

Index-Based Futures and Options Markets in Real Estate

A big future for real estate in institutional portfolios, if...

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Residential real estate and land in the United States account for about half of the national wealth. If we include also commercial real estate, we have the bulk of the national wealth.¹ The same is true in many other countries. Yet, at the time this is written, futures and options markets devoted to real estate, or index-based over-the-counter derivative real estate markets, are nowhere in operation.

A futures contract on real estate prices in the United Kingdom was initiated by the London Futures and Options Exchange (London Fox) in May 1991, but trading in this contract was suspended in October 1991, following news that the exchange had artificially supported trading volume. Now no price-index-based real estate futures contract exists in the world, nor are there good substitutes for such markets.

Futures and options markets should be established that are cash-settled on the basis of indexes of real estate prices, and there should be separate markets for each of the major geographic regions and for each of the major kinds of real estate: residential, commercial, and agricultural land. Index-based over-the-counter derivative markets in real estate are another worthwhile idea; these markets will allow more contract diversity and will augment and broaden the activities of the futures and options markets.

If all these index-based real estate markets came to be established and were liquid, institutional investors might often choose to put most of their portfolio, in effect, in such markets. Their clients would thereby enjoy better portfolio diversification. Individual and corporate owners of real estate could then hedge away most of the real estate risk that they bear, risk that has

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caused them enormous concern and trepidation in past years. That risk would be more efficiently borne by large institutional investors that can diversify over many regions and types of real estate, as well as over financial assets.

Nowhere in the world today are there markets that allow investors to invest in a widely diversified portfolio of real estate without incurring enormous transaction costs. Because they cannot invest in a widely diversified portfolio of real estate, they cannot invest in a truly diversified portfolio at all. The presumed diversification that is supposed to be practiced by all investors according to modern financial theory just isn't happening.

Nor are there markets that allow individuals and institutions with large exposure to specific real estate risk to hedge these risks. People for various reasons usually prefer to own their own homes, rather than rent them, and firms usually prefer to own real estate that they use in connection with their operations. But they cannot easily hedge the risk of these holdings.

In order to hedge their portfolio, these owners of real estate should go short in index-based real estate derivatives that are closely correlated with the real estate that they live in or operate. At the same time, everyone should invest in a broad portfolio of these real estate derivatives, which they can do by holding a portfolio of the opposite sides of the futures, options, forwards, and swaps contracts that those who own real estate concentrated in a certain area undertake.

The long sides of any given index-based derivatives real estate contract would be taken by a wide spectrum of investors, presumably primarily institutional, who invest in many contracts as a means of diversifying their portfolios. The short side would be taken by owners of region-specific real estate: individual homeowners, managers of rental properties, developers, corporations, and farmers.

The establishment of real estate futures and options contracts could spectacularly lower transaction costs for trading in real estate. The modern theory of transaction costs (see, for example, Demsetz [1968], Akerlof [1970], Gammill and Pérol [1989], and Gorton and Pennacchi [1991]) stresses the importance of superior or inside information. Dealers must announce bid-asked spreads wide enough that they are not routinely "picked off" by more informed traders. Baskets of corporate stocks and other financial assets are inherently subject to lower bid-asked spreads than

are individual assets, because there is less informed trading in the aggregates.

The same would be true for the baskets of real estate on which an index used to settle real estate futures and options contracts would be based. Those who invest in real estate could be spared the concern that they are buying lemons by spreading the enormous costs and risks associated with buying individual properties.

EXISTING INVESTMENT AND HEDGING MEDIUMS

There have of course been previous institutional innovations that allow individuals and firms to invest in a broader portfolio of real estate than they could conveniently do by direct purchase of properties. And existing institutions offer some ways for real estate owners to hedge the risk of their real estate. Yet, no mechanism comes close to offering the investment and hedging capabilities that would characterize futures or options contracts, or well-designed index-based forwards or swaps.

Real estate investment companies grew out of an effort to provide a diversified portfolio of real estate. The idea of such a company dates back before the turn of the century: Old Dominion Land Corporation (New Jersey) was incorporated in 1880, Alliance Realty (New York) was incorporated in 1899.

