

NBER WORKING PAPER SERIES

DERIVATIVES MARKETS FOR HOME PRICES

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Working Paper 13962

<http://www.nber.org/papers/w13962>

NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue

Cambridge, MA 02138

April 2008

An earlier version of this paper was presented at the Lincoln Institute of Land Policy conference "Housing and the Built Environment: Access, Finance, Policy," Cambridge MA, December 7 and 8, 2007. This paper will appear in a Lincoln Institute volume edited by Edward Glaeser and Jonathan Quigley. The author thanks David Blitzer, John Hartigan, Terry Loeb, Jonathan Reiss, Steve Rive, Aniket Ullal and Ronit Walny for helpful comments. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 13962
April 2008
JEL No. G13,R31

ABSTRACT

The establishment recently of risk management vehicles for home prices is described. The potential value of such vehicles, once they become established, is seen in consideration of the inefficiency of the market for single family homes. Institutional changes that might derive from the establishment of these new markets are described. An important reason for these beginnings of real estate derivative markets is the advance in home price index construction methods, notably the repeat sales method, that have appeared over the last twenty years. Psychological barriers to the full success of such markets are discussed.

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Derivatives Markets for Home Prices

The near absence of derivatives markets for real estate, particularly single family homes, is a striking anomaly that cries out for explanation and for actions to change the situation. In the U.S. alone, the value of real estate held by households is about \$20 trillion, which rivals the stock market. And yet the kinds of derivative instruments available for real estate are miniscule compared to those of stocks.

The proper hedging of real estate risks is of the utmost importance. Risk management theory never said that only stock and bond risks should be managed. All economic risks should be managed. There are many kinds of economic risks that are not managed, and real estate risk is high on the list. The recent “subprime crisis” might be described as the result of failure to manage risks properly. Recent research by Karl Case and John Quigley [2007] shows that repercussions of recent and projected home price falls through the financial markets are far more important than the direct wealth effects on the economy. If any factor will push the U.S. economy into recession in 2008, it will be the financial repercussions of the housing decline. The repercussions of major changes in real estate prices go far beyond the risk of recession, since they impinge on the well being of hundreds of millions of people who are often locked into highly-mortgage-leveraged positions in their individual homes.

Beginnings of Derivative Markets

Case and I have been working and thinking about real estate risk and how it might better managed for nearly twenty years. We effectively began our public advocacy for real estate futures markets in our 1989 paper on the efficiency of the market for single family homes. In that paper, we showed that well-constructed repeat-sales home price can accurately capture trends in the real estate market (more on this in the next section). The paper also found that these repeat-sales indices, which are not subject to the noise caused by change in mix of sales that previous indices were, are very autocorrelated and forecastable, with a forecast R-squared at a one-year horizon of about a half. We attributed this forecastability to the profound illiquidity of the market. Much subsequent research, for example Glaeser and Gyourko [2006], or Gyourko Mayer and Sinai [2006], confirms the inefficiency of the market for homes.

Professional investors find it very costly to trade in this market, and very costly to maintain an inventory of homes as investments. Thus, they cannot take advantage of the forecastability of home prices and cannot take actions that would enforce the efficiency of the market. The problem has been the total absence of derivative markets for real estate prices. Mortgages have extensive derivative markets, but there have been, until very recently, no derivative markets at all tied to real estate prices. If such markets could be created, they might ultimately lead towards more liquidity in the cash markets. Thus began our mission to create just such markets.

We thought that if a liquid futures market (or another kind of derivative market) could be established for single family homes, it might provide the financial infrastructure to bring forth a number of new financial instruments. I later described some of these in

my 1993 book *Macro Markets*: home equity insurance, down payment insurance on home mortgages, or price warranties on new homes, and it might allow the rationalization of a number of businesses. Some of these institutions have since been put in place (see for example William Goetzmann *et al.* 2007), but their success has been limited by the absence of hedging markets

Karl Case, Allan Weiss and I began our campaign to launch futures markets on single family homes in 1990. We named ourselves the “Index Research Group,” but by June we were “Case Shiller Weiss Research Group.” We presented our idea at the Coffee Sugar and Cocoa Exchange (which had previously launched the innovative, but ultimately unsuccessful consumer price index futures market) in August 1990, the Chicago Board of Trade in November 1990. In November 1991, we, along with partner Charles Longfield, created Case Shiller Weiss, Inc, a firm whose sole purpose then was to produce home price indices designed expressly to settle financial contracts. The discussions with the Chicago Board of Trade led to an alliance of our firm with the Chicago Board of Trade to study the possibility of launching home price futures.

