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REAL ESTATE ISSUES

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Diversity is the Hallmark of Real Estate Counseling

This edition of *Real Estate Issues* is a classic reflection of today's diverse real estate problems and the dedicated professionals who work to solve them. The articles represent a variety of topics from real estate investment banking to housing affordability. We are especially pleased to serve our diverse readership with a journal of authors representing both business and academia. This combination contributes greatly to understanding practical, yet often complex issues.

Samuel Zell (Equity Financial and Management Group) has prepared an overview of economic issues likely to impact both the supply of and demand for real estate in the near future. His cogent analysis serves to introduce other current topics. In the area of investment banking, Bowen McCoy (Morgan Stanley) has prepared a comprehensive discussion of changing financial markets and securitized real estate finance. James McNulty (Federal Home Loan Bank, Atlanta) follows with a more specialized analysis of mortgage securities and prepayment risk.

Michael Bond (Cleveland State University) contributes to understanding the housing markets with the relationship of mortgage rates and housing demand. The topic of counseling of retail property is addressed first by Terry Meyer (Urban Science Applications), who explores techniques for locating retail operations, and by Gene Wunder (Ball State University), who discusses the specific uses of restrictive clauses in retail leases to maintain order of the business environment within retail centers.

What is the impact of airports and aircraft noise on land values? This seldom researched question is empirically analyzed by Robert West (Tarantello & Company). Next is an analysis of the economic rationale for foreign investment in the U.S. by Peggy Swanson (University of Texas) and Arthur Nelson (Georgia Institute of Technology) whose article concludes the number with an examination of land use policy as a function of property tax structure.

For future editions send us your letters-to-the-editor, manuscript submissions or topic suggestions. Our continuing goal is to provide a forum where authors can present their practical and innovative ideas to enhance the role of the real estate professional.

R. Tarantello

Editor in chief

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FROM CASSANDRA, WITH LOVE . . .

The fallout from tax reform and an overbuilt real estate market does not bode well for future real estate development and investment.

by Samuel Zell

Much has been written about the mid-1980s' massive oversupply of real estate in the United States. Estimates of the total losses from overbuilding, deregulation gone wild, fraud and concentrated area economic downturns range from $40 to $80 billion, with much of it yet to be recognized.

The major focus of analysts has been on how soon we will recover and how quickly we will regain normality. This is similar to the postoperative period when the patient believes that soon all will be normal again. Unfortunately, the prognosis between a broken leg and the one following an amputation are radically different and often the patient in the recovery room does not know the difference until the drugs wear off. This time, the drug is an overbuilt real estate scenario which is disguising the massive fundamental changes that have occurred within the industry. The development of income-producing real estate has been a massive engine of growth for the past 20 years. During much of this period, real estate development activity has been on the forefront of growth rather than in response to it. Real estate's role has changed from an auxiliary function of the major growth factors—manufacturing, service, government—to a fourth factor that is creating unjustified activity and employment.

Income-producing construction, particularly office buildings, hotels, rental housing and strip centers, has produced, in one year, what was previously accepted as a ten-year supply. Today, the United States' real estate market is much like other countries that maintain employment by massive programs of underemployment. Farmers in China, employees of distribution systems in Japan, workers in government bureaucracies in the United States, India and the USSR are prime examples. Underutilization of real assets has masked the extent to which supply and demand have skewed. Most markets have obfuscated these realities by extending massive concessions on the assumption that current conditions represent temporary aberrations which will be cured as soon as the overbuilt period wears off. This is not too dissimilar from the budgetary process where politicians create current deficits for which the cure will come after the current unique circumstance passes. The economic events of 1987 have signaled a major change in our ability to embrace these unrealistic assumptions. The post-stock market crash reality has told us that major underlying changes have occurred and these changes will have a dramatic impact on this country for the foreseeable future. Our borrowing from the future debt has come due. The real estate industry will be one of the major victims of this change.

This industry has been buffeted by major structural changes in a very short period of time. These societal changes, from the extreme of tax reform to the reduction

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in our standard of living, signal the sunset of the real estate industry as an engine of employment and growth. The dislocation that the changes create will be significant and will dramatically reduce the ways in which we use and invest in real estate.

Although the prognostications are dire, they will prove to be necessary in order to reorient the industry to function on a true economic basis. The downsizing of the industry ultimately will reward those with staying power. Existing, well-located and tenanted real estate will become very dear.

On January 1, 1987, the Tax Reform Act of 1986 went into effect. This legislation represented the final uncoupling of a public policy of growth from the tax system. Although the law materially diminished many benefits that inured to the investor, the effective elimination of the ability to offset real estate losses against other income dramatically altered investment incentives in real estate. Noncash real estate investment losses that previously allowed an investor to defer tax payments, acted as a subsidy to the industry and the user/consumer. Tax reform converted the real estate business from one that builds for future demand to one that builds for pent-up demand.

This subsidy to development reduced the risk of construction and provided a yield to the investor while waiting for the income to catch up with the cost. Conventional wisdom anticipated that the loss of subsidy would increase the cost of occupancy to the tenant. The user market always has been elastic, and increase in price has lead to reduction in demand. Reduced demand has lead to an increase in the risk of creation.

Past tax policy encouraged risk by providing tax deductions and credits. In the past, the subsidies previously described lowered the cost of the delivered product. Encouraging competition and oversupply was the system's way of passing on the subsidy to the user.

Post-reform will make owning empty buildings very expensive. Post-reform, all invested dollars are hard, and the investor no longer benefits from converting deductions taken early at higher ordinary rates and recaptured at the point of sale with lower capital rates. This increased tax cost will lower after-tax net proceeds and discourage development.

Between 1965 and 1985, Chicago built an average of 2,022,300 square feet per annum of urban office space. That average represented about three times the average per annum for the previous 15 years. This tremendous creation of space and the absorption thereof reflected a combination of growth, consumption and the conversion of the economy from a manufacturing base to a service base. The recognition of this conversion became the justification for continued development and financing. Just as some trends in the past tended to lead to excessive assumptions ($90-a-barrel oil by 1986), the theoretical demand for new office space was limited only by the amount of money lenders were willing to commit to new structures.

As our competitive position worldwide deteriorated, more and more of our resources were moved from manufacturing to service. Both federal and state governments increased employment and the need for additional space. The proliferation of financial instruments, often representing a multitude of ways to skin the same cat, generated more demand for space to house the people who traded them, audited them, settled them, sued over them and wrote about them.

But trees do not grow to the sky, and demand for space from conversion does not endlessly compound. Not only does it not compound, but if underlying fundamentals change, demand can contract. Whether or not current conditions represent contraction, the period of heady growth is over. The demographics tell us that the rate of population growth has diminished, and the fall of the dollar has started the pendulum swinging the other way, back toward manufacturing.

The internationalization of monetary markets has permanently altered the United States' real estate market. Floating exchange rates and steep deficits inexorably have moved control over the cost and availability of funds offshore. It also has created an instantaneous ability to approve or disapprove changes in policy by putting pressure on our currency. This sensitivity has created a new, unwanted form of discipline. No longer can we, at will, monetize our past excessive debts and allow inflation to bail us out.

When real estate financing was primarily long-term, fixed-rate debt, real estate became a vehicle for the transfer of wealth from the saver to the user. The saver found his rate fixed at the same time that inflation reduced the purchasing power of his yield. In the real estate community, this was translated into getting bailed out by inflation.

The prospects from this kind of monetization are not possible in the current environment. Expansionary, undisciplined spending is immediately reflected in the value of our currency and stock markets. As a net debtor nation, our interest rates are governed by our creditors, and such inflation-creating policies are immediately translated into a higher cost of funds. Therefore, another subsidy has been removed from real estate, with floating rates and the monetization of previous excesses no longer being an option for extraction from oversupply. Thus, the cost of excess activity will increase exponentially as absorption will be governed by real growth requirements, not inflationary delusions.

Inflation also is less likely to govern future real estate decisions as much as it has in the past. As global competition controls prices in the United States, downsizing and adjustment in the standard of living will become the norm. Reduction in consumption, unfortunately, will remain the dominant theme for the foreseeable future. Real estate in the United States has reflected another form of consumption. Glaring examples of this consumption can be seen in the average number of square feet per person in residential and office buildings. These usage figures are at least double those in the Far East. Although accusations of underconsumption, particularly by the Japanese, are

valid, the contrast with our usage makes the alteration in our relative currencies believable.

Another example of underutilization of assets occurs when office buildings are built for $200 a square foot, then leased for ten years at two-thirds the rate needed to service the investment. The owner justifies the loss of his stream of income by capitalizing his losses and adding them to his basis. The theory behind this view is that growth in future value will ovecome initially higher subsidies to achieve occupancy. This is acceptable within reason, but at what point have tenant concessions amounted to a transfer of value that never will be recouped? How much current replacement cost can be capitalized and still produce returns that make real estate investment attractive? It stretches the imagination to believe that free rent and tenant allowances equal to 50 percent of the anticipated income from the lease ultimately will produce a viable investment.

The transfer of value or overinvestment in real estate represents a loss to the owner. The failure of the owner to recognize that a percentage of this capital has been consumed is the reason lenders and investors are slow to recognize change. By rolling current deficits into the future, postponement is achieved, and the inflation hope certificate is purchased. As the process continues, existing inventory is consumed, thereby diverting assets from productive uses. The fall of the dollar and the new international realities are forcing change that requires more productivity from asset employment.

Deflation, a fear not in the forefront of economic concern until the early 1980s, is a very real concern today. The Keynesian inflation bias got out of hand in the 1970s, and we are still in the process of trying to readjust without going too far the other way. Although significant decrease in demand is unlikely, one must realistically assess the real estate inventory from the perspective of need versus use. There currently is much more space used than is needed. The number of square feet per employee in office space is significantly greater than needed if austerity gains the upper hand.

Similarly, the resources absorbed by the continued expansion of our infrastructure to perpetuate the dream of a single family detached home no longer can be justified under current economic circumstances.

Retail development that creates multiple clones within a relatively close distance reflects the triumph of the art of development over the challenge of merchandizing. As long as capital is indiscriminately available for real estate, redundant creation will follow. In many cases, retailers will be forced to create more outlets than needed to preclude competition. If, however, the real estate had not been developed, no shortage of available supply would have surfaced.

These are all manifestations of a consumptive and very rich society. The events of the last 15 years are coming home to roost. We have overproduced, overallocated and overemployed in real estate. This overconsumption means there is vast opportunity to reduce demand and still meet requirements. A slow transition from use to need will avoid the pitfalls of deflation. A faster change could deflate our economy and lead to a repeat of the 1930s. Whether fast or slow, the result will be a reduction in overall demand as our society adjusts to a lower standard of living.

The economic environment now will dictate major changes in real estate. The situation is analogous to the energy business. For a period of ten years, huge amounts of human and financial capital were committed until incremental investment was no longer justified. The hangover in the oil field has been very severe. Local economies dependent upon the industry as the engine of growth require lengthy periods of adjustment.

Real estate in many communities has been the engine that fueled growth. As the reality of oversupply reduces new development, the support staff begins to contract. This contraction further reduces demand in a saturated market. This recovery and absorption both are extended by the fall of real estate activity.

An additional influence on the future of the industry is in regulatory control. The United States has by far the least regulated market in the world. Even *laissez faire* bastions such as Hong Kong maintain very strong influence and control over all use or reuse of land. The philosophy of the United States historically has been very growth oriented. Civic pride often has been measured by the number of new residences per month, trumpeted through the national media. No one person has foreseen the impact on the community of unstructured development.

The downzoning of downtown Los Angeles and the height restrictions in San Francisco are but two examples of communities that are attempting to reduce new development. The pendulum of change is likely to continue moving toward more regulation and a lengthening of the development process. This will increase costs and open development to much closer scrutiny than in the past.

Belatedly, communities are beginning to understand better the cost of growth and undisciplined development and its effect on the tax burden of the whole community. Greater awareness of cost, both direct and indirect, is bringing home the reality that communities must have a greater stake in the planning process. The logical, although not necessarily better, result of this trend is realigning the development process in the United States toward more worldwide norms. Booms and busts are municipal financial disasters, and greater scrutiny and involvement represent actions of self-interest by municipalities. Further regulation will slow development, increase costs and subject development proposals to the challenge of need.

As new development slows, the existing inventory of first-class structures will fill gradually. A chastened real estate lending and investment community will find that most new office construction, commissioned after 1982, will prove to be economically unjustified. Real estate investors will obfuscate their losses by redoing their pro formas to reduce yield expectations.

During the inflation yo-yo years of the 1970s, lease terms

were shortened to theoretically increase the owner's yield by making the releasing period arrive sooner. This strategy not only did not work, but it contributed to the destabilization of the office market by encouraging lease takeovers and by aiding the mobility of tenants. Shorter leases which reflected projected increases also made internal rates of return higher and thus made real estate seem more attractive.

Valuation techniques will revert back to a multiple of cash flow versus an analysis based on value per square foot. A new appreciation for the benefit of a lease will emerge. The real estate industry will become more conservative, and emphasis on long-term leases will become the norm. Security of income stream will become paramount in investment criteria.

The purchases of office buildings in the United States by the Japanese reflect this philosophy. Although they have been accused of overpaying, the test of time is likely to prove them right and prudent.

The supply and demand equation in real estate will improve slowly, with real income remaining essentially flat until the oversupply is absorbed. Many communities will suffer the double whammy of oversupply and unemployment, which will be exaggerated by the severe reduction in the construction industry. The absorption process will be much slower than the previous recoveries. Whereas in the past, oversupply was followed by rapid recovery creating a V of activity, this period more likely will be a slow, upward angle creating an L with bias.

The degree of pain and suffering (loss) that the real estate lending and investment community absorbs will materially intimidate future commitments of funds. Real estate investment without inflation and the leverage of fixed-rate debt will compare poorly with other active investments. Real estate, as part of a core institutional holding, will provide security and predictability in an increasingly volatile environment. As the cyclical nature of real estate development wanes, the market will pay a premium in capitalization rates for the safety and security of tenanted bricks and mortar. By contrast, the spread in value between the occupied and non-occupied will become much greater. The United States' market will look much more like the foreign ones. Yields will decrease as the risks involved in potential vacancy recede, and they will remain very low as the amount of funds available for secure, tenanted real estate investment opportunities remain much larger than supply. There will be an oversupply of development opportunities, and the only shortage will be one of leases.

The challenge for the rest of the century will be to recognize and acknowledge basic and underlying changes. The prognostication herein represents a bitter pill to a consumptive and macho industry. Failure to recognize and differentiate between past overbuilding and structural change in demand, use and affordability will be viewed with the same historical reverence held by those who opened the gates to Troy.

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THE NEW FINANCIAL MARKETS AND SECURITIZED COMMERCIAL REAL ESTATE FINANCING

Real estate securitization relates real estate more closely to money and capital markets.

by Bowen H. McCoy, CRE

Real estate securitization relates real estate finance closer to the money and capital markets. This has become increasingly more intense since the mid-1970s as linkages among all types of financial and nonfinancial assets have been established.

The concept of securitization of assets has been around for a long time. Back in 1962, when J. I. Case Company went bankrupt, money was raised to pay off the company's senior creditors by setting up a sales finance captive subsidiary and securitizing Case's accounts receivable. In the course of the exercise, many of the same functions were conducted then that are performed today on the assets underlying a collateralized mortgage obligation (CMO). We utilized statistical analysis of the average remaining life, the default patterns, the delinquent payment frequency and the average transaction size for each receivable.

In the mid to late 1960s, bauxite and iron ore facilities in Australia were financed by pledging 25-year commercial contracts, primarily with Japanese companies, in support of private placements and public offerings of debt in both the domestic United States and the Eurodollar markets. Additional security was provided through a first mortgage lien on the facilities.

In the early 1970s four Orbach's retail stores were financed. The stores were owned privately by a Dutch family that wished to avail itself of cheap financing by

guarantying payment of principal and interest, but the family did not wish to give up its privacy. Accordingly, enough net worth was shown to a commercial bank to obtain the bank's own guaranty in support of the financing. This was a form of securitized finance.

Real estate investment trusts of the 1970s were a means of introducing real estate assets into the securities markets, just as CMOs and master limited partnerships are today.

The following discussion focuses on the characteristics of the new financial markets which have led to the recent growth of securitized real estate finance.

Characteristics Of The New Financial Markets

Linkages

In recent years, increasing linkages have been observed among all financial markets and financial and nonfinancial assets. In the mid-1970s as interest rates climbed and

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This article by Mr. McCoy soon will appear as a chapter in a book to be published titled, America's New Market Geography: Nation, Region and Metropolis, *"The New Financial Markets and Securitized Commercial Real Estate Finance." George Sternlieb and James W. Hughes, New Brunswick, New Jersey, Center for Urban Policy Research, (Forthcoming 1988) Chapter 14.*

corporations such as the Penn Central and Chrysler faced financing problems, a number of corporations had difficulty raising capital, including regional banks and public utilities. At the same time, the mortgage departments of several insurance companies were having difficulty finding good quality real estate in which to invest their allocated funds.

A series of sale-leaseback transactions of lower grade credits were executed on corporate headquarter facilities at interest rates as much as 250 to 300 bonus points lower than the issuer's corporate cost of borrowing. This was accomplished because the mortgage side of the insurance companies had more available funds than good investments, and the securities side was less liquid.

When one major life insurance company wished to avoid this anomaly, its chief economist sent a memo to all the field officers saying: "Do not make a mortgage loan on any corporate real estate at a rate less than the Aa utility rate posted in your daily newspaper." The memo described a very crude but effective method of creating a proxy rate for real estate. Thus, in this and many other instances, capital market linkages to real estate were born. Most recently, these linkages have been seen in Standard and Poor's rating of office buildings and Moody's rating of particular cities from a real estate point of view.

Volatility

The stock market can move 30 to 50 points in a day or, at the extreme, as many as 300 to 500 points. The prime rate itself moved from 12 percent to 20 percent during the period of 1979-1980.

Even as interest rates have come down, the real rate of interest has stayed higher than is customary. How does one develop a project with three, five or seven year development cycles in the face of such interest rate volatility? A variety of interest rate risk management techniques have evolved—options, swaps, caps, futures, options on futures—but the techniques themselves have, at times, increased volatility and thus the underlying risk in the market.

Institutionalization

Investment decision-making has become more and more institutionally controlled. Single point decisions have supplanted the plurality of decisions made by thousands of individual investors as they have become increasingly insulated by independent retirement accounts, pension funds, money market funds and mutual funds.

On the New York Stock Exchange, trades of 1,000 shares or more increased from 70 percent of total volume to 90 percent of total volume in just eight years (1978-1986). This is a sea change in stock ownership, with the individual reduced from 30 percent to 10 percent of total volume. During the same period, large trades of 10,000 shares or more increased from 23 percent to 52 percent of total volume as institutions dominated the market.

During the period 1979-1987, institutional holders of corporate debt increased from 76 percent to 93 percent. The departure of the thousands of individual trades, which used to dampen volatility, has added further to the swings in the markets.

Internationalization

Global markets have arrived, along with 24-hour trading. Consequently, all assets are linked through currency swaps, and fixed and floating rate obligations are made fungible by interest rate swaps. Pockets of opportunity arise as various currencies or maturities fall out of line or investor preferences change. A real estate transaction may be financed on a floating rate basis with the rate reset every 30 days and then swapped into a 12-year fixed-rate obligation. A United States dollar real estate transaction may be financed in New Zealand dollars or Japanese yen or German deutshmarks and swapped back into United States dollars for funding. Each maturity for a securitized real estate financing trades at a negotiated spread over the comparable maturity United States government obligation, thus linking all market rates together.

Securitization

Securitization simply takes an asset or an obligation to pay (a commercial contract or a lease) and converts it into a financial obligation that has readily identified characteristics and can be accordingly rated to risk in the international capital markets. Securitization can be accomplished by having a project rated in one of the major investment grade categories by a respected rating service such as Moody's or Standard and Poor's. It also may be accomplished by having a high credit party add its credit (credit enhancement) to the transaction through a guaranty, letter of credit or similar arrangement. Japanese banks have been particularly active in this area because they retain high credit ratings as a class, have lower funding costs than United States banks and are more competitive on fees as they build their global business.

Deregulation

Now a worldwide phenomenon, deregulation commenced in the United States during the mid-1970s with the removal of regulations covering funding costs for financial institutions. This initial step led to spread banking which allowed financial institutions to focus closer on funding sources and costs and to seek out assets and transactions that provided a spread not only over the average cost of funds but also over their marginal costs. Spread banking created a closer link between the asset and liability side of balance sheets and caused pricing and thus money markets to become more volatile.