There was an explosion of activity in real estate investment companies in the 1920s, and 1929 saw the establishment of the New York Real Estate Securities Exchange for the trading of stocks and bonds of real estate corporations. The exchange fell on hard times soon after, with the collapse of real estate securities prices, and the market was finally closed in 1941.

Real Estate Investment Trusts (REITs), created by an act of Congress in 1960, are a special form of real estate investment company with the ability to pass through profits without exposure to the corporate profits tax. As their shares are traded on exchanges, they have relatively liquid markets.

These investment companies allow individuals and institutions to invest in a broader portfolio of real estate than available through direct investment. They thus allow some benefits of portfolio diversification.

At the same time, they do not allow people to diversify their portfolios to include some important classes of properties, notably owner-occupied residen-

tial real estate, properties held by non-incorporated businesses, or land held by farmers. Only certain kinds of properties are suitable for holding by investment companies, and hence certain kinds of systematic risk are necessarily omitted.

REIT prices are substantially correlated with the prices of shares in the stock market. This fact is noted by Rabinowitz [1978], and is also apparent in data produced by the National Association of Real Estate Trusts (see Goetzmann and Ibbotson [1990]). Indeed, prices of real estate investment companies declined sharply in the crash of 1929, and the price of REITs declined sharply in the stock market debacle of 1973-1975 and the crash of 1987, while available data do not show any evidence of a sharp decline in real estate prices in any of those periods.²

This is evidence that the kinds of properties held in real estate investment companies are more like those held by other corporations. It is evidence that investors in REITs are not successfully diversifying their portfolios into a broad portfolio of real estate.

The existing real estate investment mediums might be used to hedge real estate risk. In principle, any owner of real estate in a given city could look for a real estate investing company whose holdings are mainly in that city, and hedge his or her risk by shorting stock in the company.

In practice, this will be very difficult to do. First, real estate investing companies rarely hold all their real estate in one city; one may have to pick a REIT that has substantial holdings elsewhere. Second, not many REITs are geographically concentrated, so the total number of shares in such REITs that are available for shorting is necessarily extremely small.

REITs are not geographically concentrated because those who create REITs do not have an incentive to create a hedging medium. Those who create hedging mediums can benefit only from the transaction fees that they receive when the medium is traded, but REITs are not the recipients, under current institutional arrangements, of these transaction fees. They are therefore promoted by their creators as investment, not hedging, mediums.

While some investors might short REITs as a means of hedging their risk in real estate, doing so is not an option for the great majority of owners of real estate. There are just not enough REIT shares available to short. Indeed, the total value of all qualified REITs in the United States in November 1991 was \$45.4

billion, or a fraction of 1% of the value of all real estate.³

Even if the quantity of REITs outstanding were greatly expanded, the shorting of shares in REITs could never be a means of hedging real estate risk for the majority of real estate owners, because the value of REIT shares outstanding is limited by the value of real estate *owned* by REITs. As we have already noted, most residential real estate is owner-occupied, and hence not eligible for REIT holding.

We need instead some other medium, which allows real estate owners to hedge the risk of their real estate while at the same time owning the real estate. What is needed is some market that stands *between* individual property owners and broader portfolio investors, allowing the portfolio investors to share the risk of the property without owning it. What is needed, inherently, are futures and options markets cash-settled on indexes of real estate prices.

HOME EQUITY INSURANCE

Homeowners' equity insurance could be offered by financial institutions that take out hedging positions in the index-based real estate derivative markets and then repackage these positions into financial products designed for homeowners. The insurance would most likely be underwritten by an insurance company and sold either by the mortgage bank at the time of home purchase or refinancing, or sold by an insurance agent who also sells traditional homeowners' insurance policies.

The policy benefits could be based on the actual loss as measured by the purchase price and later sale price of an individual's home, in which case any benefits would be paid at the time of sale. Alternatively, the policy benefits could be based on the index for the metropolitan or geographic area, in which case any benefits would be paid at regular intervals, such as once per year.