The Board did a telephone survey in 1993 of potential traders. They concluded that they found people willing to sell real estate futures, but no one willing to buy. So, they became reluctant to try to launch the products then. We tried to argue with them that it is probably easier to discover short interest than long interest in a prospective new market, for the short interest are those people who own real estate and have a hedging need, while for the long interest it is those people who want merely to add real estate to their investment portfolios, and they cannot feel any particular interest in investing in the contracts until they know what the price is and how it relates to other investment returns.

However, despite our arguments, ultimately the Board decided not to try launching the market.

The London Futures and Options Exchange, London Fox, beat us to the market, though not as competitors since they launched in a different country. They launched their property futures market in 1991. They attempted to create futures markets for both single-family homes and also commercial real estate. However, in the few months over which these markets were open, there was little trade. The rapid demise of these markets was not due directly to the low volume, but to efforts to pad the volume. Traders were doing wash trades to pad the volume numbers, and when this fact was discovered, the markets were shut down in a scandal. People I spoke to in London in 1991 expressed disappointment that this wash trading scandal had shut down the market before it had been open long enough to be given a real test. Indeed, the failure of this market did not prove anything about the ultimate viability of such markets, though it created a bad precedent, and slowed down the launch of our own markets by many years.

The beginnings of a worldwide boom in home prices in the late 1990s led to renewed interest in markets for home values. In the U.K., City Index launched a spread betting market in single family homes in 2001, and this was quickly followed by another spread betting market launched by IG Index in 2002. However, both these markets were shut down by 2004. Attempts have been made to reopen property spread betting markets in the United Kingdom. Cantor Index has launched spread betting on U.K. home prices (www.spreadfair.com).

Goldman Sachs opened a market in 2003 for covered warrants on UK home price indices on the London Stock Exchange that were settled in terms of the Halifax home

price indices. However, as of 2004, the open interest was very small, roughly the amount that one would expect if only 100 houses were hedged. It has seemed hard to get hedging markets started for real estate.

Hedgestreet.com created markets for single family homes, among other markets, in 2004, on a dedicated web site aimed at consumers. The site allowed trading in “hedgelets” which were in effect \$10 bets on the direction of home prices, bets which could be used (if very many such bets were made by one homeowner) to hedge movements in home prices. It was thought by the founder, John Nafeh, that people would use these hedgelets to help insulate them from economic risks. However, the site was not a success, and trading has been shut down and replaced with mock trading only.

In May 2006 the Chicago Mercantile Exchange (now the CME Group, after the 2007 merger with the Chicago Board of Trade), in collaboration with the firm MacroMarkets LLC that Allan Weiss, Sam Mauscci and I founded, launched futures and options markets on the home price indices that Case and I pioneered, now called the Standard and Poor’s/Case-Shiller Home Price Indices. These indices are produced by Fiserv, Inc., the company that purchased Case Shiller Weiss, Inc. in 2002 and continues to produce the thousands of Case-Shiller home price indices by county, zip code, and price tier. Futures contracts, with a February quarterly cycle of expiration dates and settled at \$250 times the index were launched for ten U.S. cities and an aggregate index. This market has been much more successful and credible than its predecessors. The total notional value of futures and options traded since inception is \$612 million through November 21, 2007. There continue to be substantial trades, for example, in the week November 5-9, 2007, a notional value of \$2,782,600 was traded. However, the futures

open interest in the ten contracts together, which peaked at \$109 million in February 2007, has fallen with each contract expiration, and stood at \$49 million as of November 21, 2007. Between contract expirations the open interest has been growing at a good rate: open interest grew at a steady rate, cumulating to a 39% increase in the three months since the August 31 2007 expiration, so there are some signs of hope for growth of these contracts. The longer maturities (from one year to five years) that were added in September 2007 may enhance the product's utility.

There have also been new markets for commercial real estate. In London, the Investment Property Databank (IPD) has begun to be used for derivative products, for which the global notional outstanding value of property derivatives trades has reached £11.5 billion.² A swaps market for real estate has begun to develop in the United States. A company called Radar Logic in the United States has found some success in creating home price derivatives for single family homes with its RPX index, based on the median of a maximum likelihood estimate of the distribution of all home prices sold in the time period per square foot of floor space, existing, new, condominium.

