.432	0.000	0.270	0.000
LT	-2.166	0.000	-1.958	0.000
VIX	0.121	0.000	0.091	0.000

Source: BBVA Research

Figure 4. Residual estimates 1Q18, offices



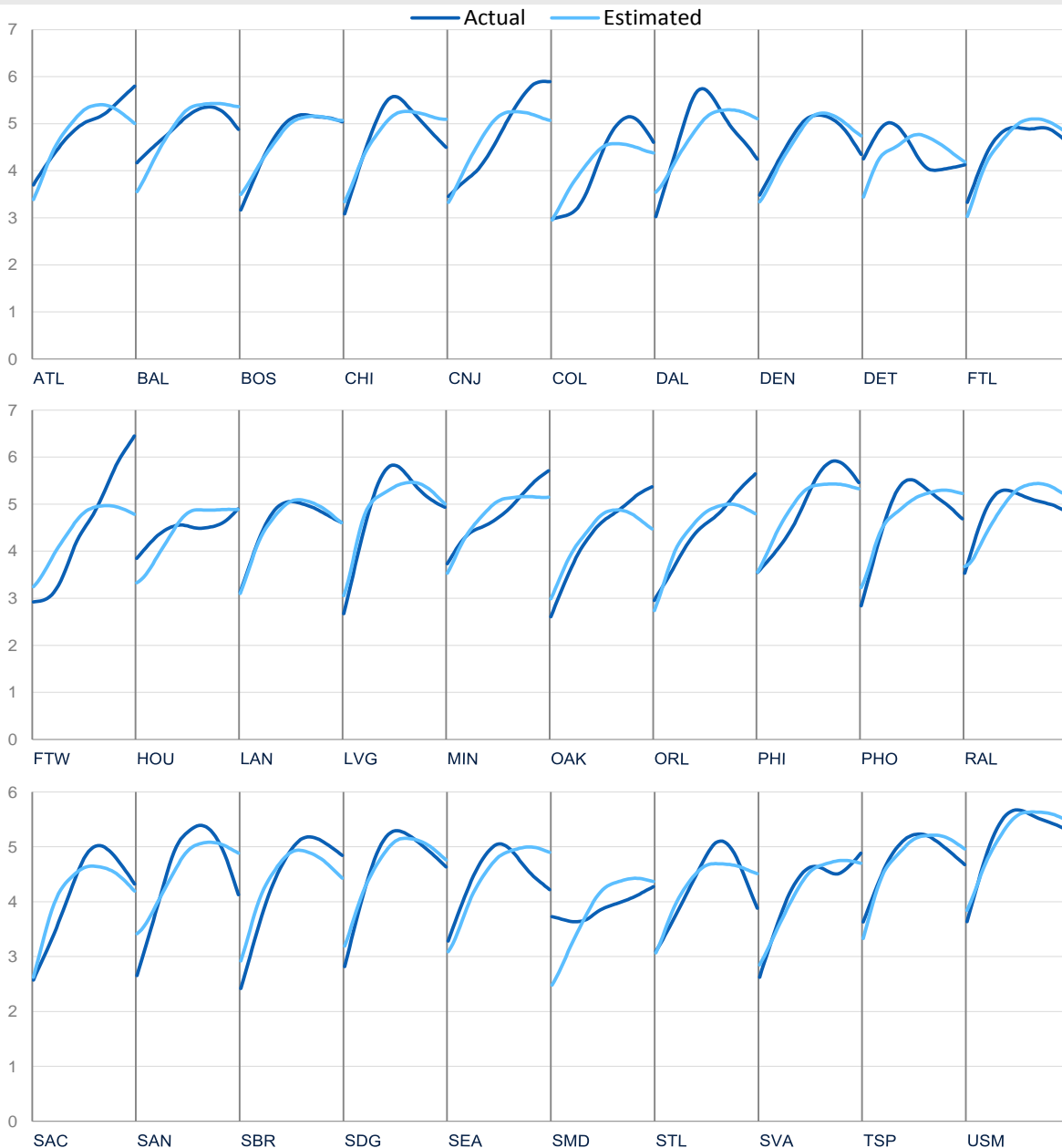
Source: BBVA Research

5: Dummy variable information available upon request

**Retail**

The regression estimates of the trend risk premium for retail CRE are presented in Figure 5. While the fit is lower than in the case of apartment and offices, it is still very high. Most explanatory variables are significant, as presented in Table 4. The metro area where the risk premium deviates most significantly from the estimate is Fort Worth, which indicates high relative attractiveness. This stands in stark contrast to the situation in Dallas, where risk premiums are significantly lower than their estimates. Retail CRE also seems to be overpriced in San Antonio, Seattle, St. Louis and Chicago.

Figure 5. Retail cap rate risk premiums, trend 1Q07-1Q18 (%)



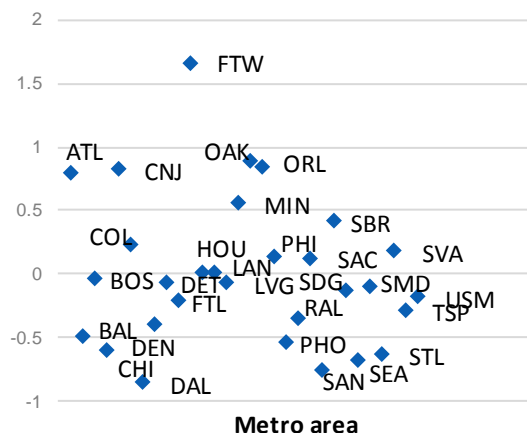
Source: BBVA Research

Table 4. Model parameters and significance levels

Dependent variable: Retail risk premium trend				
Expl. variable <sup>6</sup>	Specification 1: R2 (overall) = 0.7687		Specification 2: R2 (overall) = 0.7679	
	Coefficient	p> Z	Coefficient	p> Z
EMPL	-1.555	0.000	-1.363	0.000
EMPL <sup>2</sup>	0.649	0.000	0.571	0.000
UNEMPL	0.145	0.000	0.154	0.000
VAC	0.025	0.096	0.024	0.112
RS	0.275	0.039		
ST	0.447	0.000	0.385	0.000
LT	-1.374	0.000	-1.340	0.000
VIX	0.037	0.024	0.019	0.171