If the policy were based on an index, the policy would pay the homeowner the percentage drop in house prices in his or her area, as measured by the index, less a deductible, times the amount of insurance purchased. For example, when Ms. Homeowner buys a policy for \$100,000 worth of real estate with a 5% deductible, if prices drop 9% in her city, she receives the amount of the drop beyond 5%; payment in this case is 4% times \$100,000, for a total benefit of

\$4,000. If prices dropped less than 5%, she receives no benefit.

The benefits of the actual price scheme are that the homeowner is assured the maximum coverage of his or her particular home and runs no risk that the house value will move significantly differently from the index. This arrangement may also seem more natural to the homeowner because the coverage is based on events particular to the homeowner in the same way other types of insurance treat hospital stays, car accidents, and house fires.

There are several disadvantages of basing equity insurance benefits on the actual purchase and sale of the house. First, a person might be forced to sell the house in order to collect on the policy before it expires; otherwise there would be no price for the house on which to base settlement. Such forced sales of houses would be extremely inconvenient for homeowners, and the prospect of such sales could jeopardize the entire equity insurance market. (This disadvantage can be reduced somewhat if maturities of contracts are very distant.)

Second, the underwriting insurance company may be able to hedge only the entire metropolitan area traded on the house futures or options markets, which exposes the insurance company to the risk that homes protected under this policy could drop in value more than the index for the area. This may not be an unlikely event because of the problem of adverse selection; people who purchase this policy may know that they have a house in a deteriorating neighborhood, or a house built in an increasingly unpopular style or size, or that they paid too much for their house. These problems would be alleviated partially by a large deductible.

In addition, a moral hazard problem is created by settling the insurance policy on actual purchase and sale prices. Homeowners would have less incentive to maintain their homes and less incentive to sell them at the highest price.

For example, imagine that a homeowner buys her house at \$100,000 and has a 5% deductible policy. If her house actually drops 5% in value, she is indifferent between getting \$95,000 for it or any price below that, because the insurance company would make up the difference. This could be alleviated partially by creating a policy that pays only a percentage of the loss below the deductible.

Another problem with offering a policy on the

selling price of the house is that the homeowner may be tempted to sell the house in a non-arm's length transaction. For example, the homeowner could sell the house to her brother at a discount of 50% off the market value and collect a huge insurance benefit. This problem could be resolved partially by requiring a sale price close to the appraised value. The insurance company could also impose deterrents such as the company's right-of-first-refusal to purchase the house at the agreed-upon sale price. These solutions are only partial, and significantly complicate the terms of the policy.

Although there are advantages to basing insurance benefits on actual purchase and sale prices, we believe that the complications do not merit doing so. A better alternative is to base insurance benefits on the index of the homeowner's geographical or metropolitan area. The policy could be purchased at any time for a fixed period of coverage such as one, two, or three years. The policy would pay off only at the end of this period, not upon sale of the house. If a homeowner moves and wishes an early settlement, this could be arranged, less perhaps an early settlement fee.

Such a policy could be offered as a stand-alone product or bundled with a traditional mortgage. In the latter case, any insurance benefits would be paid to the mortgage holder to pay down the homeowner's mortgage. Such an arrangement could lower the credit risk for the mortgage holder by helping to maintain a constant loan-to-value ratio, and therefore result in a lower interest rate to the homeowner. Home equity insurance may prove particularly useful to lenders who wish to offer riskier second mortgages or equity lines of credit.

MORTGAGE INSURANCE AND DEFAULT RISK

Index-based real estate derivative markets may be an attractive complement to private or quasi-public mortgage insurance for holders of residential mortgages. Mortgage insurers themselves (MGIC, General Electric, PMI, etc.) may find hedging in such markets to be an attractive form of reinsurance.