On November 2, 2007 the Chicago Mercantile Exchange announced that it was expanding its suite of real estate indices to include the S&P/GRA Commercial Real Estate Indices, which are a joint venture of Standard & Poor's and Global Real Analytics/Charles Schwab Investment Management, the indices spearheaded by Robert Edelstein. The S&P/GRA index is not a repeat sales index, since the authors conclude that there are too few sales of commercial real estate for such a method.³ Their method

² "Property Derivatives Market Ready to Explode," Dow Jones Financial News Online, 23 November 2007.

³ However, David Geltner and Henry Pollakowski of MIT and the company REAL have recently partnered with Moody's to produce commercial real estate indices, announced in October 2007, see Geltner and Pollakowski [2007].

uses weighted average transaction prices per square foot, and indices are traded for five major U. S. regions: Northeast, Mid-Atlantic South, Midwest, Desert Mountain and Pacific West and four property sectors, apartments, office, retail and warehouse. Listings for futures contracts for all nine of these contracts and for horizons out as far as five years were posted on October 29, 2007, but trade of these indices has not yet begun.

Repeat Sales Indices

The most important innovation to make real estate derivatives markets possible has been advances in index technology, notably the advance of electronic technology for recording home sales prices and the invention and development of repeat sales home price indices. The repeat sales indices are the natural extension of existing stock price indices, like the S&P 500. The changes through time in the S&P 500 index are based on changes in the price of individual stocks. If individual stock prices don't change, then the index does not change.

The S&P500 index level does not go up if there is a higher volume of sales in higher-priced stocks, it is expressly designed so that volume of sales of the individual stocks does not affect the index, only the changes in their prices do. However, for real estate, the nontrading problem (the problem that a property of share is not traded at all for some time) is much more severe, and requires explicit attention.

Karl Case had an important insight in his 1986 paper: the repeat sales method allows us to construct home price indices that controlled for quality change in an objective and systematic way. He independently rediscovered the repeat sales (or repeated measures) price index method, which was previously described by Wyngarten

[1927], Wenzlick [1952], and Bailey Muth and Nourse [1963]. The repeat sales method was not received with any enthusiasm when proposed by these authors. As far as we know, no ongoing effort to produce repeat sales home price effort was ever launched before we did that. But Case convinced me that the repeat sales method was essential, and thus the natural method for index number construction, as we I will expand on here.

The repeat sales method was criticized by Mark and Goldberg [1984] as throwing away too much data, since only homes for which sales prices at two different dates can be used. With hedonic methods, in contrast, every single sales observation can be used as an input to the index. It may sound from this that hedonic methods have an advantage, but, with the exception of cases where data are very sparse or there is a reason to think that repeat sales are highly unrepresentative, that is not the case.

I remember Case convincing me that for the purpose of creating indexes for settlement of financial contracts, the repeat sales method is the only way to go. He maintained that he could make a price index do anything you might want by choosing hedonic variables to that end. The problem is that there are too many possible hedonic variables that might be included, and if there are n possible hedonic variables, then there are n -factorial possible lists of independent variables in a hedonic regression, often a very large number. One could strategically vary the list of included variables until one found the results one wanted. Looking at different hedonic indices for the same city, I remember seeing substantial differences, which must be due to choices the constructors made. Thus, the indices have the appearance of hypotheses rather than objective facts. One is reminded of Ed Leamer's paper, "Let's Take the Con out of Econometrics," when

he remarked on the multitude of tricks that econometricians use to get the results they want, and what they sometimes seem to want is just to come up with a different result. .

Hedonic variables can come into significance in a regression for spurious reasons. For example, it has been reported that a dummy for air conditioning in hedonic regressions explaining home prices sometimes has the wrong sign, allegedly in at least one instance because houses on the shore where there are cool breezes were less likely to have air conditioning, and also be more valuable since they are on the shore. Thus, if air conditioning becomes more common over the years, a price index based on hedonic regression that includes the air conditioning dummy but excludes a variable representing proximity to shore could show a spurious downtrend in price. If an econometrician wanted to score points by contradicting earlier indices, a search over the set of all possible hedonic regressors for the right combination of regressors might well achieve this. This can leave the public confidence in the indices in disarray, by creating an impression that no one knows what home prices are doing.

