

COWLES FOUNDATION FOR RESEARCH IN ECONOMICS
AT YALE UNIVERSITY

Box 2125, Yale Station
New Haven, Connecticut 06520

COWLES FOUNDATION DISCUSSION PAPER NO. 1006

Note: Cowles Foundation Discussion Papers are preliminary materials circulated to stimulate discussion and critical comment. Requests for single copies of a Paper will be filled by the Cowles Foundation within the limits of the supply. References in publications to Discussion Papers (other than mere acknowledgment by a writer that he has access to such unpublished material) should be cleared with the author to protect the tentative character of these papers.

INDEX-BASED FUTURES AND OPTIONS MARKETS
IN REAL ESTATE

Karl E. Case, Robert J. Shiller and Allan N. Weiss

December 1991

Index-Based Futures and Options Markets in Real Estate

Abstract

Most institutional and individual portfolios are very undiversified in real estate: many hold no real estate at all, many have holdings highly concentrated in certain regions or types of real estate. The risk of these concentrated holdings is not hedged.

We propose here that cash-settled futures and options markets be opened on real estate to better allow diversification and hedging, and show that these markets solve problems that have hampered other real estate hedging media in the past. Related institutions, such as home equity insurance, might develop around the futures and options markets.

The establishment of these markets is likely to increase the quantity of reproducible real estate, and lower rents on real estate. It may also reduce the amplitude of speculative real estate price movements and dampen the business cycle.

Karl E. Case, Jr.
Professor of Economics
Wellesley College
Wellesley, MA 02181
617 235 0320 x2178

Robert J. Shiller
Professor of
Economics
Cowles Foundation
Yale University
30 Hillhouse Ave.
New Haven, CT 06520
203 432-3708

Allan N. Weiss
CSW, Inc.
955 Massachusetts Ave.
Suite 129
P. O. Box 9183
Cambridge MA 02139
617 354-1400

Index-Based Futures and Options Markets in Real Estate

Futures and options markets should be established that are cash settled based on 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. If all these real estate markets come to be established and liquid, institutional investors might often find that most of their portfolio is in effect in such markets; their clients will thereby find that their portfolios are much more satisfactorily diversified. Individual and corporate owners of real estate might then hedge away most of the real estate risk that they bear, risk that has caused them enormous concern and trepidation in past years. That risk would be more efficiently borne by large institutional investors who can diversify over many regions and types of real estate, as well as over financial assets.

The value of residential real estate and land in the United States accounts for about half of the national wealth; if we include also commercial real estate we have the bulk of the national wealth²; the same is true in many other countries. Yet futures and options markets devoted to real estate are nowhere in evidence today. 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 in that contract; at present no real estate futures

²The 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. Source: Balance Sheets For the U.S. Economy 1949-90, Board of Governors of the Federal Reserve System, Washington D. C., September 1991.

contract exists in the world; nor are there good substitutes for such markets.

Nowhere in the world today are there markets that would allow investors to invest in a widely diversified portfolio of real estate without incurring enormous transactions costs. Since they cannot invest in a widely diversified portfolio of real estate, they cannot invest in a truly diversified portfolio at all. Thus, 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 would allow individuals and institutions with large exposure to specific real estate risk to hedge these risks. Individuals for various reasons usually prefer to own their own homes, rather than rent them from institutions, 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 sell real estate futures or buy put options 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 real estate futures and options, which they can do by holding a portfolio of the opposite sides of the futures and options contracts that those who own real estate concentrated in a certain area undertake.

Thus, the long sides of any given futures or options contract should be taken by a wide spectrum of investors, presumably primarily institutional, who invest in many futures contracts and options as a means of diversifying their portfolios; the short side should 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 might be described as having the effect of spectacularly lowering transactions costs for trading in real estate. The modern theory of the transactions costs (see for example Demsetz [1968], Akerlof [1970], Gammill and Perold [1989], and Gorton and Pennacchi [1991]) stresses the importance of traders with 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 about the aggregates. The same would be true about the baskets of real estate on which the index used to settle real estate futures and options contracts is based. Those who invest in real estate would be spared the concern that they are buying lemons, they can thereby forego the enormous costs and risks associated with buying individual properties.

Existing Investment and Hedging Media

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 themselves purchasing properties. And such existing institutions offer a limited ability for real estate owners to hedge the risk of their real estate. Yet, such existing institutions do not come close to offering the investment and hedging capabilities that would

characterize well-designed futures contracts.