Mortgage default can occur for a variety of reasons. Individual homeowners may find themselves unable to service their debt because of changed economic circumstances (divorce, unemployment, and so forth). Thus, defaults can occur randomly whether

EXHIBIT

Recent Housing Price Booms and Busts

Behavior of Median Price of Existing Houses (%)

Location	Time Period	Total Nominal Change	Annual Average Nominal Change	Annual Average Real Change
Booms				
San Francisco	1976-1980	106.9	19.9	9.3
Boston	1983-1987	114.5	20.6	17.7
New York	1983-1987	108.4	20.2	16.9
Washington, D.C.	1986-1988	30.4	14.2	10.2
San Francisco	1987-1989	53.2	23.8	19.1
Honolulu	1987-1990	101.6	26.3	21.2
Seattle	1988-1990	63.3	27.7	22.3
Busts				
Houston	1985-1987	-25.5	-12.0	-14.6
Oklahoma City	1986-1989	-22.2	-8.7	-12.2
New York	1988-1991	-14.2	-5.4	-10.1
Boston	1989-1991	-14.0	-8.3	-13.5

Sources: National Association of Realtors (median price) and U.S. Bureau of Labor Statistics (CPI-U).

or not property values change. As long as the equity in a property exceeds the unpaid balance of the mortgage plus the transaction costs of foreclosing and liquidating it, no loss is incurred by the mortgage holder or the insurer upon default.

Thus, in rising or even flat real estate markets, mortgage portfolios and insurers are insulated from all but truly random risk. Losses will, of course, occur when the value of an individual property that has not been maintained falls below the value of the secured debt.

Much larger and more systematic risk to mortgage portfolios and insurers occurs when real estate markets as a whole decline in value. The probability of default increases substantially during such periods, and losses will be incurred on foreclosure even of maintained properties.

In some states (such as Texas), there is no recourse for mortgage holders other than foreclosure. Where no recourse exists, homeowners would be expected to walk away from a mortgage whenever the unpaid balance exceeded current market value. Even in recourse states, the probability of losses rises when values fall because the mortgage will be the first obligation for a homeowner to default on, with no equity to protect. In addition, mortgage holders and insurers

generally fail to exercise recourse because of very high transaction costs.

Mortgage holders can easily insure themselves against the risk associated with interest rate movements. Mortgage insurance provides a convenient but fairly costly way of insuring against the risk associated with higher-risk individual borrowers or higher-risk individual properties. But there is currently no way of insuring against the very large risks associated with movements in general market prices.

If the risk of losses on foreclosure to a mortgage holder or an insurer were truly random across individuals, they would indeed be holding widely diversified portfolios. But in fact, it is well-known that residential real estate prices move regionally, and that regional markets are relatively independent. The boom/bust cycles in the Northeast, the Southeast, and California occurred on very different timetables.

The behavior of home prices during regional boom/bust cycles also increases the systematic regional component of risk to mortgage holders and insurers. Prices tend to rise rapidly during booms, but are generally sticky when fundamentals would predict a decline (see Case and Shiller [1987, 1988, and 1989]). When decline finally occurs, that means that there were large numbers of transactions at or near peak prices.

For example, in Boston, prior to the recent sharp declines, peak prices held for nearly three years.

PRICE VARIABILITY AND REGIONAL CONTRACTS

There is substantial price variability through time in real estate, and there is sufficient variability across cities that there is room for a number of different city-specific futures and options markets.

Regionwide price cycles have clearly dominated housing price behavior in the last several decades, and those cycles have broadened in range over this period, as the Exhibit shows. While the first major California boom of 1976–1980 was a dramatic event, in real terms it was surpassed by what was to follow. The Boston and New York booms were similar to each other in magnitude, with real prices rising at 18% and 17% per year, respectively, over a four-year period. In both cities in the middle of the 1980s, prices were rising at nearly 40% per year.

The second California boom, at the end of the 1980s, was shorter-lived, but perhaps more dramatic near the peak. Realtors reported multiple offers and prices rising at 4% per month, or over 50% per year, in 1988.

The most recent booms have been in Honolulu and Seattle. In Honolulu, the median price jumped from \$186,000 in 1987 to \$375,000 in the third quarter of 1990. In Seattle, the median was up from \$88,700 in 1988 to \$144,800 in the third quarter of 1990.

In addition to booms, regions seem increasingly to be vulnerable to busts, and at different times in different regions. The Southwest experienced a dramatic decline in values that resulted in huge losses for mortgage portfolio holders and insurers during the mid-1980s.