Deregulation of financial institutions and spread banking placed a premium on higher yielding assets (foreign loans, real estate, junk bonds, etc.) and increased the risk profile of many financial institutions. It also placed great pressure on operating costs, created a desire for fee income (which does not require funding), increased the need for permanent capital (to increase credit quality and

access to cheaper funding), spurred new product innovation and caused a shift to other businesses away from service businesses.

Certain thrifts moved into brokered loan funding and junk bond investments. Certain commercial banks changed into fee-driven investment banking transactions. Investment banks took over a large chunk of traditional commercial bank funding of corporate America through commercial paper, floating rate notes and market auction preferred stock and moved into principal and merchant banking activities.

To be successful in this environment, financial institutions needed to have a full array of products, global reach, a large capital base, a willingness and talent for managing risk, an ability to seek out market anomalies and the discipline to avoid and cut back commodity or low margin businesses.

Sophistication

In 25 years, the computer changed financial institutions from slow-paced Dickensian establishments, where MBAs looked up stock prices in yellowing *Wall Street Journals*, to highly sophisticated, electronically driven enterprises engaging in futures, options, program trading and multicurrency transactions. Many bankers have computer screens on their desks that can be programmed to retrieve and display whatever worldwide data may be relevant to their own transactions.

With computers, portfolio managers and investors think and act more like traders. Dealers amass an array of software resources and capital to stay ahead of investors. A new product idea, innovation or knowledge of a mismatch somewhere in the money or capital markets has a half-life measured in nanoseconds as worldwide computer and communications' networks buzz 24 hours a day.

Restructuring

The competitive pressure to achieve return on capital and reduce operating expenses has focused attention on under-performing assets and lines of business. Business units that may be redundant or irrelevant to one enterprise may become much more productive as a part of another enterprise. The constant review of business units and capital allocations has created even greater motivation for managers to aggressively run their businesses.

The Mechanics Of Securitization

To understand securitization, three discrete aspects of a transaction are highlighted: (1) credit support, (2) funding and (3) interest rate risk management techniques.

Arranging Credit Support

This phase of the securitization process begins with traditional real estate financing and involves identifying and negotiating with an institution that is prepared to accept credit risk for a particular project. Considerations include location, construction, completion, rent roll and sponsorship. Such discussions may be held with conventional sources (United States banks, insurance companies, pension funds) or with unconventional sources (a new entity established to provide financial guaranties, rating agencies, foreign banks, Japanese trading companies or other foreign industrial corporations with excess tax credits). At the conclusion of this phase, funding may be obtained directly or it may be supported by a bond-type rating, a letter of credit or a guaranty of some nature.

Identifying The Funding Source/Structuring The Financing

This phase involves the cheapest source of financing that will accept the credit support—locating wherever in the world it exists, in whatever currency and at whatever maturity. The least expensive source of financing may be commercial paper, fixed or floating rate Eurodollar notes, a floating rate private placement in yen, a domestic public offering or a foreign currency.

The funding is chosen from a hodgepodge of floating and fixed, dollar and nondollar alternatives. Lowest financing cost is optimized and the result usually is short term, floating rate, nondollars—completely unsatisfactory to fund a long term United States dollar assets. Hence, phase three.

Interest Rate Risk Management Techniques

An array of techniques has evolved (and is evolving) to convert wholesale funds into retail funds, to match the funding source to the project's needs, to meet construction draw schedules, to create a simple medium-term fixed rate loan and to hedge against possible future interest rate movements. It is beyond the scope of this article to detail these techniques; but usually they involve the intermediation of risk preferences of financial institutions and capital users throughout the world. Floating rate obligations are swapped for fixed-rated obligations, various maturities on the yield curve are traded and currencies are swapped. Each party to the transaction has a preference or opinion of the trend in interest rates, the slope of the yield curve or the relative strength of certain currencies. Swaps may be entered into merely to cover a previously exposed position. They may be arranged by a financial intermediary on an agency basis (where both counter-parties are located) or on a principal basis (where the position is taken uncovered by the intermediary itself).

As the market has broadened, several hedging techniques have developed including forward swaps, accreting swaps, caps and accreting caps, which fundamentally add an option to a swap transaction in order to accomplish certain timing/hedging objectives.

All these techniques carry fees, and the fees widen and narrow as investor preferences change and as outlooks for the future direction of interest rates and currency fluctuate. Basically, the more the perceived risk at any time, the higher the fees. In each case, the cost of the hedged transaction must be compared to the current

borrowing rate and the premium paid must be compared to the unhedged interest rate risk.

Case Study: Trammell Crow International Partners

New ground was broken in 1986, when $180 million was raised for Trammell Crow International Partners (TCIP). A diversified fund of 16 industrial, retail and office properties owned by this company was placed in a limited partnership structure, against which $90 million of equity was raised from a syndicate of Japanese institutional investors and $90 million of securitized debt was obtained.

The perceived finite capacity for equity in Japan led to a capital structure that included debt. Credit enhancement was required to obtain a broad market for the debt. The cash flows from the portfolio were finite; returns had to be provided to the equity; therefore, the cost of debt became critical. The strategy was to obtain credit support for the debt, sell the debt only after equity placement was reasonably assured and get the best price for the debt.

Credit support was arranged by purchasing a guarantee from Financial Security Assurance (FSA) which was founded in the fall of 1985 as the first monoline insurance company to provide financial guaranties for corporate debt issues. FSA was rated AAA by Standard & Poor's. FSA had $205 million in equity capital and had been involved in $2 billion of transactions at the time of the negotiations.

FSA became actively involved in the structuring of the debt instrument, as guarantor, and they performed extensive real estate due diligence on the properties. After negotiations among the Trammell Crow organization, FSA and ourselves, the portfolio consisted of 16 projects in six diversified markets. FSA obtained a cross collateralized first lien position on the properties. The appraised value of the portfolio, as submitted by Joseph J. Blake & Associates, exceeded the purchase price for the portfolio. The initial year loan to value on the debt was 52%, and the cash flow coverage of debt service; was approximately 1.9 times.

With a guaranty from FSA, a AAA-rating debt was secured. The debt was funded on a 10-year bullet loan basis in the international capital markets. In order to mitigate principal repayment risk, a defeasance reserve was established to commit the partnership to reserve funds to repay principal 18 months prior to maturity and to defease the entire amount within six months of maturity.

Additional support was negotiated by FSA. The appraised value of partnership assets must be at least 125 percent of the partnership's secured debt; semiannual net operating income (before debt service) of the partnership must be at least 125 percent of debt service; and other tests must be met before additional indebtedness may be incurred.

By the time the partnership equity was committed, interest rates had become quite volatile. During the period of June through August 1986, the 10-year United States Treasury bonds ranged in yield from 6.93 percent to 8.01 percent. Spreads off Treasury bonds widened as yields decreased, and swap spreads also widened. Japanese institutions, the initial target for the debt, were not prepared to pay for the funding structure that was being offered. The lack of liquidity inherent in a real estate asset-based transaction further narrowed the investor market.

By mid-August, the international capital markets had been canvassed but investors could not be found who were willing to focus purely on the credit enhancement and not the underlying real estate.

In order to facilitate the transaction and close on the equity, Morgan Stanley, in late August, purchased all the debt as principal, locking in a rate to TCIP that was priced from an interest rate which was within two basis points of the lowest 10-year United States Treasury yield in over eight years.

This example illustrates the complexity of securitized real estate debt and the need for financial intermediaries to assume risk and act with a principal-oriented mentality to make markets perform.

Interest rate risk management techniques were less important here because the issue was dominated by United States dollars and was set at a fixed rate with a relatively low interest rate level.

Case Study: Parklabrea Finance Corporation

Parklabrea, one of the largest residential real estate complexes in the United States, is located in the mid-Wilshire Boulevard district in Los Angeles. On October 31, 1986, May Department Stores sold a portion of the Parklabrea complex (approximately 2,800 of the total 4,000 apartment units) to a subsidiary of Forest City Enterprises. May retained the remainder of the complex in a joint venture agreement with Forest City. As part of the consideration for the sale, May received from Forest City a $165 million promissory note and first trust deed for a term of 12-years.

May had several objectives in this transaction: liquefy the $165 million note by either selling or financing against it at a low cost of borrowing; obtain financing to match the 12-year maturity on the underlying note; remove the asset from its balance sheet and minimize any continuing contingent liability; book the gain on the 1986 sale of the real estate to take advantage of the lower capital gains rate. This meant May also was aiming for a year-end closing on the liquification of the note.

Most of the conventional real estate lenders showed little interest in the transaction due to its 12-year maturity, large size, age and because it was a residential property. Also, conventional lenders were wary of asbestos, methane gas and earthquake risk associated with the project.

The structure finally chosen took into account the current market conditions and realized all May's objectives. To achieve the objective of removing the asset from its books, May sold the $165 million promissory note to a newly created third-party subsidiary, Parklabrea Finance Corporation, which issued the bonds.

The issue totaled $165 million and the bonds had 12-year maturity (five years non-call). By keeping the 12-year

term, the issue was so specialized it would appeal only to particular segments of investor demand, namely portfolio investors who were looking for long-term investments. The Eurodollar floating rate market was chosen because this market offered the lowest cost of borrowing.

One of the most important aspects of this transaction was its multiple levels of guaranties. The first and most important was a full guaranty of the issue's principal and interest once again by FSA. The second level was provided by May (rated AA3/AA-) through a partial guaranty of the principal and a shortfall guaranty of the interest payments. The final layer of security was the property itself.

Why were so many layers of guaranties needed? The aim in paying FSA a fee for its guaranty was to make a complicated real estate deal simple and marketable to investors who were not sophisticated in real estate analysis. Consistent with its no loss underwriting policy, FSA, in turn, required May to provide the partial guaranties in addition to the first mortgage on the property.

The Parklabrea bond issue was launched on Monday, December 1, and it was priced at the London Interbank Offered Rate (LIBOR) plus 25 basis points. Once the floating rate funding was completed, an interest rate swap had to be executed with a 12-year term to satisfy May's objectives. A 12-year term is too long to optimize the market, and so once again, to effect the transaction, Morgan Stanley took the swap as principal and provided a 12-year, fixed rate funding to May at cost, including all fees, of 9.35 percent.

Conclusion

Securitized real estate finance attempts to make real estate fungible so it may be traded like a bond. But is real estate fungible? Can an array of financial techniques make a real asset a financial asset? Perhaps so in good times. What happens in bad times?

Sam Zell addressed this issue in his article "Modern Sardine Management" in Real Estate Issues, Volume II, Number I, 1986. "The current attempt to develop securitized commercial real estate only extends the separation of the investor from the risk he is taking. Securitization converts mortgages into a commodity that blurs the risk to the investors."

Putting it another way: Does marketability guarantee liquidity? Probably not, at least not throughout the full market cycle. Just as in the days when erstwhile merchant bankers were swapping beads around the campfire: Caveat emptor!

MORTGAGE SECURITIES: CASH FLOWS AND PREPAYMENT RISK

Many analytical methods are being used to reduce the uncertainty of cash flows and prepayments for the mortgage investor.

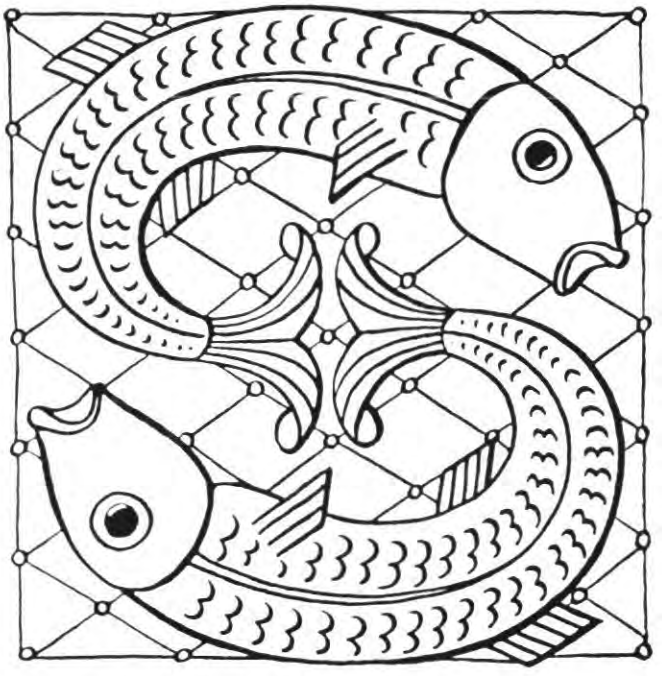
by James E. McNulty

The development of an organized secondary market for conventional mortgage loans in the last 15 years has opened up many new opportunities for mortgage lenders. With more liquidity, the mortgage instrument has provided institutions with much greater flexibility in managing the mortgage portfolio. Selling loans in an active secondary market also has allowed institutions to continue to be mortgage lenders without adding risky, long-term, fixed-rate loans to their portfolios.

It is well known that this secondary market has grown rapidly. At the end of September, 1987, for example, 31 percent of outstanding mortgage debt was represented by mortgage pools, up from 16 percent at the end of 1982 and only 9 percent in 1977. Even more indicative of the trend toward securitization in the mortgage market is that, during 1986 and the first three quarters of 1987, fully 80 percent of the growth in mortgage debt represented increases in mortgage pools. This article provides information to let investors knows what they are getting when a mortgage security is purchased.

The investor who purchases a mortgage-related security obtains a completely different set of cash flows than the investor who buys a bond. The unpredictable nature of the cash flows is part of the reason why, even on default-free mortgage securities, there is a yield advantage to the mortgage security relative to U.S. Treasury securities.

Table 1 shows scheduled interest and principal payments on a $100,000 fixed-rate, 30-year mortgage with a 12 percent interest rate. The mortgage borrower makes 12 monthly payments of $1,028.61 every month to cover principal and interest, for a total annual payment of $12,343. Of this amount, $11,980 goes for interest, and the balance ($363) is used to repay the principal. As the



outstanding principal is reduced, interest falls proportionately; so, as time goes on, the same monthly payment includes a larger principal component. In this way, the annual principal repayment increases sharply over time, from $363 in the first year to $1,063 in the 10th year and $3,508 in the 20th.

If an investor buys a pool of ten mortgages just like the one depicted in Table 1, he will obtain a total cash flow of precisely ten times the above amounts, for a total cash flow of $123,434 per year. However, he will obtain this fixed annual cash flow year after year only if no early principal repayments are made. Over a 30-year time span, this occurrence is extremely unlikely.

Since part of the annual cash flow represents the repayment of principal, the annual cash flow from a mortgage security is greater than it would be for a bond with the

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same interest rate. For example, if the investor purchases a 30-year, 12 percent U.S. Treasury security, the annual cash flow will be $12,000 compared with $12,343 for the mortgage security. Perhaps more importantly, the cash flow from the mortgage security will be received monthly rather than semiannually, giving the investor the benefit of additional compounding.

The decision to buy a mortgage security rather than a bond thus hinges on several factors. One is whether the investor feels that the principal repayments, which grow substantially as time goes on, can be reinvested at an attractive yield. Closely related is the fact that the amount invested (the principal balance owed by the mortgage holder) declines over time. The decision to buy a mortgage security is less of a long-term commitment of funds than the purchase of a 30-year bond is, since the bond will not generate any principal repayment until maturity. If interest rates rise, for example, the mortgage cash flows can be reinvested at higher rates. With the very volatile interest rates of recent years, this feature can make the mortgage security very attractive.

The investor also must calculate the benefits of monthly compounding. A 12 percent interest rate that is compounded monthly produces a yield of 12.68 percent [$(1.01^{12} = 1.1268$] compared with only 12.36 percent if the same rate is compounded semiannually [$(1.06)^2 = 1.1236$]; so there is a 32 basis point yield advantage with monthly compounding. In addition, mortgage securities generally yield more than bond-type securities with similar default risk characteristics.

Variable Cash Flows

Up to this point, the cash flow from the mortgage security has been treated as if it were a fixed amount every year. However, as noted, this will be the case only if no early principal repayments are made. Over a 30-year time span, and even over a shorter one, some borrowers who are represented in the pool will prepay their mortgage.

TABLE 1

Amortization Of A 12%, $100,000 Mortgage Over 30 Years

Year	Payment on Interest	Payment on Principal	Total Payment	Balance at End of Year
1	$11,980.47	$ 362.88	$12,343.35	$99,637.12
2	11,934.45	408.90	12,343.35	99,228.22
3	11,882.59	460.76	12,343.35	98,767.46
4	11,824.16	519.20	12,343.35	98,248.26
5	11,758.31	585.04	12,343.35	97,663.22
6	11,684.11	659.24	12,343.35	97,003.98
7	11,600.50	742.85	12,343.35	96,261.13
8	11,506.29	837.06	12,343.35	95,424.07
9	11,400.13	943.22	12,343.35	94,480.84
10	11,280.50	1,062.85	12,343.35	93,418.00
11	11,145.71	1,197.64	12,343.35	92,220.35
12	10,993.82	1,349.53	12,343.35	90,870.82
13	10,822.66	1,520.69	12,343.35	89,350.13
14	10,629.80	1,713.55	12,343.35	87,636.58
15	10,412.48	1,930.87	12,343.35	85,705.71
16	10,167.60	2,175.75	12,343.35	83,529.96
17	9,891.66	2,451.69	12,343.35	81,078.27
18	9,580.72	2,762.63	12,343.35	78,315.64
19	9,230.35	3,113.00	12,343.35	75,202.64
20	8,835.55	3,507.81	12,343.35	71,694.84
21	8,390.67	3,952.68	12,343.35	67,742.15
22	7,889.37	4,453.98	12,343.35	63,288.17
23	7,324.49	5,018.86	12,343.35	58,269.31
24	6,687.98	5,655.38	12,343.35	52,613.94
25	5,970.73	6,372.62	12,343.35	46,241.32
26	5,162.53	7,180.83	12,343.35	39,060.49
27	4,251.82	8,091.53	12,343.35	30,968.96
28	3,225.61	9,117.74	12,343.35	21,851.22
29	2,069.25	10,274.10	12,343.35	11,577.11
30	766.24	11,577.11	12,343.35	0.00

TABLE 2

Mortgage Principal Repayments Under Various Assumptions

Year	A	B	C	D	E
1	$ 3,628.79	$ 3,628.79	$ 3,628.79	$ 3,628.79	$ 3,628.79
2	4,089.02	4,089.02	4,089.02	4,089.02	4,089.02
3	4,607.60	4,607.60	4,607.60	4,607.60	103,375.06
4	5,191.96	5,191.96	5,191.96	5,191.96	102,921.03
5	5,850.44	5,850.44	5,850.44	5,850.44	102,343.57
6	6,592.42	6,592.42	491,612.30	6,592.42	101,618.67
7	7,428.50	7,428.50	3,714.25	7,428.50	100,718.23
8	8,370.62	8,370.62	4,185.31	8,370.62	99,609.37
9	9,432.22	9,432.22	4,716.11	9,432.22	98,253.73
10	10,628.47	10,628.47	5,314.23	10,628.47	96,606.54
11	11,976.42	11,976.42	5,988.21	11,976.42	94,615.64
12	13,495.33	922,203.54	461,101.78	104,366.15	92,220.35
13	15,206.88			103,036.32	
14	17,135.49			101,344.98	
15	19,308.70			99,221.80	
16	21,757.53			96,584.48	
17	24,516.93			93,336.73	
18	27,626.29			89,366.15	
19	31,130.00			84,541.64	
20	35,078.05			78,710.45	
21	39,526.83			71,694.84	
22	44,539.82				
23	50,188.58				
24	56,553.75				
25	63,726.18				
26	71,808.26				
27	80,915.34				
28	91,177.43				
29	102,741.01				
30	115,771.14				
Total	$1,000,000.00	$1,000,000.00	$1,000,000.00	$1,000,000.00	$1,000,000.00

A—No early prepayment of principal.
B—All mortgages prepaid at the end of 12 years.
C—Half the mortgages balance is prepaid at the end of 6 years; the other half is prepaid at the end of 12 years.
D—Slow pay: 10 percent of the outstanding mortgage balance is prepaid each year beginning in year 12.
E—Fast pay: 10 percent of the mortgage balance is prepaid each year beginning in year 3.

NOTE: All examples assume a pool of ten $100,000 mortgages, each with a contract rate of 12%.

Table 2 presents the cash flows that result when ten $100,000 mortgages in a pool are repaid at various periods of time. For example, column A of the Table shows the cash flows of principal if there are no unscheduled repayments during the 30 years; these values also are plotted in Figure 1. As noted, it is extremely unlikely that any mortgage pool will behave like this: indeed, once we allow for unscheduled payments, anything is possible. Columns B through E in Table 2 and Figures 2 through 5 illustrate why life can be much more complicated for the mortgage investor than for the bond investor.