Real estate investment companies were created in 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 (NJ) was incorporated in 1880, Alliance Realty (NY) was incorporated in 1899. There was an explosion of activity in real estate investment companies in the 1920's, 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 folded soon after, with the collapse of the real estate securities prices in 1929.) Real Estate Investment Trusts (REITs) were created by an act of Congress in 1960; they are a special form of real estate investment company with the ability to pass through profits without exposure to the corporate profits tax. Since 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 they could if they invested directly in real estate. They thus allow some benefits of portfolio diversification. However, investment companies do not allow people to diversify their portfolios across certain kinds of properties, notably owner-occupied residential real estate, properties held by nonincorporated 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 was noted by Rabinowitz [1978], and the fact is also apparent in data produced by the National Association of Real Estate Trusts [1985], see Ibbotson and

Goetzman [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 1973-5. Available data do not show any evidence of a sharp decline in real estate itself in either of those periods.³ 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.

These existing real estate investment media 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, and so the total number of shares in such REIT's that are available for shorting is necessarily extremely small.

REIT's are not geographically concentrated because those who create REITs do not have an incentive to create a hedging medium. Those who create hedging media can benefit only from the transactions fees that they receive when the medium is traded, but REIT's are not the recipients, under current institutional arrangements, of these transactions fees. They are therefore promoted by their creators as investment media, not hedging media. Indeed, the total value of all qualified REITs in the United States in November,

³That is, real prices of houses did not fall much in 1929-1932 (see Shiller [1989], nor was their any fall in single-family housing prices in 1973-75, see Case and Shiller [1987].

1991 was 45.4 billion⁴, or a fraction of 1% of the value of all real estate.

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. 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. The reason is that 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, that 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 would be offered by financial institutions who take out hedging positions in the house futures or options 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

⁴Data courtesy of the National Association of Real Estate Investment Trusts, Inc., Washington, D. C..

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 geographical 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, if a homeowner bought a policy for \$100,000 worth of real estate with a 5% deductible, if prices dropped 9% in his city, he would receive the amount of the drop beyond 5%, in this case, 4% times \$100,000, for a total benefit of \$4000. If prices dropped less than 5% he would receive no benefit.

Although there are advantages to basing insurance benefits on actual purchase and sale prices, we believe that the complications do not merit doing so and a better alternative is to base insurance benefits on a city-wide real estate price index. The benefits of the former 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 than the index. This arrangement may also seem more natural to the homeowner because with most other types of insurance, the coverage is based on events particular to him such as hospital stays, car accidents, and house fires.

The disadvantage of basing equity insurance benefits on the actual purchase and sale of the house are as follows. First, a person might be

forced to sell his or her 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 might be extremely inconvenient for homeowners, and the prospect of such sales might 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 only be able to hedge the entire metropolitan area traded on the house futures or options markets so the insurance company would be exposed 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, one that is built in an increasingly unpopular style or size, or may know that they paid too much for their house. These problems would be partially alleviated 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 bought her house at \$100,000 and had a 5% deductible policy. If her house has actually dropped 5% in value then 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 partially alleviated by creating a policy that paid 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-arms-

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 partially resolved by requiring a sale price close to the appraised value. The insurance company could also impose deterrents such as the insurance company having the 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.

We believe that the most appealing policy would have payments based on the index of the homeowner's geographical or metropolitan area. The policy could be purchased at any time, and have 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.

The 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 futures or options markets may also 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 a market to be a very attractive form of reinsurance.

Mortgage default can occur for a variety of reasons. For example, individual homeowners may find themselves unable to service their debt due to changed economic circumstances (divorce, unemployment, and so forth). Thus, defaults can randomly occur whether or not property values change. But as long as the equity in a property exceeds the unpaid balance of the mortgage plus the transactions 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 which 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 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 since there is no equity to protect. In addition, mortgage holders and insurers generally fail to exercise recourse because of very high transactions costs.

Mortgage holders can easily insure themselves against the risk associated with interest rate movements. In addition, 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 (See discussion below).

The behavior of home prices during regional boom bust cycles, to be discussed below, 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 3 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 contracts.

Region-wide price cycles have clearly dominated housing price behavior in the last couple of decades, and those cycles have increased in amplitude over this time period, see Table 1. While the first major boom was the 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 percent and 17 percent per year respectively over a four year period. At peak price increase in both cities in the middle of the 1980's, prices were rising at nearly 40 percent per year. The second California boom, at the end of the 1980's was shorter-lived, but perhaps more dramatic near the peak. Realtors reported multiple offers and prices rising at 4 percent per month, or over 50 percent per year, at the peak. 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 is up from \$88,700 in 1988 to \$144,800 in the third quarter of 1990.