More recently, there have been sharp regionwide declines in home values in the Northeast. Our own recent research reveals declines of 30% for condominiums and 22% for single-family homes in the Boston metropolitan area between mid-1988 and early 1992, and declines of 10% for condominiums and 11% for single-family homes in Los Angeles County between the second quarter of 1990 and the first quarter of 1992.

Because these enormous booms and busts occurred at different times in different parts of the country, a single national futures contract would not serve to insulate individual homeowners against risk in

their particular market. We need regional futures contracts covering regions of sizes at least as small as some of the regions discussed above.

It has been documented that housing price movements in each region are relatively smooth through time (see Case and Shiller [1987, 1989] and Poterba [1991]). There is inertia in housing prices, which do not behave like near-random walks as do prices of liquid financial assets. This suggests that day-to-day movements in housing prices are not large.

Nonetheless, we would expect to see prices of futures or options tend to show day-to-day fluctuations more characteristic of financial asset prices. The futures and options markets should be immediately responsive to any news about the outlook for housing — and certainly there is no shortage of such news — even if the cash markets themselves are sluggish.

There is also the likelihood that the existence of futures or options markets will tend to make the cash market more efficient. Prices for real estate properties may in fact one day be quoted in terms of the prices in futures markets, as are many commodity prices today. A sales agreement for a single-family home may automatically be indexed for the change in the futures price between agreement and closing, thereby making the cash market more efficient.

HORIZONS OF CONTRACTS

In most futures markets, volume of trade tends to be concentrated in the contract with the shortest time to maturity, unless this time becomes very short, that is, close to the expiration date of the nearest contract. We think that there would be less concentration of trade in the nearest contract in the house futures and options contracts, and there may be substantial trade in very distant maturities.

Part of the reason for this is that there should be substantial long-run hedging demand by homeowners, who will wish to sell a futures contract or buy a put with years to maturity. Institutional investors may also wish to hold a large part of these long-horizon contracts, or write a large number of long-horizon puts, as part of a long-term portfolio strategy.

Another reason is that in futures and options markets with a very illiquid cash market, rolling over short contracts may not hedge long-term risk. Suppose that information becomes available that real estate prices will decline over the next three years. Because

the cash market is sluggish and inefficient, this information is not fully incorporated in real estate prices, and hence not in current short-term futures prices. As investors roll over the futures contract, in subsequent years, they will find that the futures prices will reflect the information, so that the risk is no longer insurable.

In short, holders of an existing short-term contract are not compensated for the fact that they must now confront very unfavorable terms when they roll over the futures contract. This factor may contribute to making index-based forwards and swaps, which are traditionally of a longer horizon than futures and options, a relatively more important factor (relative to futures markets) for real estate assets than they are for purely financial assets.

EFFECTS OF INDEX-BASED DERIVATIVE MARKETS ON CASH PRICES AND RENTS

Economic theory suggests that providing index-based derivative markets to hedge real estate risk should boost the aggregate price of real estate, at least initially. For example, people's demand for housing services is dampened by the necessity of undertaking financial risk specific to their neighborhood when consuming these services. Absent that necessity, other things equal, they should demand more.

To the extent that the supply of housing is limited by land or other restraints, greater demand will result in higher home prices. When a large derivative market is first established, this will provide a windfall to existing homeowners.

To the extent that real estate is reproducible with constant costs, its long-run price will be unaffected by the establishment of derivative markets. Instead, the quantity of real estate will be increased. The greater supply of real estate will mean that rents will tend to fall to clear the rental market. Thus, indirect beneficiaries of the real estate futures and options markets will be renters.

EFFECTS OF DERIVATIVE MARKETS ON CASH PRICE VOLATILITY AND THE BUSINESS CYCLE

There is a large literature on the effects of the establishment of futures markets on the volatility of the cash market. Empirical studies generally find that insti-

tution of a futures market reduces cash market volatility. This conclusion is reached by Gray [1963] and Cox [1976] for the onions market, by Hooker [1901] for the wheat market, by Emery [1896] for the cotton market, by Powers [1970] and Cox [1976] for the cattle market, and by Schwert [1989] for the stock index futures market. (See also Turnovsky [1983] for other references.)