The standard assumption in the mortgage industry used to be that there were no prepayments until the 12th year of the mortgage and then all the borrowers prepaid their mortgages at once. In fact, yields on mortgage securities often are still quoted this way by such publications as *Barron's* and others. The cash flows following from this assumption (Column B, Table 2) are shown in Figure 2. This figure shows that cash flows with the outstanding

FIGURE 1

Cash Flows With No Prepayment Of Principal

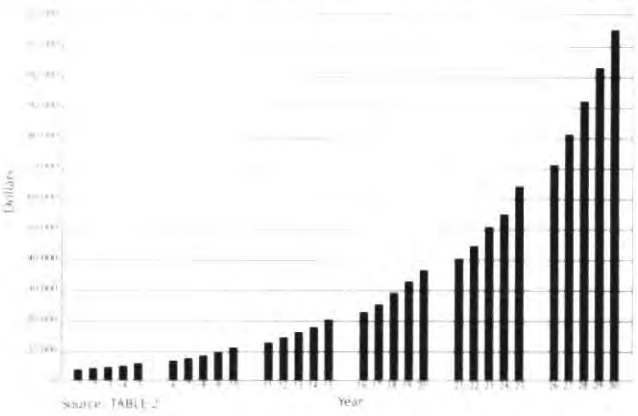


FIGURE 2
Cash Flows With All Outstanding Principal Repaid In Year 12

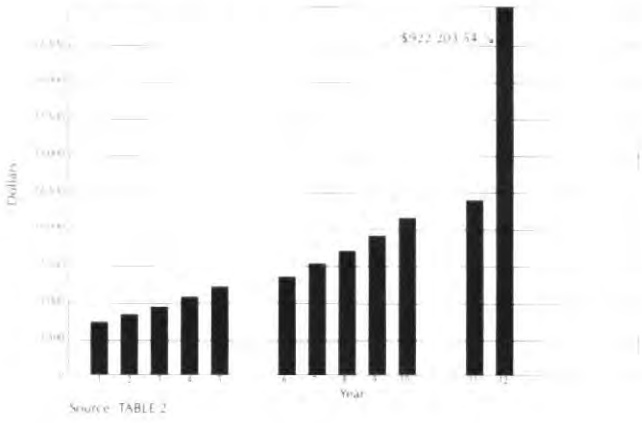


FIGURE 3
Cash Flows With 50 Percent Prepayment In Years 6 And 12

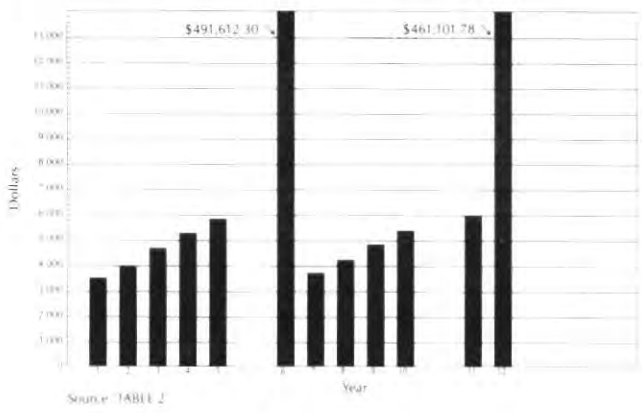


FIGURE 4
Slow Pay-Ten Percent Prepayment Per Year Beginning In Year Twelve

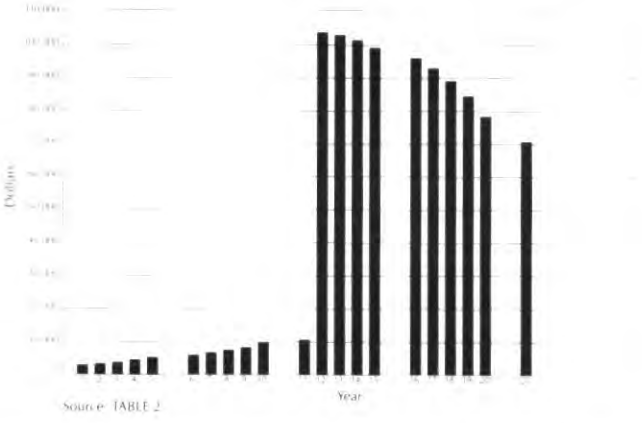
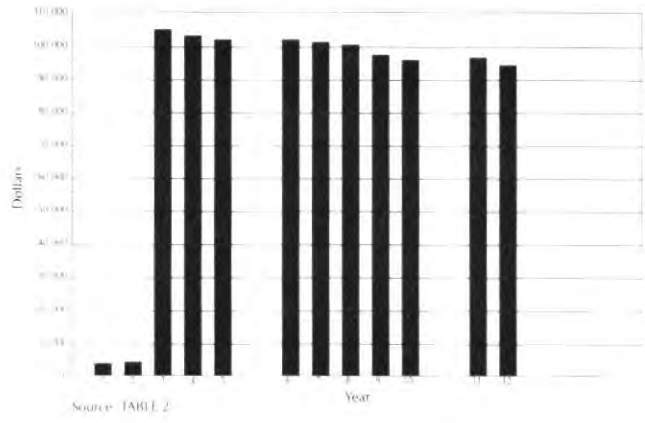


FIGURE 5
Fast Pay-Ten Percent Prepayment Per Year Beginning In Year Three



principal paid in year 12 are the same as the cash flows when there has been no prepayment of principal for 11 years, then all outstanding principal is repaid in year 12.

Columns C, D and E in Table 2 and Figures 3, 4 and 5 show other possibilities. Column C and Figure 3 assume that half the borrowers will prepay the mortgage balance at the end of year 6 and half at the end of year 12. With this assumption, the scheduled prepayments in years 7 through 11 are smaller than the prepayments in the first five years because less principal is outstanding at the end of the sixth year.

Column D and Figure 4 assume slow prepayment—i.e., one mortgage (10 percent of the pool) is prepaid each year beginning in year 12—which may occur for mortgage pools with 8 percent or 9 percent coupons when mortgage rates are much higher. Fast pay—i.e., one mortgage (10 percent of the pool) is prepaid each year beginning in year 3—is illustrated in Column E and Figure 5. Fast pay may occur with a pool of 14 percent mortgages when current mortgage rates are around 11 percent.

The Prepayment Option

The unpredictability of cash flows is one uncertainty for the mortgage investor. Adding to that unpredictability is the fact that cash flows depend upon what happens to interest rates after the mortgage security has been issued. If interest rates fall, prepayments are likely to be quite high because the housing market will be active and mobility will increase. Even the homeowners who stay put may refinance their mortgages, especially if the decline in rates is dramatic. The situation will be similar to that depicted in Figure 5. A drop in interest rates works to the disadvantage of the mortgage investor because the large cash flows that arise from increased prepayments will have to be reinvested at lower interest rates.

On the other hand, if rates rise, housing activity and prepayments will decline sharply. Homeowners will attempt to hold onto their old, low-rate mortgages by remaining in their existing homes. Even when their houses are sold, homeowners who do not have a due-on-sale clause in their mortgage will arrange for their low-rate loan to be assumed. Many conventional mortgages issued in the 1960s and early 1970s do not contain due-on-sale clauses. In addition, Federal Housing Administration and Veterans Administration loans are assumable under most conditions. The investor who buys into a pool of low-rate loans at a discount will want to know whether a significant number of the mortgages in the pool are assumable. If so, the yield on this type of pool should be

significantly greater than the yield on other pools to compensate for the fact that the expected life of the loan is greater.

Prepayment Models And Consolidated Mortgage Obligations

As noted, the standard prepayment assumption in the mortgage business until the mid- to late-1970s was that a mortgage pool had a 12-year average life. However, this assumption came to be viewed with increasing skepticism as interest rates rose in the mid-1970s. It was seen as completely unreliable after the Federal Reserve's shift in October, 1979, to a more *monetarist* monetary policy because this policy created much more volatility in interest rates.

For example, investors who had purchased mortgages in the 1960s and early 1970s found that the 12-year average life of a mortgage pool was incompatible with their own experience, since homeowners continued to hold onto low-rate mortgages long after the standard rule-of-thumb said they should have been repaid. More recently, when interest rates fell sharply in 1982 and 1983, and again in 1986 and early 1987, the opposite phenomenon occurred—investors who thought they had locked in high yields for about 12 years found themselves flooded with prepayments which they had to reinvest at much lower rates.

These developments led to an exciting new area of financial research—the development of econometric models to forecast prepayment patterns on mortgage pools. It also led to the development of secondary mortgage market instruments with more certain cash flow patterns. The development of the new securities, known as collateralized mortgage obligations (CMOs), and the development of the prepayment models were closely linked; however, prepayment analysis came first.

Almost all large Wall Street firms have set up entire departments to analyze prepayment patterns, and academic economists have been active in this area as well.

According to Helen Peters, who directed Merrill Lynch's research in this area for several years, "Running a mortgage-backed securities research department means trying to get a handle on prepayments and defaults. If you don't understand these two components of mortgage termination, you can't possibly get a handle on the price/yield relationship or the cash flows."[1]

Peters' research has indicated that prepayment rates vary, not only by the coupon rate on the mortgage but by geographic region, by loan amount, by the age of the borrower and by the level of economic activity. More recently, a study by Professor Frank Navratil of John Carroll University in Cleveland, concluded that prepayment rates would be about 5 percent to 8 percent per year if market interest rates remained in the same general range as the coupon rate on the mortgage.[2]

If the general characteristics of the mortgages in a certain pool are known, use of econometric models will give the analyst a much better handle on what the prepayment pattern is likely to be, which, in turn, will determine how the mortgage pool should be priced and what the holding period yield will be.

If prepayment patterns are known with greater certainty, mortgage pools can be split into several classes of securities, each with different expected maturities. Under this arrangement, the holder of the short-term security will receive all the initial principal payments from the mortgages—both scheduled and unscheduled. After these investors have been paid off, principal payments will be directed to the holder of the intermediate-term security and then to the holder of the long-term security. (Interest payments will be handled in the normal way, with all investors receiving regular payments based on their outstanding balances.)

Consolidated mortgage obligations or CMOs provide a way for mortgage lenders to match maturities and, hence, reduce their interest-rate risk. The short-term security is of interest to thrift institutions, while the longer term securities are more appropriate for insurance companies and pension funds.

Pricing The Prepayment Option

The arrangement by which prepayment is at the option of the borrower creates interest-rate risk for the mortgage investor. In effect, a mortgage in this arrangement is like a bond which is callable at any time, and, therefore, it is quite different from any other debt instrument. The fact that the mortgage investor is providing an option to the borrower is not a problem as long as the option is properly priced to cover the risk that is involved. It seems clear, however, that in the past this option was not properly priced. Since the option is most often exercised when this action is detrimental to the lender (i.e., when rates have fallen), there is interest-rate risk whenever the option value is not incorporated into the mortgage rate or fees. Thus, another new area of current research in the secondary market concerns the proper pricing of the mortgage prepayment option.

Effect Of Prepayments On Yield

Unexpected prepayments can either raise or depress the yield on a mortgage security. The crucial question is whether the security is purchased at a discount or a premium. Figure 6 shows the hypothetical relationship between the yield and the prepayment rate for three different mortgage securities, under the assumption that the current mortgage rate is 10 percent. If the mortgage has an 8 percent coupon, it will be purchased at a discount (say, $90). Thus, faster prepayments will increase the yield. In the extreme case, if all the mortgages are prepaid tomorrow (at par, of course), the investor will receive a windfall, since he will get the entire discount back as interest.

In the opposite case, if the mortgage is purchased at a premium (say, $105), the investor will be hurt by faster-than-expected prepayments. The borrower will only repay at par ($100), and the investor will forfeit the difference. In other words, the investor who pays a premium to

FIGURE 6

The Effect Of Prepayment Rate On Yield
(Current Coupon = 10%)

get a higher coupon payment benefits from slow prepayments. In this way, he can receive the high coupon payment on as large a balance as possible for a longer period of time. This is why Figure 6 shows that the yield falls as prepayments increase, in the case of the high coupon mortgage.[3]

In order to provide the investor with greater call protection and, hence, greater certainty of yield, various methods have been proposed to restrict prepayments in some way. One extreme possibility is a market-value prepayment penalty which requires the homeowner to pay the lender the present value of the lost interest income when he prepays the mortgage. This is similar to the prepayment clauses in many commercial and business loans. Numerous other prepayment formulas can be devised as well, such as requiring a percentage of the outstanding balance to be paid. Presumably, these requirements will be enforced only if the homeowner refinances, not if he moves. Nonetheless, it is doubtful that these proposals will be feasible politically.

Another, less onerous possibility is to have two types of mortgages—one that is prepayable and one that is not. The one that is not prepayable will cost the borrower less. Again, the restriction against prepayments will not be enforced if the homeowner moves.

In 1987, some lenders went in the opposite direction and developed mortgages that could be refinanced automatically without paying points and closing fees, if rates fell two percentage points. Mortgages with this refinancing privilege carried a higher yield (generally 1/8 of one percent), which was, in effect, an attempt to price the prepayment option in the marketplace. The homeowner had to make higher monthly payments initially (because of the higher mortgage rate) in return for the possibility of making lower payments later. Investors had to make similar calculations about the yields they were willing to accept on these types of mortgages.

Adjustable Rate Mortgages

The previous discussion has been based on the assumption that the mortgage is a fixed-rate instrument. At times in recent years, however, over half the mortgages that were originated in the United States have carried adjustable rates of interest. Investors need to be familiar with the characteristics of these mortgages to determine if the mortgages are suitable for their portfolios, while lenders need to know what types of adjustable rate mortgages (ARMs) can be readily sold in the secondary market. There are significant differences among ARMs with respect to the initial rate of interest, the type of index, the formula used to adjust the rate and the limits or caps on the amount of rate adjustment.

Initial rates of interest differ not only over time but also because of local market conditions. For example, many lenders offer initial rates of interest that are substantially below what the contract formula calls for, in order to market their loans. These so-called teaser rates usually apply in the first year only, after which the contract formula goes into effect. The indices that are used by lenders differ widely and include the cost of funds for savings institutions, rates on U.S. Treasury securities and national mortgage rates. In addition, some lenders adjust ARM rates once a year; some adjust once every three years; and some even adjust rates once every six months.

The diversity among ARMs is much less than it used to be, however. Many lenders have found that linking their mortgages rates with the rates of U.S. Treasury securities allows their interest rates to move with market conditions, thus creating an image of fairness with the borrowing public as well as ready marketability in the secondary mortgage market. The most common type of ARM in many markets now has a rate that is linked with rates on one-year U.S. Treasury securities, has a margin of 200 to 275 basis points over the Treasury securities' rate and provides for adjustment once a year, with a maximum increase or decrease of 2 percent in any one year and 5 percent over the life of the loan. Nonetheless, initial rates of interest still vary considerably because of competitive conditions, and mortgage-rate linkages with other types of indices continue to be made.

Cash Flows With ARMs

The investor who purchases a pool of ARMs obtains a set of cash flows from principal repayments somewhat similar to that shown in Table 1, with a gradual increase in principal payments over 30 years. The interest payments on the outstanding balance differ substantially, however, depending upon the initial rate, the behavior of the index, the rate caps and the other characteristics of the mortgage.

Consider, for example, an investor who purchases a pool of ARMs that are indexed to one-year U.S. Treasury rates. The investor will receive a set of interest payments that change in a manner similar to the interest payments he would have received if he had purchased a one-year Treasury security and rolled it over every year. The level of the interest earnings will be about 200 to 275 basis points greater, however.

ARM cash flows may be affected by early prepayment, just as fixed-rate mortgages are. Nonetheless, these flows

are expected to be affected less by interest rate changes, since the incentive to refinance has been reduced or eliminated. The prepayment option has not been eliminated entirely, however, since rates on ARMs may get out of line with market rates. This can happen if the lender uses an index that does not track market rates very well, such as the average cost of funds, or if rates reach their cap or floor.

Consider a group of ARMs with an initial rate of 9 percent and a 14 percent lifetime cap. If the formula used to calculate the mortgage rate (say, one-year U.S. Treasury rates plus 250 basis points) reaches the 14 percent lifetime cap, the mortgages become, in effect, just like fixed-rate mortgages. If rates on other mortgage instruments rise well above 14 percent, prepayments will slow substantially. While this seems unlikely, it must be remembered that the levels of rates that were experienced in 1981 and 1982—13 percent to 14 percent on U.S. Treasury bills and 16 percent to 18 percent on new fixed-rate mortgages—were completely unanticipated by most market participants. Many ARM lenders offer guaranteed assumability as a selling point for ARMs, which further reduces the chances of prepayment in a high interest rate environment.

Consider also the situation in the mortgage market in 1983. Mortgage rates and U.S. Treasury rates had fallen substantially, but the average cost of funds index had increased, due, in large part, to the deregulation of deposit rates. At this time, the consumer complaint departments of the financial regulatory agencies were flooded with calls from borrowers who ended up with mortgage rates as high as 18 percent on ARMs that were indexed to the average cost of funds. Many of these mortgages were, no doubt, refinanced at prevailing market rates of 12 percent to 13 percent.

Even without prepayment, cash flows of principal with ARMs can be substantially different than those with fixed-rate mortgages. Table 3 shows a hypothetical ARM originated in July, 1983, with an initial rate of 9 percent and a 2 percent annual cap on the rate increase. The rate is set using a margin of 2.5 percent over the one-year U.S. Treasury rate after the first year. The actual one-year Treasury rate is shown in Column 2, and the index (Treasury rate plus 250 basis points after the first year) is shown in Column 3. Because of the initial rate of 9 percent and the 2 percent annual caps, the rate charged the borrower (Column 3) does not reach the index value until the third year.

The important information for the investor is the pattern of cash flows revealed in Column 7. In contrast with fixed-rate mortgages (Table 1), cash flows of principal with ARMs actually fall in the second year—from $683 per month to $501. The reason for this drop is rooted in the mathematics of mortgage amortization. When rates are low, a larger portion of the payment goes to principal than when rates are high. Thus, with the increase in rates from 9 percent to 11 percent, the investor receives larger interest payments but smaller principal payments; and when rates fall somewhat in the third year, principal payments go up. This is somewhat similar, albeit on a much smaller scale, to the pattern of cash flows that is expected with fixed-rate mortgages, since the cash flows fall when rates rise and rise when rates fall. This pattern creates problems for the investor, because, as with fixed-rate mortgages, cash flows have to be reinvested at lower interest rates.

Despite these factors, there is a general tendency for cash flows of principal on ARMs to increase over time, since the mortgage must be paid off in 30 years. In addition, annual prepayments due to non-interest-rate factors, such as mobility, death, divorce and default, also are expected to increase if the loan has been on the books for a long period of time.

Defaults And ARMs

Default often is considered to be more of a problem with ARMs than with fixed-rate mortgages. In fact, default was one of the key issues in the mortgage market in the mid-1980s, and entire books and conferences have been devoted to the subject.[4] The problem occurs because a lender making ARMs has, to some extent at least, substituted credit risk for interest rate risk. As Table 3 indicates, a 2 percent rate increase (from 9 percent in July, 1983, to 11 percent in July, 1984) can translate into an 18 percent increase in the monthly payment (from $804 to $950), which may be more than many families can afford.

As Leon Kendall, chairman of the board, Mortgage Guaranty Insurance Corporation in Milwaukee, has pointed out, the problem is compounded by the fact that property values in the 1980s are not increasing at a rate anything like the rates in the 1970s (in some areas, property values actually are declining). Moreover, disinflation is resulting in lower salary increases. As a result, new homeowners

TABLE 3

Amortization Of A $100,000 Adjustable-Rate Mortgage Over 30 Years

(1) Date	(2) Treasury Rate	(3) Index*	(4) Mortgage Rate	(5) Monthly Payment	(6) Annual Payment Interest	(7) Annual Payment Principal	(8) Total Cash Flow	(9) Principal Outstanding at End of Year
July, 1983	10.20%	12.70%	9.000%	$804.62	$ 8,972.28	$683.16	$ 9,655.44	$99,316.84
July, 1984	12.03	14.53	11.000	950.09	10,900.09	500.99	11,401.08	98,815.85
July, 1985	7.86	10.36	10.375	904.49	10,222.69	631.19	10,853.88	98,184.66

*Index equals Treasury rate plus 250 basis points.

with ARMs who are facing payment shock frequently find that they cannot sell their property, even for what they paid for it. If they had financed the property with a low down payment loan, their best recourse often is to turn the deed over to the lender to avoid foreclosure or simply leave the keys in the mailbox.[5] The subject of designing an ARM that protects both the borrower and the lender currently is attracting considerable attention.