In addition to booms, regions seem to be increasingly vulnerable to busts, and at different times in different regions (see also Table 1). The Southwest experienced a dramatic decline in values that resulted in huge losses for mortgage portfolio holders and insurers during the mid-1980's. More recently, there have been dramatic region-wide declines in home values in the Northeast. Our own recent research reveals declines of nearly 25% for condominiums and 16% for single family homes in the Boston metropolitan

area. Anecdotal evidence suggests declines nearly as large in some parts of the huge California market.

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 an individual homeowner against risk in his or her market. We need regional futures contracts covering regions of sizes at least as small as some of the regions we discussed above.

Now, it has been documented (see Case and Shiller [1987, 1989] and Poterba [1991]) that housing price movements in each region are relatively smooth through time; there is inertia in housing prices and they 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 that the prices of futures or options should 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 be automatically indexed for the change in the futures price between agreement and closing, thereby making the cash market more efficient.

Horizons of Futures and Options 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 may 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 into current short-term futures prices. As the individual rolls over the futures contract, in subsequent years, he or she will find that the futures prices will reflect the information, so that the risk is no longer insurable. In short, the holder of an existing short-term contract is not compensated for the fact that he or she must now confront very unfavorable terms when he or she rolls over the futures contract.

Effects of Futures and Options Markets on Cash Prices and Rents

Economic theory suggests that providing futures and options 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, this will result in higher home prices. When a futures or options market is first established, this will provide a windfall to existing homeowners.

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

Effects of Futures Markets on Cash Price Volatility and the Business Cycle

There is a large literature on the effects of the institution of futures markets on the volatility of the cash market. Empirical studies have generally found that institution of a futures market reduces cash market volatility. This conclusion was 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 further 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, but assert also 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 the effects of an index alternative is likely to have measurable but small effects. "Transactions volatility" occurs because of the bid-asked spread and by uninformed order flow imbalances. At times of great order-flow imbalances caused by uninformed investors, the bid-asked spread may become extremely wide, since market makers do not know that new orders are coming from uninformed investors, hence there may be great transactions-induced price movements. As was noted in the introduction to this paper, the establishment of index futures markets may reduce the 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," therefore 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 [1990].) There is 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 transactions 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. We think that since among those brought into the market will be professional institutional investors, 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 may, if public attitudes are conducive, 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 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 be protected from price increases at a very low cost relative to buying a house that their particular circumstances may not currently warrant. 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 can embark on long-term construction projects in a hedged basis, thereby meeting any increased demand with an increased supply. This will mean a more rational supply response to speculative demand, this may interact with speculative behavior in such a way as to reduce, in the long run, the volatility of house price movements. If real estate prices become stabilized, then there will be a tendency for stabilization of construction expenditure as well; a good thing since 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 Futures and Options Markets

One argument against real estate futures 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 of trade. 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, based on assessed values of properties owned by 31 funds.

Failures of other, analogous, futures markets are also 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; due to inadequate investor interest it was shut down in 1989.

The CPI futures market was heralded, when trading was first announced, as a cure for much of the harms of inflation. There are some very important costs of inflation: the costs of nominal contracting when there is substantial unexpected price level changes, costs that 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 here are making for real estate futures contracts.

Why did the CPI futures markets fail? Horrigan [1987] gave 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 died down 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 we can eventually do 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 the proposers of the CPI futures market (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. There was not, to our knowledge, any development of accessory institutions, such as residential real estate price insurance, to allow these markets to be readily used by homeowners.

Conclusion

The economic significance of real estate futures and options markets, if they become well established, may well be much greater than that of all financial futures and options markets established to date, combined. The reason is that the decline in transactions costs caused by the introduction of these markets is of an order of magnitude larger than the decline afforded by the other futures and options 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 will make life better for so many of us: for homeowners who are worried about their concentrated investment in local housing, for prospective homeowners who are worried about being one day priced out of the market, for renters who are concerned about rental costs and availability of apartments, for investors who want to diversify their portfolios to include real estate, for builders who want to hedge the risk inherent in their business, for 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 markets, by exchanges that have the resources to see these markets through a trial period, and an education campaign to see to it that the general public understands and can use these markets. Given the enormous importance of the establishment of such markets, the markets should be established as soon as possible.