As I argued in my book *Macro Markets* [1993], one may think of the repeat sales home price index method as a hedonic regression where there is one dummy hedonic variable for each house, and no other hedonic variables. That is, we can think of the repeat sales regression method as taking each sales price as an observation for the dependent variable (so that the number of observations equals the number of all single sales, whether in pairs or not) and using as independent variables as complete set of time dummies (one for each time period) and a complete set of house dummies (one for each house, the i th dummy being 1 only if the sale represents the i th house). Any house that is sold only once is in effect “dummied out” in such a regression and has no effect on the

results. In that sense, we are not throwing away data by using repeat sales methods; we are using all the data with a very complete set of hedonic variables that is defined in a systematic way that eliminates all possible discretion in choosing hedonic variables.

Square foot of property is just an example of one hedonic variable, and taking some as an index some indicator of price per square foot is in effect running a hedonic regression and constraining the coefficient of this variable to be one and the constant term to be zero, so that no regression need be calculated at all. There are so many other hedonic variables, including for example square foot of lot, quality of neighborhood, etc., that the price per square foot alone is only one of very many quality measures. The constant term in a hedonic regression of price on square feet of floor space will certainly have a nonzero constant term, which differs across neighborhoods and property types.

It is very important to get the index number construction method right when one starts trading real estate derivatives. One anomalous reading from an index that has inadequate controls for quality mix could cost traders millions of dollars and could create bad feeling for the entire concept of real estate derivatives.

As an exercise, to add some perspective on the potential importance of repeat sales, I computed a monthly volume-weighted median price of the 500 stocks that comprise the S&P 500 index, January 2003 to December 2007. I used twelve-month average volume of sales for each stock as the weight of its price in calculating the median. This is doing something analogous to what the National Association of Realtors does when it computes the median price of existing homes. In contrast, S&P takes careful account of the changing number of shares outstanding for each stock, and, when stocks are added or removed from the index, the divisor is adjusted appropriately so that there is

no sudden spurious jump in the index. But for this exercise, I dispensed with a divisor altogether, and let the sales volume for each stock determine the weight it got in the index. The National Association of Realtors of course has no divisor since it takes no account of changes in the mix of homes, and makes no other adjustments for possible jumps in the index caused by sudden changes in the mix of sales. The resultant stock price index that I got looks quite different from the S&P 500. The correlation coefficient between the monthly changes in the volume-weighted median and the change in the S&P 500 was only 0.38. Moreover, the standard deviation of the monthly percentage change in the volume-weighted median was over twice as high as that of the S&P 500.

This exercise with the 500 stocks in the S&P 500 index has, to my knowledge, not been tried before. Apparently no one would choose a volume-weighted stock price index if they had their a choice, so no one does it, and all stock price indices are repeat-sales indices. (Volume weighted indices have been used for special purposes, for example, in constructing measures of the mispricing of options, volume-weighting has been used so that mispricing of insignificantly-traded options does not overly affect the measure of mispricing. The volume-weighted stock price has also been used in studies of transaction costs.)

Repeat sales methods thus do not use new home prices. This is a potentially important advantage when compared with other indices that incorporate both new and existing home prices. A problem with including new home prices could at some times be severe: the median price of a new home in nature of the supply of new homes on the market changes through time, as market conditions change. If high quality houses in wealthy neighborhoods and with lots of land are selling well in good school districts at

some times, then new home prices will at those times be higher than usual, even if there is no change at all in the price of individual homes.

Between May 2006 and December 2007, the monthly ratio of new sales to existing sales (the former from U.S. Census, the latter from the National Association of Realtors) ranged between 10.4% to 18.2%, a significant variation. But, the fraction of sales constituting new sales is relatively low, and the difference in price (the median new home sales price only 10.5% higher on average) so that the weighting anomalies have not been large. The presence of new sales along with existing sales could, however, become an important problem in the future, if either the fraction of sales or the relative price of new homes varies a lot.

The problem with raw new home sales prices is that they are a virtually meaningless series, for they represent a price of a constantly changing thing. New homes are built in times and places where the market is strong, and hence are highly unrepresentative of home prices, even of newer home prices. Certainly, new homes will not be built at all in areas where home prices have declined far enough that price is below construction cost. Looking at median new home prices as an indicator of the market is like looking at the median price of a piece of fruit sold as an indicator of the fruit market, without regard for the fact that the varieties of fruit sold changes over time.