Mortgage pools issued by the three federal agencies that are active in the secondary market—the Federal Home Loan Mortgage Corporation (FHLMC), the Federal National Mortgage Association (FNMA) and the Government National Mortgage Association (GNMA)—guarantee the timely payment of principal and interest. For these securities, then, defaults affect the mortgage investor only with respect to the timing of the cash flow—mortgages with higher probabilities of default result in earlier cash flows.

Capital Risk

As longer-term instruments, pools of fixed-rate mortgages decline sharply in price if interest rates rise. Nonetheless, the decline in price for a 30-year mortgage is less than the decline for a 30-year bond (with a given change in interest rates) because the effective maturity is lower. The effective maturity is lower because of the factors cited above—scheduled amortization and early prepayment.

TABLE 4

Durations Of Various Mortgages And Bonds

	Mortgage Rates				
Year of Total Prepayment	8% Coupon Rate	10% Coupon Rate	12% Coupon Rate	14% Coupon Rate	16% Coupon Rate
3	2.64%	2.58%	2.52%	2.46%	2.40%
6	4.66	4.46	4.26	4.06	3.87
9	6.19	5.81	5.44	5.10	4.78
12	7.32	6.77	6.25	5.77	5.34
15	8.15	7.44	6.78	6.20	5.67
30	9.56	8.94	7.56	6.76	6.08
	Bond Rates				
30	11.76%	9.94%	8.57%	7.51%	6.68%

Financial economists use a concept known as duration to measure the price sensitivity of a security. Duration is measured in units of time, just like maturity, and securities with larger durations have larger price sensitivities for a given change in interest rates. In fact, as indicated by the following formula, the relationship between price sensitivity and duration is approximately linear for small changes in interest rates:

$$\Delta p = -d \times \Delta i$$

where:

Δp = the percent change in price for security
d = the duration of security
Δi = the change in market interest rates on this particular security

Table 4 shows the estimated duration of newly issued mortgage pools with various coupons and lengths of time to prepayment which is assumed to take place all at once or at the end of 3, 6, 9, 12, 15 or 30 years. Thus, if interest rates increase by one percentage point, a mortgage pool with a coupon rate of 12 percent and an expected prepayment at the end of 12 years will decline in value by 6.25 percent. This decline is calculated simply by multiplying the duration (6.25) by the interest rate change (.01). As indicated, a 30-year bond with the same coupon will decline in value by a larger amount—8.57 percent—if rates rise by 1 percent.

Conclusion

Securitization has changed the mortgage industry in a fundamental way. There is much more emphasis on developing precise, quantitative relationships that will explain the pattern of the cash flows. The need for understanding the cash flows explains the creation of prepayment models, duration calculations, estimations of the value of the prepayment option, etc. In the process, what used to be a collection of local markets has evolved into a more uniform, national market. Mortgage investors are asking a lot of questions about the mortgage-backed securities they purchase, and an entire industry has emerged to supply the answers.

NOTES

1. Peters, Helen F. "Debt Strategies," in *Managing Interest Rate Risk in the Thrift Industry*, Federal Home Loan Bank of San Francisco, Proceedings of the Seventh Annual Conference, p. 229.
2. Navratil, Frank. "The estimation of mortgage prepayment rates," *Journal of Financial Research* (Summer 1985).
3. The effect of prepayments on prices of mortgage-backed securities is more complicated. The mathematics is described in detail in Fabozzi, Frank J. (ed.), *The Handbook of Mortgage-Backed Securities*. Probus Publishing Company (1985), pp. 269-277.
4. See, for example, *Solving the Mortgage Menu Problem*. Federal Home Loan Bank of San Francisco, Proceedings of the Tenth Annual Conference (1984).
5. Kendall, Leon T. "The new economics in mortgage finance," *The MGIC Newsletter* (May/June 1985).

HOUSING DEMAND, REAL MORTGAGE RATES AND THE TILT PROBLEM

Changes in real mortgage rates as well as changes in the tilt factor can influence housing demand.

by Michael T. Bond

The interest rate on a home mortgage is an important determinant of the demand for housing. Periods of high interest rates on housing loans have been accompanied by dramatic slowdowns in the sale of both new and existing houses in the United States. Drops in the cost of housing money generally have been associated with a marked increase in home sales. This article develops a theoretical framework to explain why the housing industry suffers when mortgage rates rise in nominal terms but not in real terms (i.e., when adjusted for inflation). This phenomenon, referred to in the literature as the tilt problem,[1] has been addressed as a determinant of housing demand over time.

The Tilt Problem

The following problem illustrates the use of a conventional fixed-rate mortgage during a period of inflation. Assume there is a five-year mortgage on an initial balance of $50,000 with annual payments. Also assume that the buyer of the home has a dollar income at time period zero of $30,000. If the rate of interest on the mortgage is 6 percent, the annual payment of principal and interest is $11,869.82. If there is no inflation over the life of the contract and the homeowner's income remains the same in real terms, the homeowner will have a ratio of debt service to income of 39.57 percent in each of the years the mortgage is outstanding, as shown in Table 1.

Now assume that 10 percent inflation has been anticipated and built into the mortgage agreement. The inclusion of an inflation factor necessitates a nominal yield on the mortgage of 16.6 percent (the original 6 percent plus the expected inflation of 10 percent and a cross-product term). Thus, a mortgage rate of 16.6 percent is needed to keep the real cost of the mortgage at 6 percent, as suggested by Fisher.[2]

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The tilt problem now becomes obvious (see Table 2). With a built-in inflation factor, the amortized amount for the five-year, fixed-rate mortgage becomes $15,484.74. If the homeowner's income remains the same in real terms, the ratio of debt service to income in the first year is 46.92 percent. Thus, even though the real cost of the mortgage is the same (6 percent), it is more difficult up front to afford the home in question. Of course, if income remains the same in real terms and inflation is actually 10 percent, the servicing ratio over time will become easier to handle. Note the ratio of debt service to income declines to 32.05 percent in the last year of the mortgage.

Probably the best method for dealing with the tilt burden is a price level-adjusted mortgage (PLAM). Table 3 presents the data for the above mortgage when the real interest rate of 6 percent is used in a PLAM. In this example, when a nominal yield of 6 percent is set in the contract and the mortgage payment is indexed to the rate of inflation over time, the debt service to nominal income ratio does not change. In each time period the ratio of debt service to nominal income remains 39.57 percent. This phenomenon also occurs with a fixed-rate mortgage

TABLE 1

Debt Service Ratio On A Conventional, Five-Year, Six Percent, Fixed-Rate Mortgage for $50,000

Year	Annual Payment on Principal and Interest	Amount Paid for Interest	Amount Paid on Principal	Unpaid Balance	Homeowner's Income	Debt Service Ratio
1	$11,869.82	$3,000.00	$ 8,869.82	$41,130.18	$30,000	39.57%
2	11,869.82	2,467.81	9,402.01	31,728.17	30,000	39.57
3	11,869.82	1,903.69	9,966.13	21,762.04	30,000	39.57
4	11,869.82	1,305.72	10,564.10	11,197.94	30,000	39.57
5	11,869.82	671.88	11,197.94	0.00	30,000	39.57

TABLE 2

Effect On Inflation On A Conventional, Fixed-Rate Mortgage For $50,000 And The Tilt Problem

Year	Annual Payment on Principal and Interest	Amount Paid for Interest	Amount Paid on Principal	Unpaid Balance	Homeowner's Income	Debt Service Ratio
1	$15,484.74	$8,300.00	$ 7,184.74	$42,815.26	$33,000.00	46.92%
2	15,484.74	7,107.33	8,377.41	34,437.85	36,300.00	42.66
3	15,484.74	5,716.68	9,768.06	24,669.78	39,930.00	38.78
4	15,484.74	4,095.18	11,389.56	13,280.23	43,923.00	35.25
5	15,484.74	2,204.52	13,280.23	0.00	48,315.30	32.05

TABLE 3

Effect Of PLAM On The Tilt Problem

Year	Annual Payment on Principal and Interest	Amount Paid for Interest	Amount Paid on Principal	Unpaid Balance	Homeowner's Income	Debt Service Ratio
1	$13,056.80	$3,300.00	$ 9,756.80	$49,767.52	$33,000.00	39.57%
2	14,362.48	2,986.05	11,376.43	42,230.20	36,300.00	39.57
3	15,798.73	2,533.81	13,264.92	31,861.80	39,930.00	39.57
4	17,378.60	1,911.71	15,466.90	18,034.40	43,923.00	39.57
5	19,116.46	1,082.06	18,034.40	0.00	48,315.30	39.57

TABLE 4

Effect Of PLAM On A Five-Year, Eight Percent Mortgage for $50,000

Year	Annual Payment on Principal and Interest	Amount Paid for Interest	Amount Paid on Principal	Unpaid Balance	Homeowners Income	Debt Service Ratio
1	$12,522.82	$4,000.00	$ 8,522.82	$41,477.18	$30,000	41.74%
2	12,522.82	3,318.17	9,204.65	32,272.53	30,000	41.74
3	12,522.82	2,581.80	9,941.02	22,331.51	30,000	41.74
4	12,522.82	1,786.52	10,736.30	11,595.21	30,000	41.74
5	12,522.82	927.62	11,595.21	-0.00	30.000	41.74

when there has been no anticipated or actual inflation over the life of the contract.

While this tilt effect has been noted and discussed in the literature, there is another effect, which I will call the real effect, that also influences the affordability of a mortgage. Assume that the $50,000 mortgage is set up as a PLAM, the homeowner's income remains at $30,000 in real terms and there is 10 percent inflation. What if the real mortgage rate is 8 percent? The results are shown in Table 4. Note that in each of the five years the ratio of debt service to nominal income is 41.74 percent. Thus, even though the PLAM has eliminated the tilt problem, it has not eliminated the negative influence of the higher mortgage rates.

The Tilt Problem's Effect On Housing Demand

There is a substantial body of literature on housing demand and mortgage rates. The tilt problem has been recognized in the literature and has been shown to have a negative influence on the demand for housing. The influence on housing from changes in real mortgage rates also has been examined. For example, Cohn and Lessard suggested that the conventional fixed-rate mortgage was a central determinant of the dramatic decline in the United States housing market in the 1974-1975 period.[3] Among their recommendations for diluting the impact of high-cost, fixed-rate mortgages on housing demand was a PLAM that would maintain over time a constant rate of real interest on a mortgage by relating the payments on the loan to an appropriate price index. Hyer and Kearl also suggested that a PLAM would have the potential of ameliorating the difficulties encountered with fixed-rate mortgages in an inflationary environment.[4] Vandell, using simulation analysis, demonstrated that PLAMs were far less likely to discourage home ownership during periods of high inflation than were both fixed-rate mortgages and variable rate mortgages.[5] Alm and Follain estimated that the use of PLAMs would allow the average homebuyer to purchase a house valued at 30 percent more than the homebuyer could afford under a standard fixed-rate mortgage.[6]

However, Vandell also suggested that PLAMs would be unpopular with many lenders because the real incomes of certain groups of borrowers might not keep up with increases in the monthly mortgage payment over time.[7] Cassidy pointed out that because of the lower initial cash flow from a PLAM, lenders would resist this type of mortgage, and a similar type of instrument would have to be developed for savers.[8]

Batten and Hein pointed out that, adjusted for ex-post inflation, real mortgage rates were relatively stable through the 1967-1982 period in the United States. They attributed the variation in housing activity in the country to the fixed-payment feature of fixed-rate mortgages, although they did not attempt to quantify this phenomenon or name it.[9] Harris defined the increase in the ratio of mortgage cost to homeowner income when fixed-rate mortgage costs rose as the tilt problem but did not attempt to use it as a variable in explaining housing demand.[10]

Both Kearl[11] and Schwab[12] attempted to measure the effect of changes in real mortgage rates. Kearls' study involved only the 1966-1973 time period, while Schwabs' work was a simulation analysis that focused primarily on the microfoundations of housing demand.

This article represents an additional contribution to the literature because it estimates the effect of changes in real mortgage rates and the tilt burden through 1986. The paper constructs theoretical measures of the tilt problem and the real problem using survey-based measures of expected inflation, and it tests these measures as determinants of housing demand in the United States.

Measurements Of Tilt And Real Burdens

The tilt burden may be defined roughly as the increase in the ratio of debt service to nominal income when a mortgage rate rises in nominal terms but remains constant in real terms. This definition obviously ignores the fact that, over the life of a fixed-rate mortgage, the debt service burden will decline because of increases in nominal incomes. However, it does capture the upfront lockout problem that faces many homebuyers.

In order to measure for empirical examination, the upfront tilting of real mortgage payments on a fixed-rate mortgage when there is expected inflation, an index has been constructed in Equations 1 through 3 below using the following variables: the current after-tax nominal mortgage rate, the expected inflation rate over the life of the mortgage, the amount being financed and the income of a prospective homeowner.

$$1 \qquad \frac{\left[\dfrac{L}{1 - \left[\dfrac{1}{(1 + mr/12)^n}\right]}\right]}{HI}$$

Equation 1 represents the present value of a stream of payments for a fixed-rate mortgage. It divides the loan amount L by an annuity factor for n years with a mortgage rate equal to the real rate r and the expected inflation rate i. The quotient from this equation produces the monthly mortgage payment, which is then divided by the homeowner's initial income HI.

$$2 \qquad \frac{\left[\dfrac{L}{1 - \left[\dfrac{1}{(1 + rm/12)^n}\right]}\right]}{HI}$$

Equation 2 expresses algebraically the real value of the payments on a PLAM. The loan amount L is divided by an annuity factor using the real after-tax rate of interest to generate the base payments on the mortgage. The real rate on the mortgage is equal to the observed nominal rate minus the expected rate of inflation over the contract. (These payments would rise over time at the rate of inflation of 1 percent to keep the mortgage payment constant in real terms.) The initial payment is then divided by household income HI to give a debt service ratio on the PLAM.

Equation 3 is the result of dividing Equation 1 by Equation 2 and produces the tilt index:

$$3 \quad \frac{\left[1 - \left[\dfrac{1}{(1 + rm/12)^n}\right]\right]}{\left[1 - \left[\dfrac{1}{(1 + mr/12)^n}\right]\right]}$$

By dividing Equation 2 into Equation 1, both the loan amount L and the household income amount HI are eliminated. The numerator of the tilt index is equal to the annuity factor that uses the after-tax nominal mortgage rate. The denominator is equal to the annuity factor that uses the real after-tax mortgage rate as the per period interest rate. It is obvious that if the anticipated rate of inflation is zero percent, the nominal and real mortgage rates will be equal and the tilt burden will be 1.

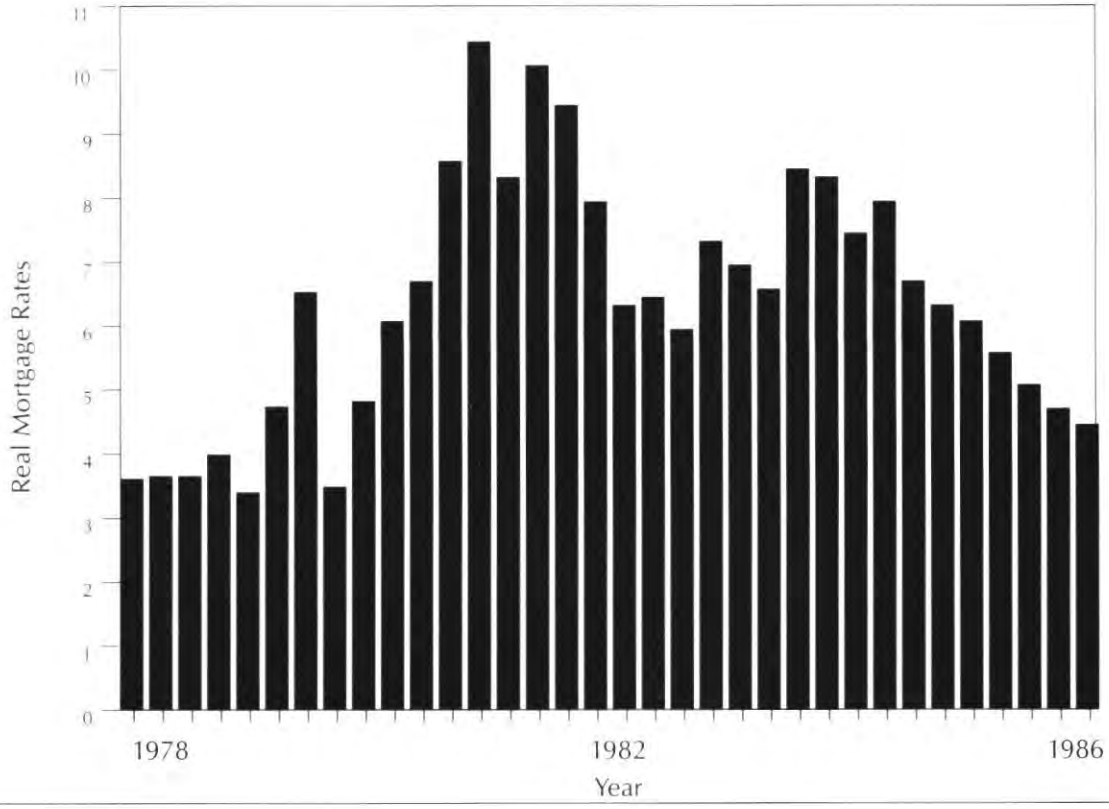
Empirical Evidence

From the previous discussion, it would appear that changes in the tilt burden as well as changes in the level of real mortgage rates should influence the affordability of and, hence, the demand for housing. In this section, the demand for housing is related statistically to measures of the real mortgage rate and the level of the tilt burden. Since increases in either the real mortgage rate or the tilt burden increase the ratio of debt service on a mortgage to income, both of these variables should be related in a negative manner to the demand for housing.

Three dependent variables have been used in the study as measures of the demand for housing: the number of new housing starts, the index of new starts authorized by local building permits and the number of sales of existing single family homes. The measure of real mortgage rates involves subtracting an expected inflation variable from an observed mortgage rate in each time period. The yields on secondary Federal Housing Administration (FHA)

FIGURE 1

Expected Real Mortgage Rates



mortgages have been used as proxies for nominal mortgage rates, and a long-term expected inflation series, which is compiled through quarterly surveys by Drexel-Burnham-Lambert,[13] has been used as a measure of anticipated inflation. The difference between the FHA mortgages and the inflation series has produced the expected real mortgage rates as shown in Figure 1. This variable has been converted to an after-tax figure using an average marginal tax rate series constructed by Joe Peek from *Statistics of Income Data*.[14] This adjustment is desirable because of the tax deductibility of interest on home mortgages and the positive impact that deductibility has on housing demand.

The tilt index is derived from Equation 3 using the measures of nominal and real after-tax mortgage rates indicated above, and the tilt burden TB is calculated for a 15-year mortgage TB15 and a 30-year mortgage TB30. The time period under study includes quarterly observations from the third quarter of 1978 (the first observation in the Drexel Series) to the fourth quarter of 1986 (the latest observation in the Drexel Series). Thus, there are 34 observations in the analysis. A larger sample is desirable, but the limited observations of the Drexel Series (which apparently is the only survey-based, long-term expected inflation series available) make a large sample impossible to obtain.

In order to test for the separate effects of changes in the real mortgage rate and changes in the tilt burden on the demand for housing, the parameters of Equation 4 have been estimated:

$$4 \quad HD = a_0 + a_1 rm + a_2 TB + e$$

where: HD = demand for housing
rm = real mortgage rates (after taxes)
TB = tilt burden
e = error term

The hypothesis is that changes in both real mortgage rates as well as changes in the tilt factor would influence housing demand if both a_1 and a_2 were found to be negative. In addition, since there would be a positive demand for housing even if real mortgage rates were zero percent and if there were no tilt burden, a positive intercept a_0 has been anticipated.

The results of least square regression using the Cochrane-Orcutt method[15] for autocorrelation correction are presented in Table 5. For all three dependent variables (new housing starts, new housing permits and existing home sales), the explanatory variables (real mortgage rates and the 30- and 15- year tilt burdens) are negatively related to housing demand. The explanatory power of the regressions is good, ranging from an r^2 correlation coefficient of .8213 in regression 1 to a coefficient of .8951 in regression 5, and all six regressions have a positive and statistically significant intercept. The real mortgage rate variable in all the regressions is statistically significant at the five percent level of confidence.