Table 1

Recent Housing Price Booms in the U. S.
Behavior of Median Price of Existing Houses

<u>Location</u>	<u>Time Period</u>	<u>Total Nominal Change</u>	<u>Annual Average Nominal Change</u>	<u>Annual Average Real Change</u>
<u>Booms</u>				
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
<u>Busts</u>				
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).

References

- Akerlof, George A., "The Market for "Lemons": Quality Uncertainty and the Market Mechanism," Quarterly Journal of Economics, 84:488-500, 1970.
- Case, Karl E. The Market for Single Family Homes in Boston. The New England Economic Review, May/June, 1986.
- Case, Karl E. and Robert J. Shiller. The Behavior of Home Buyers in Boom and Postboom Markets New England Economic Review, pp. 29-46, November/December 1988.
- . The Efficiency of the Market for Single Family Homes. American Economic Review, Vol. 79 No. 1, pp. 125-137, March 1989.
- . Prices of Single Family Homes since 1970: New Indexes for Four Cities. New England Economic Review, pp. 45-56, 1987.
- . Forecasting Prices and Excess Returns in the Housing Market. AREUEA Journal, Vol. 18, No. 3, 1990.
- Cox, C. C., "Futures Trading and Market Information," Journal of Political Economy, 84:1215-1237, 1976.
- Demsetz, Harold, "The Cost of Transacting," Quarterly Journal of Economics, 82:33-53, 1968.
- Ederington, Louis H., "A Proposal for New Futures and Options Markets," Financial Analysts Journal, 36:42-8, Jan/Feb 1980.
- Emery, H. C., Speculation on the Stock and Produce Exchanges of the United States, Columbia University Press, New York, 1896.
- Gammill Jr., James F., and Andre F. Perold, "The Changing Character of Stock Market Liquidity," Journal of Portfolio Management, pp. 13-18, Spring, 1989.
- Gorton, Gary, and George Pennacchi, "Security Baskets and Index-Linked Securities," National Bureau of Economic Research Working Paper No. 3711, May 1991.
- Garbade, Kenneth, and William L. Silber, "Cash Settlement of Futures Contracts: An Economic Analysis," Journal of Futures Markets 3:451-72, Winter 1983.
- Gray, R. W., "Onions Revisited," Journal of Farm Economics, 65:273-276, 1963.

- Hakansson, Nils H., "The Purchasing Power Fund: A New Kind of Financial Intermediary," Financial Analysts Journal, Nov/Dec 1976, pp. 49-59.
- Harris, Lawrence, "The Economics of Cash Index Alternatives," The Journal of Futures Markets, Vol 10, No. 2, pp. 179-94, 1990.
- Hochman, Jack E., and Deyo P. Breen, "Residential Investing: A Good Strategy for Pension Funds," Pension World, 27:30-31, October 1991.
- Hooker, R. H., "The Suspension of the Berlin Produce Exchange and its Effects upon Corn Prices," Journal of the Royal Statistical Society, 64:574-604, 1901.
- Horrigan, Brian R., "The CPI Futures Market: The Inflation Hedge that Won't Grow," Business Review, Federal Reserve Bank of Philadelphia, pp. 3-14, May-June 1987.
- Lovell, Michael C., and Robert C. Vogel, "A CPI-Futures Market," Journal of Political Economy, 81:1009-12, July-August 1973.
- Mankiw, Gregory, and David Weil. The Baby Boom, the Baby Bust, and the Housing Market. Regional Science and Urban Economics, Vol. 19, No. 2, pp. 235-258, May 1989.
- Peck, Ann E., "Futures Market, Supply Response, and Price Stability," Quarterly Journal of Economics, 90:407-423, 1976.
- Powers, M. J., "Does Futures Trading Reduce Price Fluctuations in the Cash Market?" American Economic Review, 60:460-64, 1970.
- Rabinowitz, Alan, Development of the Real Estate Investment Industry, 1925-1975, Alan Rabinowitz, publisher, University of Washington, Seattle, 1978.
- Saunders, Anthony, and Lawrence J. White, eds., Technology and the Regulation of Financial Markets, Lexington Books, 1986.
- Shiller, Robert J., Market Volatility, M. I. T. Press, Cambridge MA, 1989.
- Turnovsky, Stephen J., "The Determination of Spot and Futures Prices with Storable Commodities," Econometrica, Vol 51, No. 5, pp. 1363-1388, September, 1983.