We can see other important changes in the mix of homes sold. According to the Massachusetts Association of Realtors, the fraction of Boston-area home sales that were condos rose from 26.3% in 1998 to 49.5% in 2005, a near-doubling of the fraction condos. Condos are very different from single-family homes, and if price is corrected for

square feet of floor space, may have a very different relation to square feet than do single-family homes, for, indeed, the latter has substantial land as well.

We of course do not have data on all dimensions of change in mix. But the data we do have suggests that change in mix can be very important, and should be dealt with carefully. The best method we have today to take account of change in mix is to use repeat sales indices, and we have also been producing repeat sales method separately for price tier (low, medium or high-priced homes) and property type (single-family or condo) and anyone who wants a specific mix of these types had best use a weighted average of such repeat-sales indices.

Other Indices

Because of these problems, the Census Department has produced since 1964 a “Constant Quality (LaSpeyres) Price Index of New One-Family Homes Under Construction.” The correlation between the monthly change in their median new home price and the monthly change in their Constant Quality Index May 2006-December 2007 has been only 0.11. This figure is surprisingly low, and indicates the sharp changes in mix that occur month to month. It is remarkable that the news media seem to accept the latest median new home price number, and largely ignore the Constant Quality Index, when the former is so heavily driven by what must be just noise.

In the current (2005) incarnation of the Constant Quality index, Census uses, in addition to the average square feet of floor area of the house, also the log of square feet, and 49 other variables that indicate quality and geographical location. They use census region, construction method, exterior wall material, heating system and air conditioning

form, parking facilities, finished basement, number of bathrooms, number of fireplaces, etc. It is unlikely, however, that even with all these variables, that they can really get a price of a constant quality new house, because change is the essence of new houses, as they are built in the precise micro-geographical- area and with precise features that represent current buyer interests.

A repeat-sales index such as the Case-Shiller index solves all these problems by following individual homes through time. We could also add to a repeat sales regression additional hedonic variables, so long as these variables change over time for individual houses, otherwise there would be multicollinearity. I called such a regression a hedonic-repeated-measures regression, 1993.⁴ However, any such method is inherently tied to taking account of important hedonic variables that change through time for an individual house, and we do not have good candidates for such variables at the present time.

There are other directions toward which repeat sales indices could be improved. Childs, Ott and Riddiough [2002] have shown a method that deals with noise in asset prices that creates a time-filtered value that takes account of autocorrelation. Genesove and Mayer have shown a regression method that corrects equilibrium home prices for bias from homeowners holding out for a better price. Bradford Case and John Quigley [1991] have shown a different way of combining hedonic and repeat sales methodology. The index methodology is something that may be changed somewhat in the future to reflect better methodology, though we need to be conservative in our adjustment of methods if we are to maintain trust of the market, and wary of any methods that might involve judgment or the possibility of manipulation.

⁴ Bradford Case and John Quigley proposed a different way of combining repeat sales and hedonic methods.

Of course we have to throw away data if we want to measure some theoretical quantity accurately. That is what futures markets in fact systematically do when they narrowly define the kind of commodity that may be delivered in fulfillment of a futures contract. In wheat futures, for example, one may be required to deliver hard winter wheat, of a certain kind and quality, and cannot substitute soft summer wheat for delivery. The futures exchanges make these rules for they know that if they did otherwise the price of the wheat delivered would be erratic, for at some times one kind of wheat would be delivered and at other times another grade would be.

A Regret Theory Approach to Understanding Obstacles to Hedging Real Estate Prices

The UK spread betting markets were shut down just at the time that home prices in the United Kingdom had begun to fall in 2004 after a huge boom. In December 2004 I talked to John Austin, who was manager of the property spread betting at IG Index, and inquired why they had shut down the market. He said “We’re only getting one-way sentiment.” He said that the volume of trade was rapidly falling off, and that it was as if everyone had the same opinion about the UK housing market, that it would decline, and hence there was no basis for trade. This view would be rather ironic, for in fact the UK property market had a remarkable turn of fortune and prices began to increase rapidly again starting in 2005.

But it seems that Austin was trying to say to me that people who might have traded were of two views, there were people who hoped to take short positions in a non-backwardated market, and people who hoped to take long positions in a backwardated market. But there were few crossings of orders, so little trade.