Source: BBVA Research

Figure 6. Residual estimates 1Q18, retail



Source: BBVA Research

## Index

The findings from the regressions are used to produce an index of attractiveness for the metro areas in the dataset. The constructed index has a mean of 100, which indicates a balanced market. Values above 100 indicate higher relative attractiveness and vice versa. The index is scaled to have a standard deviation of 15. The index values for the last quarter are presented in Table 5. The red cells indicate lower attractiveness and the blue cells indicate higher attractiveness.

As can be seen in Table 5, the apartment and office segments have a larger number of attractive markets, as well as higher overall attractiveness nationally compared to retail CRE. This supports our real estate analysis which indicates that retail CRE is the segment that is most at risk in the current environment.

Table 5. Geographic relative CRE attractiveness index, 1Q18

	ATL	AUS	BAL	BOS	CHA	CHI	CNJ	COL	DAL	DEN	DET	FTL	FTW	HOU	LAN	LVG	MIN	NNJ
<b>Apartments</b>	110	56	89	103		123	72	83	50	82	79		129	89	114	97	55	146
<b>Offices</b>	122		99	104	81	95	63		87	127	128			23	85		140	137
<b>Retail</b>	135		79	99		74	136	110	63	83	97	91	173	100	100	97	124	

	OAK	ORL	PHI	PHO	PIT	RAL	SAC	SAN	SBR	SDG	SEA	SFR	SJS	SMD	STL	SVA	TSP	USM
<b>Apartments</b>	126	98	113	87				157	119	100	105	110		92		113	103	100
<b>Offices</b>	118		137	105	106		94			131	89	140	127	98	78	122		120
<b>Retail</b>	139	137	106	77		85	106	67	118	94	71			96	73	108	88	92

Less attractive  More attractive

100 = Relatively balanced market. Grey = Data not available

Source: BBVA Research

6: Dummy variable information available upon request

## Bottom Line

Using vacancy rates and economic fundamentals to model trend risk premiums contained in cap rates can help to identify markets that have a temporary imbalance between CRE incomes and prices in light of the markets' long-term economic fundamentals. This can help identify markets that are more or less attractive for investors and lenders. Using this approach on cap rate data provided by REIS, opportunities appear for investments in apartments in San Antonio, offices in San Francisco and Minneapolis and retail in Fort Worth, as well as potential red flags when it comes to apartments and retail in Dallas and offices in Houston. However, there are idiosyncratic factors that have to be taken into consideration, such as commodity prices or foreign trade trends, which may support an unattractive market or weaken one that may seem strong. Moreover, conditions related to specific CRE properties vary significantly, as every property is subject to a myriad of local factors that professionals take into account when determining property specific prices and attractiveness. Nonetheless, this analysis is helpful to provide an attractiveness perspective on CRE segments across major metro areas in the U.S.

## Acronyms

ATL	Atlanta	DEN	Denver	OAK	Oakland	SDG	San Diego
AUS	Austin	DET	Detroit	ORL	Orlando	SEA	Seattle
BAL	Baltimore	FTL	Ft. Lauderdale	PHI	Philadelphia	SFR	San Francisco
BOS	Boston	FTW	Ft. Worth	PHO	Phoenix	SJS	San Jose
CHA	Charlotte	HOU	Houston	PIT	Pittsburgh	SMD	Suburban Maryland
CHI	Chicago	LAN	Los Angeles	RAL	Raleigh	STL	St. Louis
CNJ	Central New Jersey	LVG	Las Vegas	SAC	Sacramento	SVA	Suburban Virginia
COL	Columbus	MIN	Minneapolis	SAN	San Antonio	TSP	Tampa-St. Petersburg
DAL	Dallas	NNJ	Northern New Jersey	SBR	San Bernardino	USM	U.S. Metro

## Bibliography

Florance, A. et al. (2010). *Slicing, Dicing, and Scoping the Size of the U.S. Commercial Real Estate Market*. Journal of Real Estate Portfolio Management. Vol. 16, No. 2, 2010

Savills. (2016). *Around the world in Dollars and Cents*. <https://goo.gl/pBAMs4>

Chervachidze, S. and Wheaton, W. (2011). *What Determined the Great Cap Rate Compression of 2000–2007, and the Dramatic Reversal During the 2008–2009 Financial Crisis?* The Journal of Real Estate Finance and Economics 2/2013

## DISCLAIMER

This document was prepared by Banco Bilbao Vizcaya Argentaria's (BBVA) BBVA Research U.S. on behalf of itself and its affiliated companies (each BBVA Group Company) for distribution in the United States and the rest of the world and is provided for information purposes only. Within the US, BBVA operates primarily through its subsidiary Compass Bank. The information, opinions, estimates and forecasts contained herein refer to the specific date and are subject to changes without notice due to market fluctuations. The information, opinions, estimates and forecasts contained in this document have been gathered or obtained from public sources, believed to be correct by the Company concerning their accuracy, completeness, and/or correctness. This document is not an offer to sell or a solicitation to acquire or dispose of an interest in securities.