Hedging Real Estate Equity Portfolios

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Commercial real estate derivatives used for hedging strategies usually have national aggregate indices as the underlying asset, which is in most cases the IPD in the United Kingdom or the NPI in the United States. This paper demonstrates that, despite the big correlation between different property types returns, or distinct regions returns, and nation-wide returns, national aggregates do not constitute a good hedge when using real estate derivates to hedge real estate equity portfolios. Moreover, basket options of indices on multiple property types, or regions, are proposed as an alternative for an appropriate hedge and its pricing model is suggested using a non-arbitrage approach.

Keywords: real estate derivatives; basis risk; portfolio hedging

Hedging commercial real estate equity portfolios has many complexities involved and there is not a unique way to approach this challenge. Although investment managers have organic tools to manage their risks, such as property type or geographical diversification, as well as property level financial liquidity and debt management, there is still an open exposure to systemic risks that cannot be addressed with these tools. For instance, a core-equity hospitality private fund exposed to high room vacancy and low average daily rates due to an economic recession (as seen with the recent COVID-19 pandemic), has limited organic tools to hedge systemic risk since diversifying with other asset classes requires huge amounts of capital (and changing the portfolio strategy), while selling the assets to buy them back again after the crisis, implies a lot of transactional costs that may wipe out any profits. Therefore, the portfolio or asset manager would have to assume losses while the macroeconomic effect vanishes.

A sound alternative would be to take a short position on a similar real estate portfolio, but this is not possible in private markets, and public markets are constrained due to liquidity problems (Bertin, Kofman, Michayluk, & Prather, 2005) i.e., short positions would affect prices rapidly making the hedge inefficient, and REITs high

dividend yield policy would be affected by systemic risks as well. A good substitute that has been widely proposed by academics - see for example (Fabozzi, Shiller, & Tunaru, 2020) - is the use of real estate derivatives like futures or forwards, plain vanilla options and total return swaps, with price indices as underlying assets, to hedge the real estate portfolio. These derivatives have been actually used since the 1990's and are commonly written on the IPD in the United Kingdom and on the NPI in the United States.

However, real estate derivatives lack of liquidity and volume. Even though there are exchange traded residential real estate derivatives, like the Case-Shiller Index futures traded at CME, commercial real estate derivatives are mostly traded OTC with no exchange alternatives in the US. There are multiple plausible reasons why the latter derivatives have not enough deepness in the market. One interesting study performed by (Yoon Lim & Zhang, 2006) interviewed investment managers and other investor on their use of real estate derivatives. Although the usefulness for hedging purposes of these financial products was recognized by most of them, they were cautious on using them because of their lack of liquidity, the lack of dealers in the marketplace and their lack of knowledge on how to price them. Even more, they recognized the importance of using regional property price indices rather than just nation-wide indices.

Therefore, real estate derivatives seem to satisfy an important role in the real estate public and private equity markets. They constitute the financial engineering approach to hedge systemic risks given that the natural way of hedging this asset class is idiosyncratic or face many constraints on the real estate equity markets. However, inefficiencies and the lack of an standardize methodology to price these derivatives limit their growth in financial markets. This paper contributes to the academic effort of creating a practical framework of structuring and pricing real estate derivatives, based on a pragmatic view of how to use them for hedging purposes. It shows that nation-wide indices, although

highly correlated with specific property type or regional indices, do not constitute a good hedge in the sense that basis risk is not properly covered. Therefore, basket options are proposed as an alternative, and the corresponding pricing model is presented. In consequence, the following section presents a review of related literature on the different frameworks of real estate pricing, as well as their use for hedging real estate equity portfolios. Thereafter, the methodology for measuring basis risk, determine whether is properly hedged or not by real estate derivatives, and the model for pricing plain vanilla options are thoroughly described. In the third part the data used for the empirical study is described, which in summary constitutes of NCREIF NPI and property type and regional sub-indices. The results and conclusions are presented in the two following sections.

Literature review

Paragraph:

Methodology

Measuring Basis Risk

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Pricing real estate derivatives

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Data

Paragraph:

Results

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Conclusions

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