I also asked him why he thought there was relatively little volume in these bets even before the drop in home prices, for, when they launched these contracts, the market in the U.K. was rising. Wouldn't one think that in a time of such attention to housing market conditions that a substantial number of people would want to hedge their homes? He said that they had never promoted spread betting as a hedging device, and that virtually all of their customers were in it for sport or amusement, not hedging.

Note that the theory he presented for the relatively low volume of the IG Index property spread betting market is analogous to that which is often used to describe the tendency of volume of sales on the housing market itself to decline in times of falling prices. The oft-cited theory is that home owners are reluctant to realize a loss on their house, and so hold out trying to wait until the market provides them with the profit that they want. They simply regret having bought at a high price, and wish to avoid the pain of regret by avoiding selling. Regret theory [Loomis and Sugden, 1982] can model this behavior, and the Prospect Theory of Kahneman and Tversky [1979] yields similar implications.

Genesove and Mayer showed, with data on Boston condominium sales, that indeed those home owners who bought when home prices were higher than currently held out longer than did home owners who bought when prices were lower. It appears that there is a pain of regret at selling at a loss, and so people take steps to avoid this pain even if it means not selling the property for a long time. Psychologists have documented that pain of regret is actively avoided, even if the means to do so represent deliberate self deception.

Case and I have been doing surveys of recent home buyers and sellers and asked those who had had trouble selling their house, why they did not lower their price:

23n. If your property did not sell, presumably it might have if you had lowered the asking price more. If you considered doing so but decided not to, can you say why?

1. My house is worth more than people seem to be willing to pay right now
2. I can't afford to sell at a lower price
3. By holding out, I will be able to get more later
4. I didn't want to pay off my low rate mortgage
5. Other: _____

In our 2007 survey, only 27 of our 300 respondents reported having had trouble selling their prior house and chose to answer this question. But, for what this is worth, a third of them picked 1, and a third of them picked 2, 11% picked 3, 0% picked 4 and 22% picked 5. Two thirds of them picked 1 and 2, answers which would appear to be consistent with the regret theory, and only 11% picked three, which would be a purely rational economic motivation.

Psychologists say that the pain of regret is something that people like to avoid. If they have made a mistake that has lost them money, they don't want to think about it.

In a down market, such as in London in 2004, it is now clear that owners of real estate are going to lose substantially, because of the inertial nature of housing markets. One has already lost the expected amount of the loss, in effect, if one is not going to sell the property, and it will be painful to watch. Therefore, the natural hedgers would like to tune out and just forget about it.

Suppose the London market is expected to lose 10% over the next year. That is already a given. A hedger, however, is supposed to be wanting to hedge against the risk that it will go down 20%. So, the hedger sells a futures contract. If the price of the house goes down 20%, he is rewarded by the futures contract, so that his total loss (on his

house) is only 10%. But, on the other side, if home prices don't go down at all, then he still loses 10%.

Maybe that is what John Austin was discovering. If he lowers the price so far that it would mean that a hedger would lose if prices drop only 5%, they just don't want to think about that.

Kahneman and Tversky, the authors of prospect theory, say that people are risk lovers for losses, that they willing to take big risks to try to get off scot-free, with no loss. If you take a short futures contract on real estate in a down market, you eliminate the possibility of getting off scot-free. So, perhaps that is why people don't want to do it. They don't want to face up to the fact that they have lost money.

The reason property is so different from other markets is that it must sometimes take deep discounts because there are expectations of big price change. Other markets for liquid assets are nearly random walks. Oil is an example of an existing futures market that may more closely resemble the futures market for housing. The Nymex futures market for light sweet crude oil has been in backwardation about half the time.

A Lack of Hedging Demand Theory for the Slowness of Real Estate Derivatives to Develop

Another theory has been proposed to explain the relative lack of success of hedging markets for real estate: that owner occupants, if not other investors, are self hedged, and hence do not need to hedge their risks. In its simplest form, the argument is that people generally expect to live in a house forever, and so if they will never sell their property, the price it attains in the market is irrelevant to them. If that is the case, then

hedging their home price risks might actually *create* problems, rather than solve them, for should home prices rise, then a homeowner who had shorted the market would have to come up with money to pay on the risk-management contract.

Sinai and Souleles argued that for owner occupants, purchasing a home may be a way of hedging volatility of rent risk. They showed evidence that in cities with more volatile rent, homeownership rates are slightly higher. It is indeed plausible that one motive for owning a home could be to hedge rent risk.