The only disturbing aspect of the results is the statistical insignificance of the tilt burden measures, particularly in regressions 5 and 6. The tilt burden's statistical insignificance may be explained partially by the small size of the

TABLE 5

Regression Of Real Mortgage Rates And Tilt Burden On Quarterly Housing Demand
(From Third Quarter 1978 To Fourth Quarter 1986)

Regression Number	Dependent Variable	Constant	Real* Mortgage Rates	Tilt Burden (15-year Mortgage)	Tilt Burden (30-year Mortgage)	Correlation Coefficient (r^2)	S.E.E.
1	New Housing Starts	4330.04 (3.44) †	-101.46 (2.35)	-1689.28 (2.19)	—	.8213	148.08
2	New Housing Starts	3394.72 (4.10)	-146.22 (2.52)	—	-746.44 (2.21)	.8234	147.20
3	New Housing Permits	307.53 (2.98)	-8.77 (2.67)	-112.36 (1.77)	—	.8436	10.99
4	New Housing Permits	240.29 (3.54)	-11.49 (2.53)	—	-47.47 (1.72)	.8443	10.96
5	Existing Home Sales	6.538 (2.97)	-.2024 (3.03)	-1.973 (1.46)	—	.8951	.2199
6	Existing Home Sales	5.218 (3.67)	-.2409 (2.61)	—	-.7726 (1.35)	.8942	.2208

*Real Mortgage Rates = yields on secondary FHA mortgages after taxes (Department of Housing and Urban Development, Federal Housing Administration) minus long-term anticipated inflation series (Drexel-Burnham-Lambert, Inc.)

† t statistics are presented in parentheses

Sources:

New private housing starts (Department of Commerce, Business Conditions)

Index of new private housing units authorized by local building permits (Department of Labor, Bureau of Labor Statistics)

Existing single family home sales (National Association of Realtors, Economics and Research Division)

sample under investigation. Collinearity may explain the insignificance of the 30-year tilt burden variable which has a correlation coefficient with the real mortgage rate of .6. Overall, however, it appears that the model supports the assertion that the demand for housing is a function of both the real costs of borrowing and the tilt burden.

Effect Of PLAM On Housing Demand

As was demonstrated earlier, the tilting effect on housing demand probably could be eliminated by replacing the standard fixed-rate mortgage with a PLAM. How would a PLAM effect the demand for housing? Earlier work by Kearl indicated that the total U.S. housing stock would have been 10 to 12 billion higher during the 1966-1973 time period if PLAMs had been available.

One way to examine the effect of PLAMs during the time period of this study is to take the parameters from one of the previous regressions and calculate the predicted values for housing demand using the actual real mortgage rate in each period and a tilt burden equal to 1 (which is the result when a PLAM is used). This calculation has been done for regression 2 (which uses new housing starts as the dependent variable and a 30-year tilt burden). The mean, standard deviation and coefficient of variation for the predicted values have been calculated and compared to the mean, standard deviation and coefficient of variation for the actual housing starts:

	Mean	Standard Deviation	Coefficient of Variation
New Housing Starts (Actual)	1552.48	332.05	.2138
New Housing Starts (Predicted)	2358.99	195.52	.0828

The contrast is striking. The predicted mean for new housing starts is nearly 50 percent higher than the actual mean during the period. In addition, the overall variability of the housing cycle in relative terms is much lower. These figures indicate that the housing industry would be a stronger, more stable economic concern if standard, fixed-rate mortgages were replaced with PLAMs.

The benefit of using PLAMs would not be limited to the apparent positive effect on housing demand. If the lender eliminated inflation risk by linking mortgage payments to price levels, there should be little reason for the housing finance industry to oppose assumable mortgages. Mortgages that are assumed would have significantly higher payments if inflation increased since the granting of the mortgage. In contrast, fixed-rate mortgages would have lower payments on the loan because the payments were not adjusted for inflation.

In addition, holders of mortgages in secondary markets, Government National Mortgage Association (GNMA), etc., would have significantly less prepayment risk because periods of falling inflation would reduce only the growth of dollar payments on PLAMs and not the actual contract rate on the mortgage. Since PLAM borrowers already have a relatively low contract rate, they would have significantly less incentive to incur point charges and closing costs on refinancing. However, fixed-rate borrowers would observe a fall in the contract rate on new mortgages with a decline in inflation, giving many an economic incentive to pay off older, higher rate loans.

The above benefits from PLAMs reduces the risk of supplying funds to the mortgage markets. This, in turn, increases the willingness of lenders to loan in this market and tends to reduce the real cost of obtaining a mortgage. Thus, a switch to PLAMs by the housing finance industry would not just eliminate the tilt burden. It also would lower the real cost of home mortgages, which would further stimulate the demand for housing.

Summary And Conclusions

Periods of relatively high nominal mortgage rates in the United States have been accompanied by declines in housing demand and vice versa. This article addresses why housing activity is affected when the real cost of home mortgages remains the same. Numerical examples and a review of the literature reveal that a tilt burden occurs when nominal mortgage rates rise and real mortgage rates remain the same. While this effect has been examined both theoretically and empirically in the literature (and has been found to affect housing demand negatively), previous study of changes in real mortgage rates and their influence on housing demand has not focused on the housing market in the inflationary period of the late 1970s and 1980s.

This article separately considers the influence of changes in real mortgage rates and changes in the tilt burden on the demand for housing using a survey-based measure of inflation. The empirical results of the study, in general, support the proposition that *both* of these influences are important in determining housing demand. Finally, it demonstrates that a movement to PLAMs would, through elimination of the tilt burden, significantly increase the level of housing demand in the United States and decrease its variability over time. By reducing the risk to mortgage lenders, PLAMs should reduce the real cost of housing mortgages as additional funds flow into these markets.

NOTES

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2. Fisher, I., *The Theory of Interest*. New York: Macmillan Co., 1930.

3. Cohn, R. and Lessard, D. "Recent Research on Indexation and the Housing Market," *Journal of Finance* (May 1976): 404-413.

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5. Vandell, K., "Distributional Consequences of Alternative Mortgage Instruments," *AREUEA Journal* (Summer 1978): 129-152.

6. See Alm and Follain, above.

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13. Obtained via personal communication.

14. Obtained via personal communication.

15. Cochrane, D. and Orcutt, G., "Application of Least Squares Regression to Relationships Containing Autocorrelated Error Terms," *Journal of the American Statistical Association*, 44 (1949): 32-61.

SITE SELECTION VS. SITE EVALUATION: TECHNIQUES FOR LOCATING RETAIL OUTLETS

The network approach simultaneously considers all possible retail sites, existing as well as potential, to develop a retail chain that maximizes revenue and profit.

by Terry G. Meyer

One of the most important decisions a retailer can make is where to locate a retail outlet. Because convenience is so important to consumers today, a retail store can prosper or fail solely on the basis of its location. No matter how much advertising, no matter how good the product or service, trying to attract customers from too far away is like trying to push water uphill. A good location can mean a difference of 20 percent, 40 percent, even 100 percent in revenue!

Despite the importance of location, many retail chains play the site-selection game with the deck stacked against them. Computerized data bases, demographic studies, analytical methods—the entire available arsenal of site selection technology—are brought into play only *after* a specific location has been chosen. As a result, many potentially superior locations often are never even considered in the evaluation process.

As practiced today, site *evaluation* (that is, the assessment of the strengths and weaknesses of a specific location) is a sophisticated, highly scientific procedure. But site *selection* (that is, the determination of which sites to even evaluate) for the most part is a hunch-driven, hit-or-miss affair. Concentrating on site evaluation at the expense of site selection is a case of misplaced priorities, particularly since new procedures for site selection are equal in sophistication and rigor to current site evaluation methodologies.

Site Selection Vs. Site Evaluation

More time and money currently are being spent on site evaluation than on site selection, one of the major reasons being that the two often are confused. Site selection is frequently and incorrectly viewed as a consequence of site evaluation; actually, however, the opposite is true.

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Site selection, if properly planned and executed, may contribute more to the long-term growth and stability of a retail network. (See Table 1 for a comparison of the characteristics of site selection and site evaluation.)

Current Practice In Site Selection

Management judgment and real estate agency listings are the two ways by which sites are selected most often today. An officer of a company frequently will play the major role in selecting a particular site. He may have visited an area and been impressed by a recently opened shopping mall or foreseen a potential market in a fast-growing area of the city with much new residential housing. He then will base site selection on his judgment, supplemented by observation and possibly some data.

TABLE 1

Comparison Of Site Selection And Site Evaluation

Characteristic	Site Selection	Site Evaluation
Focus	Evaluation of an entire area or all possible locations	Evaluation of one location
Goal	To learn how many stores the entire area can support and where, in the area, stores should be located	To learn if a store at this location will be successful
Purpose	To maximize the combined revenues of all stores	To predict the sales from a store at a particular location
Degree of detail	Uses averages representing the strengths and weaknesses of similar sites	Assesses the strengths and weaknesses of a specific location

Real estate companies also play a role in site selection. An agency may have a parcel of available land and solicit a company to locate an outlet there, citing the development potential, or a company with an ongoing relationship with a realtor may ask for assistance in site selection. All too often, realtors limit their suggestions to locations that happen to be available.

Some companies, however, use data-driven methods of site selection. A number of companies map current locations, drawing a ring around the approximate trade area of each store, then select new sites so that future trade areas will have a minimum of overlap with existing ones.

Other companies use a method that relies on the computer's ability to select a point, such as the middle of a census tract, and determine the demographic makeup of the area that surrounds the central point for a given distance. This information provides the demographics of a hypothetical trade area. The computer then compares these hypothetical demographics against a predetermined standard in a search of all points in the region. As a demographic standard, a company may require, for example, that a potential site have at least 10,000 households, at least 1/4 of which earning in excess of $35,000, within a six-mile radius and direct the computer to identify all census tract centers with those characteristics.

Both of these methods presume that the trade area of a store will be a circle, which it often is not. The methods also assume that all residents within a hypothetical trade area are likely to be customers of the store, which also is not necessarily the case. The likelihood that a resident will be a store customer decreases steadily as the distance to the store increases.

Site Evaluation

It is at this point, after a site has been selected, that the site evaluation process begins. As in site selection, site evaluation sometimes is done totally with the eye and mind of the company officer who visits the site, examines the property and surrounding area, and decides whether the site is a winner or a loser. Most major retailers, however, use other, more sophisticated site evaluation methods, including the analog method, the regression method and the gravity model.

Analog Method

The analog method of site evaluation is similar to the judgment approach; but, rather than using only the eye and mind of the company officer, it employs a systematic assessment of pertinent factors. With the analog method, successful stores are examined and the location-related factors that account for each store's success are isolated and analyzed. These location-related factors may include the level of competition, trade area demographics, available parking and ease of access. Some of the findings from the analysis of these factors may be expressed in arbitrary rules-of-thumb: for example, if a three-mile ring is drawn around the store, the area in that three-mile circle must include at least 10,000 households. Otherwise, a list is drawn up of all the factors that are thought to contribute to success, and the location-related factors of the new site are measured against the list to see how the new site stacks up.

Regression Method

The regression method is a formal evaluative version of the analog approach. Instead of allowing subjective judgment to determine the factors that account for successful sites, statistical (regression) analysis is used to determine the factors that are important and to assess a weight to each factor.

Gravity Model

The gravity model is a method of evaluating people's behavior. It is based on the likelihood that individuals will gravitate to a store depending on the distance they must travel, the distance they must travel to alternatives and the inherent drawing power of each location. The gravity approach requires sales information and other data, a computer and an experienced analyst to input and evaluate pertinent subjective factors. However, it enables the analyst to estimate a store's sales at any particular site.

Network Approach

Only after a systematic assessment of all possible locations has been completed can a company be certain that its market area is being covered as efficiently as possible, with no major gaps or overlapping trade areas: that is, stores are not so close to one another that they compete for the same customers nor so far apart that important, lucrative markets are ignored.

The idea of examining each store in relation to all other stores in the retail chain (that is, examining all stores as a

network) has given rise to a powerful new management decision tool for site selection. Called the network approach, this method selects the number and precise locations of stores to maximize the sales or profit of a company's entire retail network.

What data are required to implement the network approach? First, the sales potential of each geographic area in the market must be determined. As imposing as that sounds, it often is easy to obtain reasonable estimates of geographic sales potential. For example, the total population or the total aggregate income of an area may be used as a measure of potential sales. The estimate may be made more precise by including historical purchasing behavior. Thus, prior sales data may be used to determine average sales per household, and, assuming that each household has the same sales potential, a total sales potential figure for a geographic area may be derived by multiplying the number of households in the area by the average sales per household.

It is not sufficient, however, to state that Area A has a sales potential of $10, while Area B has a potential of $20. One must know what would occur if a store were actually placed at a particular location: how much of the potential $10 would a store in this location actually be able to attract from Area A? How much of the potential $20 in Area B would be realized? In short, what is the drawing power of the store? Drawing power is best shown by a graph (see Figure 1) or curve.

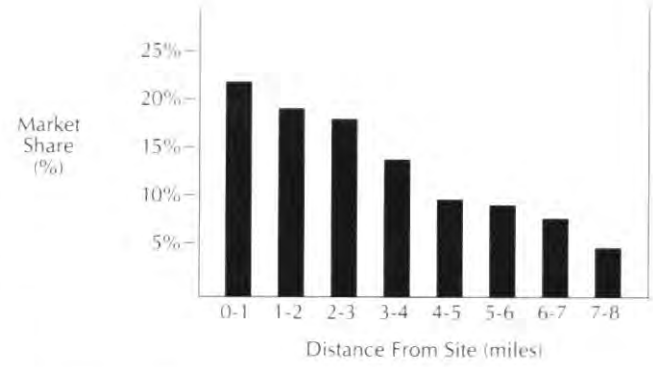
The question often is raised, how can one select a network of good sites without precise estimates of the sales at a particular location? The answer goes to the heart of the difference between site selection and site evaluation. The drawing power used in the site selection process is the drawing power of a typical store of a certain size in a region. Many factors such as egress, visibility, signage, management, traffic patterns, merchandising or the type and size of nearby noncompeting stores will determine the drawing power and sales of a store at a specific location.

Specific stores and locations should be *evaluated* using all these site-specific factors; however, for purposes of *selecting* sites to maximize the revenue of a network, the average drawing power of a store and its general location are more than sufficient. These two factors are highly predictive of the total revenue of the network. Within the network, one site may show slightly better drawing power because it draws customers away from other stores in the network, but the incremental gain to the network is negligible and is offset by the loss from a store with slightly less than average drawing power.

The drawing power of every site frequently is derived from actual measurement of the drawing power of current stores. The number and location of an existing store's customers can be determined from customer records or by a survey. A curve reflecting the percentage of customers as a function of distance can be generated for each existing store. These specific curves can be generalized to represent different store sizes or types of location

FIGURE 1

Penetration from Site A



(regional mall vs. free standing; urban vs. suburban), and the generalized curves can be assigned to every possible site. Alternatively, since patterns exist for typical retail situations, one could, with experience, select a curve for every possible site from standard patterns or curves.

Finally, the locations of the other stores in the chain and those of the competition must be factored in. If an area is heavily covered by stores, whether one's own or those of the competition, the sales available from that area are reduced proportionately.

After the pertinent data have been gathered, the network approach uses an optimization method or procedure to search all possible sites and find good combinations. The key to the search is to view sites as part of a network and select those that work together. General areas, such as a census tract or block group, are determined, but exact locations (that is, a street corner) within those general areas are not pinpointed. The focus is on identifying areas for sites that neither overlap nor leave gaps in the market.

At this point, the network approach may be employed to explore the implications of different site decisions by posing hypothetical questions, such as:

- "I have three stores and will leave them in place, but I wish to add three more stores to the chain. Where should I locate them?"
- "I have ten stores and want to keep eight in place. Where will I relocate the other two?"
- "I have reason to believe that a competitor will open a store at a particular location. What impact will that have on my operation?"
- "What if the competitor opens a store at a site that I had not anticipated? What do I do? What countermoves do I make?"
- "Suppose projected population changes do not materialize? What impact will that have on my revenue?"

The network approach also facilitates long-range planning and strategic decision-making. For example, the

immediate availability of a real estate parcel or mall lease may force a company into making a quick decision that later on may be against its best interests. Using the network approach, the company can identify general areas in which it desires to establish a presence some time in the future and direct a real estate agency to search for land or sites in these areas. The development of a presence in these areas need not be undertaken at once. When a real estate parcel or mall lease becomes available, if it is in the designated area, the company knows at once it must decide whether to act on it. The initiative therefore is in the hands of the retail chain, and expansion becomes a planned progression rather than a series of arbitrary decisions.

Conclusion

The network approach is a global planning tool that directs site evaluation as well as mall lease and real estate search efforts. It aids strategic decision-making and allows examination of alternative scenarios. It enables retail chains—from national, well-established giants to local, new enterprises—to exercise more complete control over and make better decisions concerning their growth and profitability. The network approach equips retailers to understand and respond to the projected changes to individual areas in a region. Sophisticated techniques such as the network approach, which maintain global perspective and control while satisfying local needs, are the future of marketing.

RESTRICTIVE CLAUSES IN SHOPPING CENTER LEASES: A REVIEW

Most restrictive covenants in shopping center leases have been negated by the courts and the FTC.

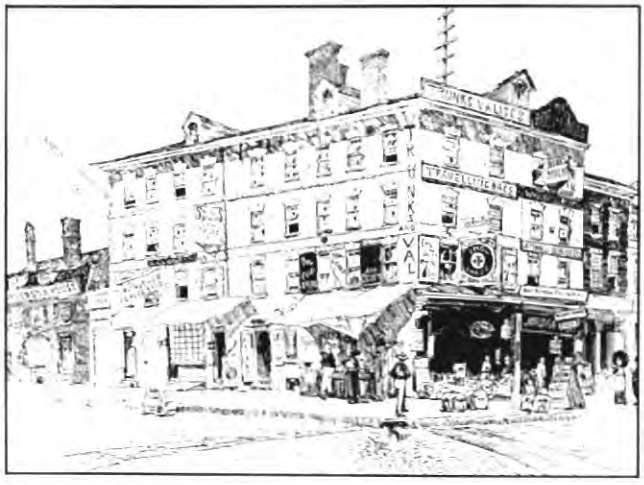
by Gene C. Wunder

The shopping center concept probably dates back to 1907, when Edward H. Bouton of Baltimore, Maryland, developed the Roland Park Company (Report of the Senate Select Committee on Small Business 1960, hereafter cited as the Senate Report). Another early development, Country Club Plaza, was built in the early 1920s in Kansas City, Missouri, by Jesse Clyde Nichols (Senate Report, 1960, and J. C. Nichols Company, undated). However, the present style of shopping center architecture did not evolve until 1924, when Hugh Potter developed the River Oaks Shopping Center in Houston (Senate Report, 1960).Presently, there are approximately 26,000 planned shopping centers in the United States (King, 1985).[1]

A planned regional shopping center is defined as ". . . an integrated development, under single ownership, with coordinated and complete shopping facilities and with adequate parking facilities . . . "(Mason and Ezell, 1987, p 505). It provides ". . . general merchandise, apparel, furniture, home furnishing in full depth and variety, has a GLA (gross leased area) of from 300,000 to 1 million or more square feet, and is built around a full-line department store as the major drawing power" (Urban Land Institute, 1972).

Major population shifts to suburban areas, heavy dependence on the automobile and development of the interstate highway system provided the impetus for the post-World War II development of planned centers. However, the phenomenal growth of planned suburban shopping centers in the United States was a development of the 1960s and 1970s.

By 1976, planned centers were responsible for 44 percent of all retail sales, excluding automotive and building supply sales (*Forbes*, 1976). After sales of motor vehicles



and gasoline were excluded, the shopping center share of retail sales was estimated at 55 percent in 1982 (Kaylin, 1983). By 1985, the percentage of all retail sales made by shopping centers was estimated to be 50 percent (Sussman, 1983).

Clearly, retailing is a highly competitive business in the United States. In the face of such competition, shopping center developers have attempted to protect their interests and those of their tenants by including various restrictive clauses in the lease for shopping center space. At times, the legality of these clauses has been questioned. Legal conflicts related to these clauses traditionally have been viewed as property or contract cases. More recently, however, they have been subject to attack on antitrust grounds by the federal government and by private parties (Underberg, 1976; Dalmo Sales Co., Inc., v. Tysons Corner Regional Shopping Center, 1970; Countrie Butcher Shoppe, v. Foodarama Supermarkets, Inc., and Munhill Associates, 1982: and Bartleys Town and Country Shops, Inc., v. Dillingham Corp., 1982).

The purpose of this article is to examine the major restrictive clauses found in leases for shopping center

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space in the United States. A brief historical review is provided of each clause with a discussion of its present status.

Federal Antitrust Statutes And Restrictive Clauses In Shopping Center Leases

The application of antitrust statutes to shopping center lease restrictions was slow to develop within the legal community. The concept was first reported in the *Journal of Marketing* in 1959, rather than in a legal publication (Sweet, 1959), and the concept was not employed in legal cases until the 1970s.