Theoretical analyses of the effects of institution of futures markets on volatility (as, for example, Peck [1976] and Turnovsky [1983]) suggest that the effect of instituting futures markets may be to reduce volatility, although researchers assert that the volatility of the cash market is not a good way to measure the welfare effects of the futures markets. Certainly, those who feel adversely affected by any increase in cash market volatility have the option of hedging this risk in the futures market.

Harris [1990] argues that an index alternative has effects on both "fundamental volatility" and "transactions" volatility. Fundamental volatility occurs in response to new public information, and here an index alternative is likely to have measurable but small effects.

"Transactions volatility" occurs because of the bid-asked spread and through uninformed order flow imbalances. At times of great order flow imbalances caused by uninformed investors, the bid-asked spread may become extremely wide. As market makers do not know that new orders are coming from uninformed investors, there may be great transaction-induced price movements.

As we noted in our introduction, the establishment of index futures markets may reduce bid-asked spreads, and this increased liquidity may therefore reduce the effects of order imbalances on prices. The same is true in a real estate market context; those who want to get out of their real estate holdings for reasons other than inside knowledge about the true value of their individual properties need not throw their lot in with people who are selling "lemons," so prices in the cash market need not drop as much from their selling pressure.

Case and Shiller have argued that the housing market in particular periods is driven by fads. (See Case [1986], Case and Shiller [1987, 1988, 1989], and Shiller [1989].) That is, there is a marked tendency for purely speculative price movements.

It is difficult to say from theory alone what will

be the effects of the institution of real estate futures and options markets on such fad-driven price movements. The lower transaction costs will encourage much greater participation in the real estate market; the effects on price volatility will depend on the nature of the people brought into the market. Among those brought into the market will be professional institutional investors, so we would suspect the tendency will be to reduce speculative volatility in the market, but this result is not assured.

Some of this fad component is apparently in reaction to past price changes. One view of financial market price movements is that major speculative price movements may be triggered by large order flow imbalances, causing noticeable price changes, and that these initial price changes, if supported by public attitudes, may lead to further speculative price changes and a snowball effect.

Major stock market booms and crashes have been interpreted in these terms, and so might real estate booms and crashes. If this interpretation is right, the effect of institution of futures and options markets in real estate might be to lower price volatility, by preventing the initial order flow imbalance price changes.

Evidence suggests that upward volatility is in part driven by buyers who do not want to be "priced out" of a rising market. With an available futures market, buyers not really ready to buy could take a long position in the market of their choice and thereby be protected from price increases at much less cost than buying a house whose purchase is not warranted by their particular circumstances. The effect of a housing futures market may therefore be to reduce the severity of the very booms that we have seen in these markets.

Any acceleration of demand for housing futures will provide signals to the construction industry about potential future demand. Builders could embark on long-term construction projects on a hedged basis, thereby meeting any increased demand with an increased supply. This will mean a more rational supply response to speculative demand, which may interact with speculative behavior so as in the long run to reduce the volatility of house price movements.

If real estate prices become stabilized, there would be a tendency for stabilization of construction expenditure as well — a good thing, for a substantial

portion of the aggregate business cycle has been related, in the past, to booms and busts in the construction industry.

DOUBTS ABOUT THE VIABILITY OF REAL ESTATE DERIVATIVE MARKETS

One argument against real estate derivative markets is that past efforts at establishing such markets, or similar markets, have failed.

The London Fox Property Futures Market closed in October 1991 after months of disappointing volume. That market included a residential real estate futures contract that was cash settled based on the Nationwide Anglia House Price Index, a regression-based hedonic price index; and a commercial real estate futures contract, which was cash settled on the Investment Property Databank (IPD) monthly index of prices in commercial real estate, on the basis of assessed values of properties owned by thirty-one funds.

Failures of other, analogous, futures markets may also be cause for concern. Of course, many efforts to establish new futures or options markets fail because the new market is very similar to an existing futures or options market. This is not a problem with the establishment of real estate futures or options markets; there is not now any market remotely resembling them. Some efforts to establish futures or options markets fail because the corresponding cash market is very small; this is certainly not a problem with real estate futures markets.