Even if there is a self-hedging aspect to holding real estate, it is certainly not the case that every owner occupant is at the optimal exposure to real estate risk. There are lots of special situations. Some people are nearing retirement and planning to leave the housing market, and may be worried about the amount of resources that will be available to them in retirement. Some are counting on reverse mortgages to sustain them in retirement, and are worried about the amount that they can get. Some people are living in a volatile geographic area and contemplating moving to another area. Some are contemplating moving to a volatile area. Some are renting and hoping to buy soon. Some are owning and planning to trade up soon. Some are owning second or third homes that they are fixing up, and they are wishing to use their skills in fixing up homes, not their skills in predicting the real estate market. Some work in the construction industry, and see their exposure to the housing market increased beyond that of the exposure through their home. Some are concerned about a possible fall in the real estate market wiping out their home equity and making it impossible for them to sell and move, and making it impossible to borrow against their home.

And, of course, owner occupants are hardly the only players in the single-family home market. There are professionals in real estate: builders, electricians, plumbers, whose fortunes depend on real estate. And there are the portfolio managers, including hedge funds, who have in effect leveraged positions in housing because of their strategy in the market for RMBS or CDOs. And there are the mortgage insurers and the GSEs who guarantee mortgages, who are vulnerable to changes in home prices. Defaults on mortgages may be thought of as exercises on options, and these options become in the money when home prices fall. Home prices thus explain a substantial portion of mortgage defaults (Deng, Quigley and Van Order 2000, Case and Shiller 1996].

The Prospects for Real Estate Derivatives

I do not believe that either of these theories, the regret theory or the lack of hedging need theory, are the primary reason for the slowness of growth of the derivative markets for real estate.

The regret theory just does not seem powerful enough to be a long-term obstacle to hedging of housing market risk. In a time of a housing downturn, the decline in volume of sales in the cash market for homes is typically no more than 40%. If we applied that ratio to the volume of trade in single-family home derivatives in the present market, it would suggest that there still should be a huge market.

Moreover, the lack of hedging need theory also does not seem powerful enough. Given all the special reasons discussed in the preceding section that different people have different feelings that they are over- or under-exposed to real estate risk, it is inconceivable that there would be no interest in hedging real estate risk. This is especially

so at the present time, when talk about the real estate market is everywhere, when a “subprime crisis” related fundamentally to the real estate market is described as the biggest risk facing the national economy. I think that the problem is rather more the problems that are inherent in getting any new markets started, problems that are heightened when the new market is very unusual.

The principal problem, as I see it, in the CME futures market is that it just does not have enough liquidity. I spoke to institutional investors who considered placing substantial orders on our CME futures contracts. But, these people reported to me that they saw relatively large bid-asked spreads and only small positions offered. One of them told me that, upon looking at the book, he decided to wait a year and look again. The greatest problem here is the dearth of market makers committed to the CME futures, and capital market hiccups this year have not been exactly conducive to institutions assuming and trading new exposures.

Starting a new market is like opening a nightclub. Lots of people will want to come if lots of people are there. But, if few people are there, few people want to come. Somehow, nightclubs do get started. So too, do real estate futures markets, but it will take time. The liquidity of the futures and options markets may be enhanced as other derivatives, such as index-linked notes, forwards and swaps take hold.

Given the current lack of liquidity in the backwardated futures markets, the regret theory explanation of low volume of trade effect may be amplified at the present time. With little liquidity, the prices in these markets are not regarded as authoritative; they do not form a standard of value that is widely cited. Hence, people do not see the loss predicted in these market as a sunk cost, they do not view these as givens. They may

think at the present time that they can avoid the pain of regret by choosing to ignore them.

The lack of liquidity in the current markets may also amplify the willingness of people to neglect their hedging demands, and to imagine that they are doing enough to hedge their real estate risks. If one can do nothing to hedge one's real estate risks, then one spends very little time developing one's thinking about these risks. After the risks become hedgeable, only then will thinking about the need for hedging develop, and only then will expertise on how to hedge these risks be promulgated.

Once liquidity develops further in the real estate hedging markets, we might expect to see less of a problem from regret, and more of a willingness of investors to think hard about how they should be hedging their real estate risks. At that point, we may hope to see derivative markets for real estate to come into their full flower.

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