There are four major federal antitrust statutes: the Sherman Antitrust Act, Clayton Act, Robinson-Patman Act and Federal Trade Commission (FTC) Act. However, the Clayton and Robinson-Patman Acts apply to activities involved "in commerce" only with regard to the sale of commodities (The Plumb Tree, Inc., v. N. K. Winston Corporation et al., 1972). Therefore, neither act is applicable to real estate leases.

Real estate transactions historically have been considered as local activities (Saint Anthony-Minneapolis, Inc., v. Red Owl Stores, Inc., 1970). Despite this tradition, restrictive covenants in real estate leases do fall under the jurisdiction of both the Sherman Act and the FTC Act, which apply to activities "in commerce" and "affecting" interstate commerce.

The FTC Act comes into play by virtue of Section 5 (a)(1), which states: ". . . unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce are declared unlawful . . ." [15 U.S.C. Sec. 45(a)(1) (1976)]. This section has provided a broad interpretation of both the Sherman and Clayton Acts; it has been applied to unfair competitive practices beyond the letter or spirit of the Sherman and Clayton Acts (FTC v. Cement Institute, 1948; FTC v. Brown Shoe Co., 1966; and FTC v. Sperry & Hutchinson Co., 1972).

Section 1 of the Sherman Act makes illegal: "Every . . . contract, combination . . . or conspiracy, in restraint of trade . . . ." Three conditions must be demonstrated in order for Section 1 to apply to restrictive covenants in real estate leases. First, there must be a joint action involving at least two parties. This condition is met easily because in every real estate lease there is a developer-lessor and a retailer-lessee. The second and third conditions require a contract, combination or conspiracy to restrain trade and affect interstate commerce.

The applicability of the Sherman Act further depends on whether the interstate commerce jurisdictional test is satisfied. This test is satisfied when an activity is "in" or "in the flow" of interstate commerce—even if the effect of the activity on interstate commerce is minimal—or when an activity that is not "in commerce" nonetheless materially affects commerce (Sullivan, 1977).

Recent cases have adopted a broad interpretation of interstate commerce (McLain et al. v. Real Estate Board of New Orleans, Inc. et al., 1979; Ballard v. Blue Shield of Southern W. Virginia, Inc., 1976; and Bartleys Town and Country Shops, Inc., v. Dillingham Corp., 1982). The courts have considered a number of factors in the determination of the existence of interstate commerce, ranging from whether the defendant purchased out-of-state supplies, obtained financing from firms that engage in interstate transactions, or was patronized by out-of-state customers (Hospital Building Co. v. Trustees of Rex Hospital, et al., 1975).

In Bartleys Town and Country Shops v. Dillingham Corp. (1982), the U.S. District Court, District of Hawaii, found that the lessee made out-of-state purchases of approximately $1 million a year and that much of its business catered to tourists who were residents of other states. In Harold Friedman, Inc., v. Thorofare Markets, Inc. (1978), which involved the validity of a shopping center lease requiring the lessor to refrain from leasing to any competitors of a lessee supermarket, the Third Circuit Court found that incoming and outgoing goods were in the flow of interstate commerce, out-of-state suppliers were used, out-of-state retail sales were made and funds for remodeling were obtained from an out-of-state source.

The interpretation of the reach of commerce by the courts is quite broad. Virtually any retailer who is part of an interstate chain is likely to be involved in some aspect of interstate commerce. Plaintiffs have established interstate commerce jurisdiction by asserting that customers come from out-of-state; advertising is done in other states; insurance premiums are paid to out-of-state companies; financing is carried by out-of-state financial institutions; supplies are purchased out-of-state; and retail sales are transacted in other states. Therefore, in most instances, when a regional shopping center or a national franchise or chain is involved in a real estate transaction, the interstate commerce test can be met easily.

An Overview Of Selected Restrictive Lease Covenants

Most space in a planned regional shopping center is leased to retail organizations. The developer-lessor usually has considerable discretion in the selection of the retail organizations that will become tenants. The developer of a shopping center recognizes that tenant selection is extremely important to the success of the project.

The basic aim of the developer is to select and obtain at satisfactory rents those tenants who, collectively, will provide the greatest possible customer satisfaction over a period of years and consequently the highest volume of sales for his project (Kucker, 1972).

Over the years, the shopping center industry has staunchly defended the right to control tenant mix and has employed several restrictive lease covenants in order to do so. Common restrictive clauses contained in shopping center leases include the:

- right of approval or veto clause, which intends to give an anchor or major tenant veto power over the admission of new tenants.
- no discounter clause, which controls the quality and price of goods to be offered by the lessees by

excluding discount retailers from leasing space in the center.

- exclusive clause, which prevents a tenant from selling a specific branded product that is already being sold by an existing tenant.
- radius clause, which prohibits a shopping center tenant from conducting a similar business activity within a given distance from leased shopping center space.

For the most part, all but the latter have been excluded or removed from most shopping center leases either because of adverse administrative or judicial rulings or because of limited use in shopping center leases. However, the radius clause remains a viable restrictive covenant in many if not most shopping center space leases.

Right Of Approval Or Veto Clause

Development of the tenant mix for a planned shopping center begins with the search for major or anchor tenants. During this process, the developer is under great pressure to obtain the best anchor tenants possible and frequently is presented with strong demands from major prospective tenants. These demands often concern the center position of the anchor store and usually request restrictions on the balance of tenant mix development (Gruen and Smith, 1960). Some tenants request the right of approval of the developer's plans for admitting other tenants (which gives an anchor or other major tenant veto power over the admission of any new tenants) or the provision of facilities for anchor tenants. Others request a straightforward restrictive covenant clause wherein the developer agrees not to admit a certain class of tenant without prior permission of the anchor tenant (Barnes, 1972).

In the past, developers justified the granting of right of approval clauses because major tenants would not sign a long-term lease without them (Business Week, 1972), and major tenants justified their demands for these clauses on the basis of the need to protect the image of the shopping center in order to attract a desired group of customers (Schear and Sheehan, 1979).

A significant case relating to the right of approval as a lease covenant was Dalmo Sales Co. v. Tysons Corner Regional Shopping Center (1970). Dalmo Sales, an operator of retail stores that sell electrical home appliances and television receivers, brought suit against the developers of Tysons Corner Regional Shopping Centers and several major tenants in the center, alleging that its exclusion from the shopping center amounted to a collective boycott in violation of Sections 1 and 2 of the Sherman Antitrust Act (15 U.S.C. 1, 4, 1970). The plaintiffs sought treble damages and injunctive relief under Sections 4 and 16 of the Clayton Antitrust Act as well (15 U.S.C. 1, 4, 16, 1970).

The facts of the Dalmo case established that the leases of the major tenants in the shopping center included a clause giving them the right to approve new tenants who were not on a list of 465 approved stores (Dalmo Sales 1970, p. 990). It was noted at trial that approximately one-half of the specialty stores in Tysons Corner were not on the approved list and had received the required approval from the major tenants. Dalmo Sales Company also was not on the list of approved stores, but it was not allowed to lease space because two major tenants, Hecht Company and Woodward & Lathrop, disapproved the lease application (308 F. Supp., p. 992-993). In its lawsuit, Dalmo sought an injunction to prevent the developer from leasing the disputed space until the matter could be settled in court. However, the District Court and the Court of Appeals refused to grant the injunction [429 F. 2d. 206 (D.C. Cir. 1970)]. The dispute finally was settled without a court making a determination of the merits of the case (Tysons Corner Regional Shopping Center v. FTC, 1972).

Although this case was not resolved in court on the basis of antitrust statutes, it was important for several reasons. First, the case provided interesting insights into the efforts a retailer will make to obtain leased space in a regional shopping center. The case reported that, in order to lease space in the shopping center, Dalmo was willing to forego discount advertising for its stores in the Washington, D.C. metropolitan area or to establish a store in Tysons Corner under another name. However, neither proposal was acceptable to the major tenants that disapproved Dalmo Sales' lease application. The underlying primary reason for denying the lease application probably was the fact that Dalmo was a discounter, and discounters were prohibited from leasing space in Tysons Corner.

No Discounter Clause

Major retail tenants are essential if large numbers of customers are to be attracted to a shopping center. Also, such tenants are crucial if the developer is to obtain the necessary financing for development. Clearly, the interests of the developer and major tenants could be at odds if the developer was prevented from leasing to a particular tenant. However, if major tenants insist on a no discounter clause in shopping center leases it is easily understood why developers would grant the requested restrictive clauses.

As mentioned previously, major tenants often argue for restrictive clauses to protect the image of the shopping center for their potential customers. Although seldom advanced by major tenants, another possible reason for requesting restrictive clauses is to protect the major tenants from competition from discounters. Many leases of shopping center space provide for lease payments to be based on a guaranteed minimum plus a percentage of sales. Since developers receive lease payments regardless of which store—discounter or otherwise—makes the sale, the no discounter clause would be essential for major tenants if protection from competition were their prime motive (International Council of Shopping Centers, Antitrust Update: The Shopping Center Industry and Antitrust Laws, 1974; hereinafter cited as Antitrust Update).

A typical example of a no discounter clause was contained in the leases provided by Tysons Corner Regional Shopping Center. The clause read in part:

> . . . tenants shall not operate . . . a type of business currently known in the commercial field as a "discount store" or as a "bargain store" similar to a "Korvette" or other type of discount store, nor shall tenant operate or conduct a business continually selling, or offering or purporting or holding itself out to sell, merchandise or services at "discount" or "bargain" prices (Dalmo Sales Co. v. Tysons Corner Regional Shopping Center, 1970, p. 991).

Prior to the Dalmo case, the Bureau of Competition at the FTC had been investigating similar restrictive leasing practices in shopping centers, including Tysons Corner. A number of complaints had been issued, and consent decrees had been obtained by the FTC from major tenants and major tenant/developers (e.g., Rich's, Inc.) The consent decrees suggested that leases with a no discounter clause and/or a major tenant approval clause had the effect of:

1. fixing, controlling and maintaining retail prices;
2. allowing major tenants to choose their competitors and to exclude actual and potential competitors;
3. eliminating discount advertising and discount selling;
4. denying the public the benefit of price competition;
5. boycotting potential satellite tenant entrants to the shopping center; and
6. restricting, hindering and coercing the developer in his choice of potential tenants in the shopping centers (Complaint No. 8,886, FTC filed May 8, 1972, 1972 Trade Cases).

The consent decree obtained by the FTC in the Tysons Corner case prohibited anchor stores and developers from entering into lease agreements with certain limitations which included:

1. prohibit the right to approve or disapprove the entry into a shopping center of any other tenant;
2. prohibit the right to approve or disapprove the amount of floor space that any other tenant may occupy in a shopping center;
3. prohibit the admission into a shopping center of any particular tenant or class of tenants including discount and catalogue stores;
4. specify that any other tenant in a shopping center shall or shall not sell its merchandise or services at any particular price or within any range of prices (Tysons Corner Regional Shopping Center, 3 Trade Reg. Rep. para. 21,082 at 20,943, 1972).

From this consent decree, it would appear that the FTC clearly thought antitrust statutes did apply to the Dalmo case. Nonetheless, the consent decree was an administrative action that still left open the question of whether or not antitrust statutes applied to restrictive covenants in shopping center leases. It is well recognized at law that administrative actions, such as the consent decree obtained by the FTC, have the force of law. However, they lack the full impact of a judicial decision.[2]

The Strawbridge & Clothier case represents another example of how a shopping center can exclude a discounter in a very subtle manner (Strawbridge & Clothier, March 22, 1976). In this instance, the major developer and the major tenant were one and the same. Although the shopping center leases contained neither a right of approval clause nor a no discounter clause, the major tenant/developer made it a practice not to lease space to discounters. The FTC recognized the exclusionary process and issued a consent order against the tenant/developer to cease and desist from this practice (Strawbridge & Clothier, 1976).

For the most part, the Strawbridge & Clothier order contained most of the restrictions found in the Tysons Corner decree. However, there was one important addition to the Strawbridge decree. The order required the respondent, in its capacity as a shopping center developer, to refrain from basing a decision to grant, renew or extend the lease of a tenant upon the pricing practices of the tenant. How this order was to be enforced has never been made clear by the FTC.

Although statistics are not available on the full effect of no discounter clauses, it seems likely that they have successfully excluded most discounters from regional and community shopping centers. Frequently, the no discounter clause has been used in conjunction with the right of approval clause. Individually or collectively, these clauses have the same end result: the exclusion of discounters from shopping centers.

Exclusive Clause

The exclusive clause, which is sometimes referred to as the covenant against competition (Urban Land Institute Handbook, 1972), is a covenant that is most often sought by a tenant who wishes to obtain an exclusive right to conduct a particular type of business or sell specific line(s) of merchandise within a shopping center. Historically, exclusive clauses have imposed limited constraints because of the multiple ownership of property in central city commercial areas. Exclusive covenants cannot significantly reduce the number of competitive locations in any substantial portion of the retail area if no one property owner holds enough property to appreciably control the types of businesses and the products that can be sold within the commercial district.

Unlike central city commercial districts, shopping centers are usually owned by one owner or development firm. Therefore, the potential to restrict competition via the commercial lease is much greater. The result is to deprive competitors of access to customers who may be attracted to the shopping center and deny customers the benefits that result from competition among retailers who sell the same or similar goods.[3]

Despite the threat to competition posed by exclusive clauses, these covenants have not been negated by the

FTC or the courts. Nonetheless, they are sought infrequently by tenants who request them to preclude the limitation of competition. Minor tenants usually are not in a good enough bargaining position to demand exclusive clauses. Developers themselves are not likely to agree to such covenants since, in so doing, they would substantially defeat the concept of the shopping center.

Radius Clause

The term *radius clause* has been assigned different meanings by courts, attorneys and the FTC. It has described two distinct types of lease clauses; one favoring the landlord and one favoring the tenant. In the first instance, the radius clause describes an agreement between a lessor and a lessee in which the latter promises not to operate a similar business within a prescribed distance of the already existing business (Lentzner, 1977). This is the most common definition of the term and is the one used in this writing. At other times, the term has described an agreement in which a landlord promises not to lease space to a subsequent tenant within a given area in order to protect the competitive environment of the existing lessee. The distance or area in a radius clause usually is measured in straight line miles from the leased location. A common radius clause defines the distance as the area falling within a two- to ten-mile radius of a shopping center.

The radius clause provides a means of protecting the developer's share of percentage rent income. Shopping center developers have justified the use of the radius clause on the grounds that if a tenant opens another outlet nearby, sales volume at the original location will be reduced and the return on the percentage rental paid by the lessee will be reduced. One study found that 88 percent of the respondent landlords required radius clauses and were successful in obtaining them from all but the largest and most desirable tenants (Steele, 1978).

Courts have distinguished the radius clause from other shopping center lease provisions that restrict a tenant's price range or exclude discount retailers. Courts have held that the radius clause does not constitute a form of price fixing because the clause restricts the retailer only from opening a second outlet within a prescribed distance from the original location; the clause does not affect price in any manner.

To date, the radius clause has not been found to be a violation of antitrust statutes. Courts have held that a radius clause cannot be construed as a tying agreement under the Sherman Act because two distinct products are not tied together by the clause. The explanation in Northern Pacific Railway v. United States (1958) was that the developer did not lease the rental location on the condition that the retailer would not purchase a second outlet within the distance specified by the radius clause. Therefore, the radius clause did not qualify as a "distinctive and discernible product."

The FTC obtained a consent order involving a radius clause in 1976 (Strawbridge & Clothier). The order prohibited Strawbridge & Clothier, a department store, from making an agreement which ". . . establishes or maintains a radius or distance from shopping centers within which a retailer may not operate another store similar to or in competition with that retailer's own store at the shopping center (Lentzer, 1977, p. 48, n. 173). However, the decision was a result of several complaints challenging covenants that gave large tenants the right of approval over leasing arrangements which, in effect, enabled them to exclude discounters from Tysons Corner Regional Shopping Center (Final Order to Cease and Desist, Tysons Corner Regional Shopping Center, 1974).

A recent Texas case is typical of many cases involving radius clauses. In Southwest Mall Associates, A Partnership v. General Nutrition Center, Inc., 1986, the defendant, Nutrition Center, held a lease for a store in Midway Mall and operated, managed and had an ownership interest in a retail store that sold similar merchandise at the Sher-Den Mall, a straight line distance of three miles from the first location. However, the defendant's lease for the Midway Mall store contained a provision that prohibited the lessee from engaging in retail operations within a five-mile radius of the shopping center.

A jury found for the plaintiff shopping center on all counts, awarding damages to Southwest Mall Associates and ordering defendant Nutrition Center to pay attorney's fees and court costs; and the court ordered the defendant to cease and desist from operating its second store. Although this case was decided in a Texas District Court, the outcome is consistent with FTC and federal actions on radius clause litigation.

Conclusion

Administrative actions by the FTC and court decisions have effectively negated the use of the right of approval or the veto clause and the no discounter clause in shopping center leases. The exclusive right clause, although still apparently viable, is of little importance in shopping center lease law. The radius clause, however, appears to be an important and significant restrictive covenant.

NOTES

1. The exact number of shopping centers appears to be in dispute. In 1984, *Shopping Center World* estimated that 25,508 shopping centers were in existence. *The 1984 Shopping Center Directory* listed the number of shopping centers at 20,680. There are many reasons for the disparity between these two sources; poor reporting and double counting most likely are the principle sources of error.

2. It should be noted that the FTC generally uses the consent decree or the cease and desist order only in cases involving shopping centers containing more than 200,000 square feet, of which 50,000 square feet or more is occupied by tenants other than department stores (*Harvard Law Review*, 1973; Cutler and Reilly, 1976; Reilly and Keys, 1986).

3. Perhaps the one major weakness in the shopping center concept from the standpoint of the consumer is the absence of comparative shopping (Urban Land Institute, 1955). Many merchants view a shopping center as an island surrounded by a parking lot sea that provides a psychological barrier preventing a customer from going to a store at another location.

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STATISTICAL INFERENCE: AN AVIGATION EASEMENT ANALYSIS

Utilization of the null hypothesis can prove to be an effective timesaving device for the real estate consultant/valuer.

by Robert J. West

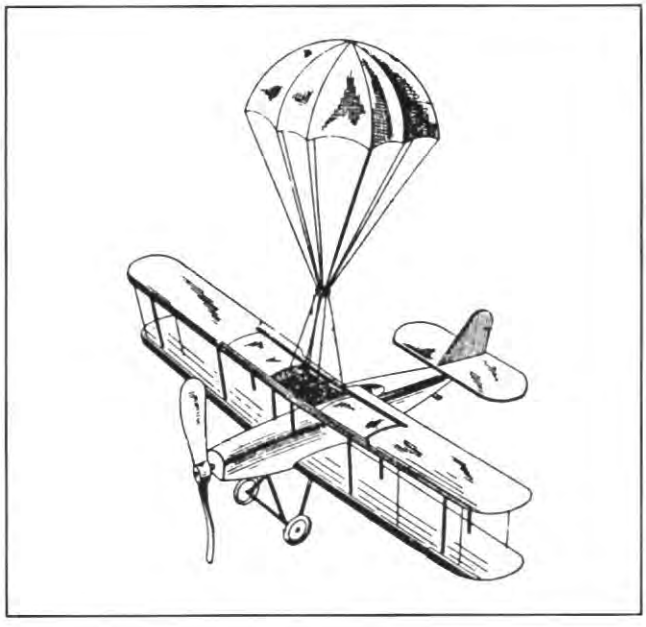
Is there a diminution in the value of property located under a major airport's flight or landing patterns? Hundreds of real estate experts have been asked this question over the last few years as consumer activism has risen to the forefront of local political activity. The question has caused experts to gather market information or consult valuation tables to assemble before-and-after valuation estimates. Using the traditional market valuation approach, experts have attempted to pair surface rights sales, identify sales that were affected by overflights and those that were not, eliminate all other variables and observe the differences in value.

However, a real estate consultant might ask the more specific question: Is there in fact a diminution in the value of property due to overflights? This question may best be answered through statistical inference.

The Situation

Recently, in a heavily populated area of Orange County, California, an experiment was undertaken to assess the possible impact of overflights on a residential area. All the homes in the area were built within a very narrow time span (about three years). Adjacent homes, which were not affected by overflights, were built about the same time. Both the homes in the overflight area and the adjacent, unaffected area had been built as part of the city's masterplan.

While there was some variation in the prices of the homes within each of these two populations, over 75 percent of the residences were single-family, detached homes in the middle income price range. As a result, many of the variables that might be associated with real estate character and value were eliminated. Were it not for the fact that one group of homes lay under the overflight area and the other did not, both groups could have been considered part of the same market segment.



Differences Between Sample Means As The Analysis Tool

After careful comparison and evaluation of the avigation easement impact area and the character of the homes located within the market area, a comparison was made between the homes within the impact area and the homes outside the area. The major difference between the two neighborhoods was determined to be the overflights. In view of the hundreds of individual properties that might be affected by this difference, statistical inference was used to analyze its affect on value.