But, the analogy of these real estate futures and options markets with the consumer price index (CPI) futures market warrants more concern. The CPI futures market was proposed by Michael Lovell and Robert Vogel in 1973. A CPI futures market was instituted by the Coffee, Sugar and Cocoa Exchange in 1985. The market was unsuccessful; it shut down in 1989 because of inadequate investor interest.

When trading was first announced, the CPI futures market was heralded as a cure for much of the harms of inflation. There are some very important costs of inflation: the costs of nominal contracting due to substantial unexpected price level changes. Such costs can be hedged against in a CPI futures market. The claims made then that it would solve big, fundamental economic problems may sound analogous to the claims that we are making here for real estate futures contracts.

Why did the CPI futures markets fail? Horrigan [1987] cites three reasons. First, the aggregate CPI may not be the relevant measure of inflation for many who have different consumption or payment patterns. Second, inflation uncertainty dropped substantially by the time the contract was first traded. Third, there is no underlying asset for CPI futures. No one is storing the CPI market basket. Demand for a futures contract is thought to require that there are people holding stocks of the asset, who will want to hedge.

We are optimistic that none of these reasons applies to our proposed real estate futures and options markets. There would be many markets; for regions and types of real estate, real estate price uncertainty is still very large; and certainly prodigious quantities of real estate assets are held, and by a wide variety of types of individuals and businesses.

One fact that should be borne in mind is that innovative futures contracts often have a slow start; this was true of the Treasury bond futures market when it was first instituted, and it was ultimately extremely successful. One reason for slowness to start is that most traders are interested only in trading on *liquid* markets. But of course, establishing liquid markets is something that can eventually be done with time, money, and patience.

Slowness to start can also be attributed to unfamiliarity of the people who have reason to trade in these markets. Certainly, most individual homeowners do not have the familiarity with futures markets that would enable them to make ready use of them. The failure of the CPI futures market has also been attributed to the unfamiliarity of labor and management, the likely big users of these markets according to its proposers (Lovell and Vogel [1973]), with any futures markets. Similarly, the failure of the London Fox Property Futures Market could be attributed to a failure of the public to understand and appreciate such markets. In England, there was not, to our knowledge, any development of accessory institutions, such as residential real estate price insurance, that would encourage use of these markets by owners of real estate.

CONCLUSION

The economic significance of index-based real estate derivative markets, if they were to become well-established, could well be much greater than that of all financial derivative markets established to date

combined. The reasons are that the reduced transaction costs caused by the introduction of these markets are of an order of magnitude larger than the reduction afforded by use of the other derivative markets, and that real estate represents the bulk of national wealth. The obstacles to investing in much real estate today are inherently prohibitive for portfolio managers, and truly diversified holdings of real estate are just not in their portfolios.

These markets could make life better for so many of us: homeowners who are worried about their concentrated investment in local housing; prospective homeowners who are worried about being one day priced out of the market; renters who are concerned about rental costs and availability of apartments; investors who want to diversify their portfolios to include real estate; builders who want to hedge the risk inherent in their business; users of commercial real estate; and farmers concerned about their costs and risks. The markets may well serve to smooth out the business cycle and allow more rational, even-keel planning in all walks of life.

What is needed is the establishment of such derivative markets by exchanges and underwriters that have the resources to see these markets through a trial period, with an education campaign to see to it that the general public understands and can use these markets. Given the enormous potential for efficiency, such markets should be established as soon as possible.

ENDNOTES

¹The value of residential structures and land in the United States in 1990 was \$8.35 trillion, or 51% of the domestic net worth of \$16.24 trillion, according to *Balance Sheets For the U.S. Economy 1949-90*, Board of Governors of the Federal Reserve System, Washington D.C., September 1991.

²Real prices of houses did not fall much in 1929-1932 (see Shiller [1989]), nor was there any fall in single-family housing prices in 1973-1975 (see Case and Shiller [1987]).

³Data courtesy of the National Association of Real Estate Investment Trusts, Inc., Washington, D.C.

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