The power of the statistical inference test lies in the hypothetical assumption that the overflights have no effect on value, that the two residential areas demonstrate the same value characteristics and that, therefore, all

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homes will be priced as if they were part of the same neighborhood. To test the hypothesis, the question is asked, "What is the probability that the two geographic areas are *not* part of the same neighborhood?" To help answer this question, the statistical significance of the differences between sample means of recent transaction prices drawn from each area can be tested. Given an observed difference between the means of two random samples, each drawn from a different population (neighborhood), does this difference signify a real difference between the means of the populations involved? This question can be answered through the use of a relatively standard statistical technique—the null hypothesis. It should be emphasized that all data points were actual sales at cash equivalent prices.

Tests Of Hypotheses: Defining The Null Hypothesis

The null hypothesis states that the mean (or average) of the sampling distribution of differences is equal to zero. Applied to the case at hand, if a statistically meaningful sample of home sales was taken from the overflight corridor and another sample was taken from the corridor outside the overflight area and there was no statistical significance between the means of the samples, it would be statistically probable that all price data had been drawn from the same population. If all price data came from the same population, then there would be a high degree of probability that the existence of overflights has had no effect on property values.

The statistical procedure for determining these probabilities is the standard error of the difference between means. The mathematical formula for computing the standard error of the difference between means is:

$$S_{\bar{x}_1} - \bar{x}_2 = \sqrt{S_{\bar{x}_1}^2 + S_{\bar{x}_2}^2}$$

where:

$S_{\bar{x}_1}$ = the standard error of the mean of the sampling distribution $\bar{x}_1$

$S_{\bar{x}_2}$ = the standard error of the mean of the sampling distribution $\bar{x}_2$

$S_{\bar{x}_1} - S_{\bar{x}_2}$ = the standard error of the difference between two means

The Samples

A survey of the sales that were made in both residential areas over the last two years resulted in a sample size of 83 sales in the overflight corridor and a sample size of 56 sales in the unaffected area. (So the reader may replicate the results, the sales are listed in Tables 1 and 2.) Fortunately, during the chosen time period, there was little, if any, change in the values of existing homes within the general price range.

Analysis of the samples provided the following results.

Item	Inside Corridor	Outside Corridor
Number of Data Points (N)	83.00	56.00
Mean (M) Price Per Square Foot	$92.65	$89.91
Standard Deviation (S)	14.10	15.50

The difference between the means ($92.65-$89.91) is $2.74 per square foot.

If the mean of the sampling distribution of differences really was zero, what is the probability that the difference between the two sample means would be $2.74?

Rephrased, the question is, "How likely is it to draw two samples in which the difference between the two means is as large as $2.74 per square foot even if, in reality, the two population samples are identical?" The answer to this question depends upon the measured difference between the means and how variable is that difference. If the estimate of the variability as measured by the standard error is large, then the null hypothesis must be rejected and it is concluded that the two populations are really identical. But if the difference is small, compared to the standard error, then the null hypothesis cannot be rejected. It must be concluded then that the two populations may well be identical. In this particular case, the difference is only about 1.058 standard errors.

This determination was made by calculating the standard error of the difference between the means and comparing it with the difference between the means. The standard error of the mean for the inside corridor was calculated as follows:

$$S_{\bar{x}_1} = \frac{14.10}{\sqrt{8.3}} = 1.55$$

The standard error of the mean for the outside corridor was calculated as follows:

$$S_{\bar{x}_2} = \frac{15.10}{\sqrt{56}} = 2.07$$

The standard error of the difference between the means was calculated as follows:

$$S_{\bar{x}_1} - \bar{x}_2 = \sqrt{S_{\bar{x}_1}^2 + S_{\bar{x}_2}^2}$$

$$= \sqrt{(1.55)^2 + (2.07)^2}$$

$$= 2.59$$

The difference between the sample means (2.74) and the standard error of the difference between the means was $2.74 \div 2.59 = 1.579$.

Statistically, in about 95 percent of cases, the differences in standard errors would be up to 1.96 above or below zero, even if the two sample sets were drawn from the same population (Figure 1). In order to reject the null hypothesis, widely accepted standards would require a statistical "t" test value that is at least equal to 1.96. While statistical analysis does not lend itself to statements of certainty, it can be stated with a high degree of probability that the two samples have been drawn from the same population.

The statistical analysis in this case actually presents results which are even stronger than those implied by a 95 percent test. Reference to a table of areas that fall under a normal bell curve indicates there still is a 29 percent probability that a difference at least as large as $2.74 would appear by chance (Figure 1). While this is not

TABLE 1

Homes Under Overflight Zone

Address	Number Brm/Bath	Total Square Feet	Lot Size (Sq. Ft.)	Price	Date of Purchase	Price Per Square Foot
10 Vercelli	2/2	1,042	2,822	$135,500	85/01	$130.04
18 Fabriano	2/2	1,045	3,872	$137,000	84/06	$131.10
8 Fabriano	2/2	1,045	3,850	$135,000	84/12	$129.19
42 Fabriano	2/2	1,159	3,818	$136,000	84/11	$117.34
6 Pike	2/2	1,284	5,030	$147,000	84/06	$114.49
24 Richmond	2/2	1,362	5,300	$160,000	84/06	$117.47
12 S. Christamon	2/2.5	1,346		$115,900	84/10	$ 86.11
18 Vercelli	2/2.5	1,383	2,460	$135,700	85/02	$ 98.12
17 Calabria	2/2.5	1,383	2,607	$143,750	84/08	$103.94
19 Rossano	2/2.5	1,401	2,310	$143,900	84/08	$102.71
6 Rossano	2/2.5	1,481	3,240	$145,600	84/06	$ 98.31
52 Fabriano	2/2.5	1,481	3,132	$159,142	84/07	$107.46
12 Campanero W.	3/2	1,325	4,590	$155,000	84/11	$116.98
3 Madrina	3/2	1,384	6,000	$148,000	84/06	$106.94
1 Darwin	3/2	1,424	4,410	$149,000	84/01	$104.63
18 Delamesa W.	3/2	1,561	4,230	$152,500	84/10	$ 97.69
3 Lafayette	3/2	1,609	5,247	$156,000	84/12	$ 96.95
1 Palmatum	3/2	1,697	6,650	$165,000	84/01	$ 97.23
17 Kara E.	3/2	1,707	5,928	$184,000	84/02	$107.79
17 Kara E.	3/2	1,707	5,928	$185,000	84/12	$108.38
32 Fortuna	3/2	1,711	5,355	$176,000	84/10	$102.86
27 S. Christamon	3/2.5	1,364		$126,900	84/04	$ 93.04
19 S. Christamon	3/2.5	1,383		$121,490	84/08	$ 87.85
68 S. Christamon	3/2.5	1,394		$124,265	84/11	$ 89.14
4 Vercelli	3/2.5	1,525	2,460	$158,790	84/04	$104.12
27 Rossano	3/2.5	1,525	2,310	$155,600	84/05	$102.03
14 Vercelli	3/2.5	1,525		$156,225	84/07	$102.44
54 Fabriano	3/2.5	1,587	3,132	$160,260	84/04	$100.98
36 Fabriano	3/2.5	1,627	3,132	$159,992	84/08	$ 98.34
29 Eden	3/2.5	1,950	3,690	$189,000	84/11	$ 96.92
46 Brena	3/2.5	2,864	4,895	$257,500	84/06	$ 89.91
38 Bunker Hill	3/3	2,230	7,200	$180,000	84/11	$ 80.72
20 Monticello	3/3	2,389	4,825	$187,000	84/05	$ 78.28
13651 Onkayha	4/2	1,647	6,438	$165,000	84/09	$100.18
7 Pike	4/2	1,810	4,200	$156,000	84/03	$ 86.19
7 Champlain	4/2	2,112	5,400	$188,000	84/03	$ 89.02
4 Alba E.	4/2.5	1,996	3,600	$183,900	84/02	$ 92.13
26 Atlanta	4/2.5	2,025	6,720	$169,000	84/01	$ 83.46
16 E. Campanero	4/2.5	2,085	4,410	$187,500	84/06	$ 89.93
20 W. Campanero	4/2.5	2,088	4,214	$180,000	84/10	$ 86.21
33 Bunker Hill	4/2.5	2,154	5,000	$175,000	85/02	$ 81.24
7 Christamon W.	4/2.5	2,190	6,900	$200,000	84/04	$ 91.32
21 Glorieta E.	4/2.5	2,252	5,500	$198,500	84/09	$ 88.14
27 W. Glorieta	4/2.5	2,331	5,035	$225,500	84/10	$ 96.74
4 Fortuna W.	4/2.5	2,336	4,700	$208,000	85/01	$ 89.04
11 Castillo	4/2.5	2,392	5,200	$189,000	84/09	$ 79.01
34 Alegria	4/2.5	2,404	5,000	$195,000	84/01	$ 81.11
1 Hidalgo	4/2.5	2,404	4,750	$206,000	84/02	$ 85.69
16 Hidalgo	4/2.5	2,416	4,929	$223,500	84/09	$ 92.51
8 Abeto	4/2.5	2,422	4,650	$220,000	84/07	$ 90.83
11 Ensueno E.	4/2.5	2,461	5,315	$208,000	84/01	$ 84.52
19 E. Glorieta	4/2.5	2,494	5,559	$207,000	84/04	$ 83.00
4116 Williwaw	4/2.5	2,550	6,000	$194,000	84/03	$ 76.08
4171 Blackfin	4/2.5	2,550	5,500	$185,500	84/10	$ 72.75
3 Puerto	4/2.5	2,882	4,914	$281,200	84/03	$ 97.57
13781 Andele	4/3	2,089	5,800	$177,500	85/01	$ 84.97
13 Colonial	4/3	2,152	5,247	$207,000	84/03	$ 96.19
17 Colonial	4/3	2,154	5,247	$197,500	84/11	$ 91.69
66 Bluecoat	4/3	2,193	5,000	$224,000	84/03	$102.14
15 Christamon W.	4/3	2,203	5,733	$205,000	84/07	$ 93.05
13842 Andele	4/3	2,232	6,000	$185,000	84/08	$ 82.89
13756 Andele	4/3	2,244	5,500	$160,000	84/08	$ 71.30
4121 Blackfin	4/3	2,268	6,500	$167,000	84/04	$ 73.63
12 Yorktown	4/3	2,277	4,752	$196,000	84/06	$ 86.08
38 Bunker Hill	4/3	2,304	6,090	$180,000	84/10	$ 78.13
13781 Andele	4/3	2,312	5,800	$177,500	84/12	$ 76.77
6 Lexington	4/3	2,327		$235,000	84/08	$100.99
13842 Solitaire	4/3	2,448	6,000	$170,000	84/07	$ 69.44
7 Chattanooga	4/3	2,487	5,000	$225,000	84/12	$ 90.47
8 Fort Sumter	4/3	2,500	5,379	$280,000	84/10	$112.00
4155 Salacia	4/3	2,505	5,500	$172,500	84/01	$ 63.86
4061 Williwaw	4/3	2,505	6,300	$180,000	84/12	$ 71.86
13531 Esprit	4/3	2,521		$177,000	84/10	$ 70.21
13842 Solitaire	4/3	2,575	6,000	$169,850	84/07	$ 65.96
5 Fortuna W.	4/3	2,720	5,350	$208,000	84/03	$ 76.47
1 Champlain	4/3	2,729	4,000	$201,500	84/12	$ 70.36
19 Alondra	4/3	2,962	5,000	$255,000	84/07	$ 86.09
1 Ticonderoga	4/3	3,112	5,800	$292,000	84/03	$ 93.83
13 Ticonderoga	4/3	3,116	5,300	$299,900	84/03	$ 96.25
27 Sunrise	4/3	3,222		$322,500	84/06	$100.09
6 Trovita	5/3	2,866		$265,500	84/02	$ 92.64
10 Merrimac	5/3	2,993	4,500	$268,000	85/02	$ 89.54
18 Yorktown	5/3.5	2,676	4,740	$220,000	84/08	$ 82.21

absolute proof that the samples are from the same population, there is no compelling evidence that a real difference exists. Thus, the possibility that the samples are from the same population cannot be rejected. Therefore, it is strongly suspected that the overflights have no measurable impact on property values.

Secondary Verification Of Findings

To provide a totally independent test of this conclusion, an interview methodology was employed. According to several sales people who are active in the general market area, a disclosure statement regarding overflights is

TABLE 2

Homes Not Under Overflight Zone

Address	Number Brm/Bath	Total Square Feet	Lot Size (Sq. Ft.)	Price	Date of Purchase	Price Per Square Foot
61 Bennington	2/2	1,279	4,275	$154,500	84/04	$120.80
27 Lewis	2/2	1,486	5,000	$235,000	84/10	$158.14
2 Whitney	2/2	1,577	7,000	$149,000	84/09	$ 94.48
24 Monticello	2/2.5	1,987	4,815	$170,000	84/01	$ 85.56
8 Monticello	2/2.5	1,987	4,815	$150,000	84/12	$ 75.49
35 Columbus	3/2	1,420	5,000	$159,250	85/01	$112.15
1 Wright	3/2	1,505	5,775	$159,300	84/06	$105.98
43 Carson	3/2	1,505	5,150	$157,000	84/08	$104.32
7 Cape Cod	3/2	1,505	5,000	$163,000	85/01	$108.31
50 Fulton	3/2	1,505	5,150	$148,000	85/01	$ 98.34
1 Whitney	3/2	1,524	7,300	$161,500	85/01	$105.97
74 Cape Cod	3/2	1,548	4,725	$151,000	84/10	$ 95.54
36 Miners Tr.	3/2	1,598	4,275	$175,000	84/04	$109.51
55 Carver	3/2	1,646	5,000	$165,000	85/01	$100.24
24 Jackson	3/2	1,646	5,000	$160,000	85/01	$ 97.21
46 Grant	3/2	1,672	5,000	$169,000	85/02	$101.08
23 Allegheny	3/2	1,673	7,434	$165,000	85/01	$ 98.63
13 Calhoun	3/2	1,684	8,400	$180,000	84/11	$106.89
72 Cape Cod	3/2.5	2,202	4,725	$167,000	85/02	$ 75.84
45 Westport	3/2.5	2,306	5,500	$195,000	84/05	$ 84.56
10 Nantucket	3/2.5	2,699	5,225	$240,000	84/04	$ 88.92
13 Harrisburg	3/2.5	2,699	4,975	$240,000	84/06	$ 88.92
5 Lewis	3/3	1,853	5,050	$165,000	84/04	$ 89.04
45 Plymouth	3/3	2,571	5,775	$235,000	84/07	$ 91.40
10 Jamestown	3/3	3,145	5,400	$260,000	84/06	$ 82.67
38 Choate	3/3	3,218	5,188	$250,000	84/10	$ 77.69
29 Farragut	4/2	2,665		$180,000	84/12	$ 67.54
9 Dewey	4/2	2,665		$178,000	85/02	$ 66.79
28 Crockett	4/2.5	2,021	8,529	$165,000	84/10	$ 81.64
11 Porter	4/2.5	2,358	6,375	$200,000	84/12	$ 84.82
8 Carlton	4/2.5	2,435	5,428	$195,000	84/03	$ 80.08
18 Porter	4/2.5	2,466		$210,000	85/01	$ 85.16
9 Carlton	4/2.5	2,475	5,080	$193,000	84/01	$ 77.98
19 Harrisburg	4/2.5	2,497	5,003	$236,000	84/03	$ 94.51
1 Nantucket	4/2.5	2,497	5,500	$245,000	84/04	$ 98.12
72 Monticello	4/2.5	2,556	5,500	$228,000	84/06	$ 89.20
39 Westport	4/2.5	2,600	4,350	$225,000	84/11	$ 86.54
6 Allegheny	4/2.5	2,669	5,770	$247,000	84/01	$ 92.54
79 Monticello	4/2.5	2,676	5,450	$232,500	84/02	$ 86.88
75 Monticello	4/2.5	2,710	5,000	$215,000	84/10	$ 79.34
13 Hunter	4/2.5	2,845	5,000	$211,000	85/01	$ 74.17
26 Columbus	4/2.5	2,870	4,950	$260,000	85/01	$ 90.59
60 Plymouth	4/3	2,003	6,500	$180,000	84/09	$ 89.87
20 Harrisburg	4/3	2,409	5,221	$235,000	84/01	$ 97.55
3 Sharpsburg	4/3	2,409	5,020	$238,000	84/05	$ 98.79
12 Monticello	4/3	2,455	4,896	$198,000	84/06	$ 80.65
3 Nantucket	4/3	2,475	5,225	$237,000	84/05	$ 95.76
4 Farragut	4/3	2,499	5,800	$200,000	84/06	$ 80.03
31 Grant	4/3	2,500	5,000	$179,000	84/09	$ 71.60
30 Bennington	4/3	2,505	4,914	$195,000	85/02	$ 77.84
41 Bennington	4/3	2,520		$205,000	84/08	$ 81.35
13 Bennington	4/3	2,553	5,600	$185,000	84/10	$ 72.46
5 Dewey	4/3	2,612	5,000	$180,500	84/06	$ 69.10
55 Plymouth	4/3	2,652	5,000	$180,000	84/12	$ 67.87
8 Tory	4/3.5	2,202	4,940	$179,000	84/10	$ 81.29
5 Sheridan	5/2.5	2,524	5,200	$195,000	84/05	$ 77.26

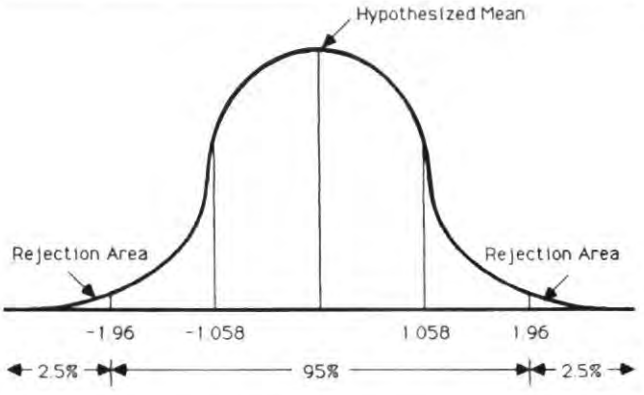
included in all purchase and sale contracts. It is the professional opinion of all the individuals who were interviewed that such disclosure has had no impact on either the sale price or the length of the sales period for properties in the overflight corridor.

Conclusion

From the above analysis it can be concluded that the existence of aircraft overflights has no impact on property values. Of broader importance, however, is the conclusion that proper examination of the basic premise of the assignment—that overflights do not result in a diminution in residential property value—can save the real estate consultant and his client a significant amount of time and effort. Proper examination of the premise can help avoid erroneous conclusions which might result from the selection of a statistically insignificant sample size (one or two properties under the flight path and one or two properties outside the flight plan) and the measurement of value differences between them. Finally, it appears that the null hypothesis, a statistical technique which is well known but rarely (if ever) applied to real estate, may have significant application to the real estate analysis/consulting field. The technique may be used by real estate counselors to determine whether or not there is an effect on value from a property's proximity to a park, freeway, school, open-air theater where rock concerts are performed, etc. Application of the technique also may lead to less subjective decision-making on the part of politicians, planners, financiers and valuers.

FIGURE 1

Differences in Standard Error



From the table: 1.058 = .3554
So: [.5000 − .3554] [2] = 0.289 or 29%

NOTES

For more information in an easy-to-read statistics book, see *Statistical Analysis for Business Decisions*, by William A. Spurr, Ph.D. & Charles P. Bonini, Ph.D. Homewood, Illinois: Richard D. Irwin, Inc., 1967.

AN ECONOMIC RATIONALE/ EMPIRICAL TESTS OF FOREIGN INVESTMENT IN UNITED STATES REAL ESTATE

Relevant economic determinants of foreign investment in U.S. real estate do not always act as predicted by theory.

by Peggy E. Swanson

Numerous articles reporting the increased significance of foreign investment in United States real estate have appeared in recent academic journals and trade publications. At the end of 1984, foreign direct investment in the United States was reported to have been $159,571 million (*Survey of Current Business*, 1985), an increase of $128,801 million (418 percent) over the figure reported for 1976 by Chung (1977). At the end of 1976; real estate investment comprised 2.6 percent of the total foreign direct investment; the corresponding figure for 1984 was 10.6 percent.[1] From these figures, it can be seen that United States real estate investment has drawn significant funds from abroad.

However, speculation abounds concerning whether or not this trend will continue. Two broad economic forces frequently are cited as the cause of the boom years 1979 and 1980. First, many major investors from industrial countries and oil-producing nations in the Organization of Oil Exporting Countries (OPEC) had large surpluses to place but had limited opportunities for local property investment. Second, the United States, with its political and economic stability, provided appealing investment prospects with potential gains from currency appreciation and economic growth without the threat of extensive government interference. Growth slowed in 1982, partially reflecting the United States recession; and continued into the first half of 1983. At the same time, United States financing costs escalated, and confidence in the dollar eroded. Thus, foreign investors have had little incentive to expand their existing United States investments or to acquire new ones.

This article empirically investigates the role of basic economic variables in determining recent trends in foreign investment in United States real estate. As an extension, the explanatory power of the variables as they relate

to total foreign direct investment is analyzed. These findings are compared with findings for the variables as they relate to investment in real estate only.

Factors Affecting Foreign Investment In United States Real Estate

Of the numerous characteristics that make the United States real estate market attractive to foreign investors, some of the most important appear to be the following: the United States is the largest and most stable free world market and has extensive diversification possibilities; yields from real estate investments generally have been higher in the United States than in other highly developed markets; financing opportunities are broad and varied; and the United States has comparatively fewer controls on property ownership and transfers than other nations (Apgar, 1984).[2]

When real estate investment is viewed in a portfolio context, risk and expected return become the dominant determinants directing investment flows. Direct measurement of these two primary influences is not possible, however; and the choice of proxy influences is complicated by the international rather than the domestic environment. In the international setting, exchange rate risk

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and various categories of political risk all may affect returns, and expected, as well as actual, changes in exchange rates have a strong impact on the direction of investment flows.

Also related to returns, but more importantly to risk, are differing rates of inflation. Real estate investment has distinct advantages for many investors because it offers a hedge in high inflation economies. However, most investors still view the high inflation economies as high risk and unstable. As a result, international investment in United States real estate is likely to grow as inflation continues abroad (Apgar, 1982).

Together, foreign exchange rates and inflation rate differentials are the two most appropriate economic variables used as proxies for risk and expected return in an investigation of the change in demand for United States real estate. The ultimate concern of the foreign investor is the risk-adjusted local currency return, which is affected directly by both foreign exchange rates and inflation. Interest rate differentials frequently are considered in determining the direction of investment flows and, when financial assets are the investments under study, they probably are the most important single consideration. In a study of real estate investments, however, interest rates are of lesser importance because yields on real assets are only roughly comparable to yields on financial assets; the primary areas of divergence relate to the differences in maturity and liquidity of the two types of assets. The high correlation between inflation rates and interest rates precludes the use of both. However, since inflation rates include both a yield factor, which is based on real interest rates, and a risk factor, which assesses higher risk to high inflation countries, inflation rate differentials are selected for analyzing the real estate component of foreign direct investment flows.

The primary determinant on the supply side of foreign direct investment is available savings. Higher rates of savings in other countries are no doubt a factor in the flow of investment to this country. For example, investment in United States real estate from OPEC countries grew from $182 million at the end of 1977 (Fouch, 1979) to $669 million at the end of 1984 (*Survey of Current Business*, 1985). For the most part, these funds represent savings from oil income in excess of the quantity of savings local economies can absorb. Even non-OPEC developing countries have invested in the United States despite the fact that, in many instances, their higher savings may have been absorbed in home markets. For the developed countries with high savings, flows of funds to the United States may be explained in part by a relative scarcity of land in those countries and by insufficient demand for office buildings, shopping centers and other fixed assets. Whatever the situation in individual countries, funds must be available for foreign investment if flows are to take place. Thus, savings rate differentials are used as the proxies for available investment funds.

Framework For Analysis

Foreign exchange rates, inflation rate differentials and savings rate differentials, in the contexts discussed above, are selected as the most relevant economic determinants of foreign investment in United States real estate. The foreign exchange rate variable is the value of foreign currency units per United States dollar. The savings rate is gross national savings (which is defined as the amount of gross domestic capital formation that is financed from national output) and equals gross domestic investment plus net exports of goods and services. Finally, the consumer price index is used as the proxy for the inflation rate.

The model being tested hypothesizes that the amount of foreign investment in United States real estate (INV) depends upon the inflation rate differential (INF—measured as the foreign minus the United States inflation rate), the savings rate differential (SAV—measured as the foreign minus the United States savings rate) and the foreign exchange rate (FE—measured as foreign exchange units per United States dollar). Because evidence exists that changes in exchange rates often affect capital flows, an alternative formulation of exchange rate impact is tested—changes in rates (ΔFE). The change in exchange rates is computed as last period's rate minus this period's rate.

The predicted direction of the impact of these variables is based upon existing theory of foreign direct investment. An anticipated direct relationship between changes in investment and changes in inflation rate differentials assumes that investment will tend to take place in countries with low inflation because high inflation implies high risk. Moreover, in both developed and developing countries, the possibility of controls or sanctions that will adversely affect foreign ownership increases as policies to remedy inflation are implemented. The predicted relationship between investment and savings rate differentials is direct because increases in savings lead to increases in investment both domestically and internationally. An inverse relationship between investment and foreign exchange rates is expected based on the rationale that, as the foreign currency gets weaker, more nondomestic investment will take place; fewer local currency units will be required per foreign currency unit, which thereby will reduce the local currency cost of the investment. However, a direct relationship between the change in exchange rates and foreign investment is expected because, when the dollar is falling ($\Delta FE>O$), investment in the United States should increase.

Four countries—Canada, the United Kingdom, Japan and Panama—are chosen because of the role each plays in United States real estate investment activities.[3] Canadian firms are particularly active in the U.S. market, frequently becoming involved in extremely large and expensive projects. Similarities between the two countries, such as geographical location, culture and market structure, largely explain the long term Canadian ties to the U.S. market. Large Canadian developers, which have outgrown their domestic markets and sought higher return investment sources, take advantage of generous lines of

available credit from their major banks. These advantageous financing arrangements give Canadian developers a clear competitive advantage for investing in the United States.

Like the Canadians, the British display a strong interest in large U.S. real estate investments. A major impetus to U.K. activity was the relaxation of exchange controls in the late 1970s, which provided an additional avenue of investment for the large, well-funded British pension funds. Many experts feel that Britain's position in the U.S. real estate market will be sustained by the financial depth and professionalism of these major pension funds (Apgar, 1984).

Backed by the strong yen and sustained economic growth, Japan's investment in U.S. real estate increased more than any other country's from 1979 to 1983 (Apgar, 1984). Limitations on domestic growth in real estate coupled with the development of global Japanese trading companies are expected to encourage Japan's increasing participation.

Panama, with its historical close ties to the United States, has been a consistent investor in U.S. real estate. Although the rate of growth of its investments does not approach that of the other three countries, Panama's developing country status allows consideration of a somewhat less economically stable environment.

Quarterly data are used for the period 1973.IV through 1985.IV, inclusive; the length of the period is dictated by the availability of consistent and comparable data. Investment in U.S. real estate data are from *Survey of Current Business*,[4] and inflation, savings and foreign exchange rate data are from *International Financial Statistics*.

The Tests For Foreign Investment In U.S. Real Estate

All tests are conducted on a bilateral basis; that is, each of the four countries is tested separately. Initial runs, utilizing a multiple regression model, reflected serious autocorrelation problems. As a result, all equations have been estimated using autoregressive techniques. In addition, relaxation of foreign exchange and foreign direct investment restraints occurred during the period under study for both the United Kingdom and Japan. Consequently, the equations for these countries have been re-estimated with both constant and multiplicative dummy variables in an attempt to identify the impact of the removal of these constraints. (Summary results for all equations are provided in Table 1.)

The estimated equation for Canada that uses the level of exchange rates (FE) is designated Equation C1. All the estimated coefficients for this equation are significant (except the intercept term); however, the savings impact is opposite of that predicted. In Equation C2, which uses the

TABLE 1

Summary Results Using Foreign Investment In Real Estate As The Dependent Variable

Equation	Constant	Inflation Rate Differential (INF)	Savings Rate Differential (SAV)	Foreign Exchange Rate (FE)	Change in Exchange Rates (ΔFE)	Dummy Variable Constant (D)	Dummy Inflation Rate Differnetial (DINF)	Dummy Savings Rate Differential (DSAV)	Dummy Exchange Rate (DFE)	Dummy Change in Exchange Rates (DΔFE)	LAG	Correlation Coefficient ($\bar{R}^2$[a])
C1	339.558	61.769	-3.408	-1212.334							8	0.7430
	(0.57)	(4.12)	(-5.99)	(-2.00)								
C2	-718.816	60.869	-2.706		1149.778						8	0.7357
	(-3.17)	(4.45)	(-5.38)		(3.93)							
UK1	-3330.727	8.547	-3.582	4056.233							9	0.7604
	(-4.71)	(0.76)	(-2.18)	(3.36)								
UK2	-1522.789	17.497	-3.743		909.094						10	0.6921
	(-3.65)	(2.84)	(-4.08)		(1.65)							
UK3	-4119.027	-1.327	-3.870	5532.012		235.484					5	0.7991
	(-5.77)	(-0.11)	(-2.24)	(4.63)		(0.83)						
UK4	-1527.633	18.634	-3.700		930.289	12.994					10	0.6915
	(-3.48)	(2.74)	(-3.69)		(1.47)	(0.09)						
UK5	-216.059	-1.508	-0.093	509.666		-5937.708	58.984	-4.216	2510.016		4	0.9748
	(-0.18)	(-0.11)	(-0.05)	(0.33)		(-4.57)	(3.61)	(-1.92)	(1.41)			
UK6	-222.654	1.895	0.509		40.683	-6440.170	61.521	-7.010		1663.049	4	0.9504
	(0.43)	(0.19)	(0.33)		(0.03)	(-8.39)	(4.43)	(-3.56)		(0.87)		
J1	-69.156	-11.978	-0.314	-0.208							9	0.7409
	(-0.31)	(-4.03)	(-1.23)	(-0.36)								
J2	-92.361	-13.699	-0.233		0.657						9	0.7448
	(-0.75)	(-4.13)	(-0.86)		(1.27)							
J3	-58.690	-11.663	-0.300	-0.225		17.252					9	0.7374
	(-0.26)	(-3.67)	(-1.15)	(-0.38)		(0.30)						
J4	-89.132	-13.399	-0.225		0.675	15.532					9	0.7397
	(-0.72)	(-3.80)	(-0.82)		(1.28)	(0.29)						
J5	3.216	-2.054	-0.051	0.085		-696.746	-22.407	-0.858	-1.655		3	0.9698
	(0.02)	(-1.24)	(-0.38)	(0.22)		(-3.15)	(-6.78)	(-3.48)	(-2.85)			
J6	55.563	-2.622	0.018		0.044	-1135.893	-19.435	-1.057		1.099	3	0.9622
	(1.06)	(-1.21)	(0.15)		(0.08)	(-8.71)	(-4.79)	(-4.05)		(1.42)		
P1	68.288	-6.067	0.063								5	0.7107
	(1.90)	(-3.96)	(0.68)									

[a]Adjusted R^2 for the transformed regression

changes in exchange rates (ΔFE) in place of the exchange rates (FE), the inflation and savings effects are almost identical with those in Equation C1. The ΔFE coefficient carries the predicted sign and reveals impacts that are similar to those for FE.

UK1, which is the basic equation for the United Kingdom, utilizes the levels of exchange rates and ignores the change in foreign investment constraints by excluding all dummy variables. The results differ appreciably from those for Canada. The inflation variable is insignificant, and the foreign exchange coefficient, while significant, carries the wrong sign. Substituting ΔFE for FE (in UK2) makes the inflation coefficient significant, and, although the ΔFE coefficient carries the predicted sign, it is significant at only .11.

Equations UK3 and UK4 include the constant (intercept) dummy variable (D), which has a value of 0 through the third quarter of 1979 and a value of 1 thereafter to represent the relaxation of foreign investment controls. No significant shift in U.S. investment occurs; neither of the D coefficients is significant, and the remaining coefficients do not vary appreciably from those found in Equations UK1 and UK2.

Adding the multiplicative dummy variables (the "D" prefix indicates an independent variable's multiplicative dummy) yields major changes in the explanatory power of the equations and in the estimated coefficients. The basic explanatory variables in Equation UK5 (INF, SAV, FE) carry the same signs as in Equation UK3 but all become insignificant. The constant dummy, which was positive but insignificant in Equation UK3, becomes negative and highly significant in Equation UK5; the multiplicative dummy variables for inflation (DINF), savings (DSAV), and foreign exchange rates (DFE) in Equation UK5 are significant at .01, .06 and .17, respectively. The substitution of ΔFE for FE in Equation UK6 increases the significance of D, DINF and DSAV, but the foreign exchange coefficient does not approach significance.

J1, the basic equation for Japan, reveals only the inflation variable to be significant, but it carries the wrong sign. Equation J2, with ΔFE, is very similar. Equations J3 and J4 add the constant dummy (0 through the end of 1980 and 1 thereafter) to capture the effect of the Foreign Exchange and Foreign Trade Control Law (Derven, 1985) but reveal little change in the estimated coefficients. The constant dummy coefficients are insignificant.

The multiplicative dummy variables are included in Equations J5 and J6. Similar to the counterpart UK equations, all the basic independent variable coefficients are insignificant, while D, DINF and DSAV are highly significant. DFE is highly significant and negative in J5; DΔFE is positive and significant at .17 in J6.

The estimated equation for Panama excludes the foreign exchange rate as an independent variable because the Panamanian balboa was fixed at parity to the U.S. dollar during the period covered. The inflation variable is significant, but it does not carry the hypothesized sign.

Findings For Foreign Investment In U.S. Real Estate

The results differ for each of the four countries studied. For Canada, the direction of impact for the inflation rate differential and foreign exchange rates is as predicted and significant. The savings rate differential also is significant, but it does not carry the hypothesized sign. This finding has interesting implications. An intuitive explanation is that the absolute level of savings within the investor country may be more relevant than the savings rate differential. Another possibility is that other factors, such as political risk and diversification motives, may be strong enough to cause negative savings differential effects. During the period covered, unrest in Quebec resulted in a flight of capital because of the political risk that was being generated (Hinds, 1982).

For the United Kingdom, the inflation differential is significant in only two instances, for Equations UK2 and UK4 which include ΔFE rather than FE. Savings behavior is similar to that found for Canada. The relaxation of capital controls does not cause a shift (change in the intercept) in the investment function, as shown by the insignificant constant dummy variable coefficients in Equations UK3 and UK4, but the importance of the controls is reflected in the significance of the coefficients of the dummy variables when the multiplicative dummies are included (Equations UK5 and UK6). The relaxation of foreign exchange controls has a significant impact on U.K. investment in U.S. real estate. All equations using FE rather than ΔFE yield positive coefficients for the exchange rate variable. These results are in conflict with international investment theory because a weakening local currency makes investment abroad more expensive in local currency units. If the depreciation of the pound sterling is expected to continue, then the foreign exchange adjusted returns on the U.S. dollar investment will, of course, increase through time. The increased local currency returns may be great enough to offset the increased initial investment as measured in local currency units. This conclusion is supported by the consistently positive coefficients for ΔFE. A relatively unstable political climate, together with many restrictions on land ownership and no real growth in the U.K. economy may cause British investors to discount further the exchange rate factor.

For Japan, the inflation differential coefficient consistently carries the wrong sign and is significant in four of the six equations. Similarly, the savings coefficient carries the wrong sign in all equations except one; however, the coefficients are insignificant. Neither the coefficient of FE nor ΔFE is significant in any equation except J5. Two factors may partially explain these results. First, during the period studied, Japan had a very strong economy with low inflation relative to the United States. Second, Japanese investors faced severe limitations in the Japanese real estate industry. As for the U.K. equations above, the constant dummy variable coefficient is significant only when the multiplicative dummies are included in the regression. Significant changes occur in

Japanese investment in U.S. real estate when controls are relaxed.

The P1 Equation for Panama is not as expected and provides little information. The intercept term, significant at .07, is probably indicative of the continuing close ties with the U.S. economy. The inflation rate differential coefficient is significant but negative.

An Extension And A Comparison

Table 2 summarizes the results when total foreign direct investment is substituted for real estate investment. The equation numbers parallel those for real estate investment in Table 1.

The results are unexpectedly similar to those found for real estate investment only. The major difference relates to the SAV coefficients in the J1-J6 equations.

For ease of comparison, Table 3 presents the independent variable coefficients that are significant for at least .05 of the two dependent variables that are being tested: investment in real estate only (REI) and total foreign direct investment (TFDI). In all cases where the coefficients are significant for both dependent variables, the coefficients carry the same sign. Parentheses identify the signs that are opposite from those hypothesized. It is assumed that as controls are removed in the United Kingdom and Japan, the direction of impact of the basic explanatory variables will be intensified and reflected in matching signs for the respective multiplicative dummy variables.

As stated above, the most significant differences between the real estate equation and the total investment equation relate to the savings variable for Japan. Two differences are reflected in DSAV estimates; other variable discrepancies occur singly. The direction of impact for the explanatory variables is virtually identical for REI and TFDI in all pairs of equations.

Conclusions

Savings rate differentials, inflation rate differentials and foreign exchange rates (measured as levels and as first differences) explain 69 percent to 97 percent of the changes in foreign real estate investment in the United States during the period 1973-1985. The best results occur for the United Kingdom and Japan when the relaxation of their foreign investment controls are included in the tests. Although most of the independent variables make significant contributions toward explaining the variance, their direction of impact is, in many cases, opposite from the direction hypothesized by theory and generally accepted in the literature.

TABLE 2

Summary Results Using Total Foreign Direct Investment As The Dependent Variable

Equation	Constant	Inflation Rate Differential (INF)	Savings Rate Differential (SAV)	Foreign Exchange Rate (FE)	Change in Exchange Rates (ΔFE)	Dummy Variable Constant (D)	Dummy Inflation Rate Differnetial (DINF)	Dummy Savings Rate Differential (DSAV)	Dummy Exchange Rate (DFE)	Dummy Change in Exchange Rates (DΔFE)	LAG	Correlation Coefficient (R^2[a])
C1	2693.208	212.575	-13.524	-1430.742							6	0.8701
	(1.31)	(4.35)	(-7.05)	(-0.67)								
C2	1551.215	228.931	-12.316		3156.065						6	0.8811
	(2.36)	(5.12)	(-7.53)		(2.43)							
UK1	-11699.062	199.672	-20.642	17677.600							8	0.7790
	(-2.39)	(2.53)	(-1.70)	(1.93)								
UK2	-3732.702	189.463	-25.039		3931.405						10	0.6525
	(-0.94)	(3.15)	(-2.80)		(0.74)							
UK3	-18874.086	104.470	-22.851	31867.900		2697.325					5	0.8180
	(-3.58)	(1.16)	(-1.75)	(3.53)		(1.33)						
UK4	-3500.180	194.840	-23.769		3449.308	646.520					10	0.6556
	(-0.87)	(3.11)	(-2.55)		(0.61)	(0.51)						
UK5	6554.077	21.218	-5.422	-5087.380		-34602.370	601.903	2.955	30375.961		2	0.9843
	(0.74)	(0.23)	(-0.43)	(-0.46)		(-3.75)	(5.23)	(0.20)	(2.42)			
UK6	3394.583	-9.560	-7.746		-505.579	-34152.849	691.907	-15.139		4977.087	3	0.9662
	(0.90)	(-0.13)	(-0.68)		(-0.03)	(-6.28)	(6.67)	(-1.04)		(0.30)		
J1	-2513.658	-190.162	-10.826	-4.850							7	0.8749
	(-0.94)	(-5.10)	(-3.40)	(-0.69)								
J2	-3283.384	-213.791	-9.672		10.388						9	0.8756
	(-2.18)	(-5.24)	(-2.92)		(1.72)							
J3	-2258.997	-187.537	-10.322	-5.053		323.323					8	0.8751
	(-0.81)	(-4.67)	(-3.10)	(-0.70)		(0.46)						
J4	-3273.860	-210.171	-9.652		10.827	154.301					9	0.8723
	(-2.13)	(-4.89)	(-2.87)		(1.74)	(0.25)						
J5	-981.483	-12.394	-8.342	-4.612		-9289.406	-388.177	-6.510	-13.114		3	0.9879
	(-0.50)	(-0.59)	(-4.80)	(-0.91)		(-3.20)	(-9.10)	(-2.03)	(-1.70)			
J6	-2678.225	-10.308	-9.427		4.545	-11852.148	-381.159	-5.979		9.680	3	0.9856
	(-4.26)	(-0.40)	(-6.67)		(0.68)	(-7.65)	(-7.99)	(-1.94)		(1.10)		
P1	505.360	-62.743	0.745								4	0.8328
	(1.99)	(-5.76)	(1.13)									

[a]Adjusted R^2 for the transformed regression

TABLE 3

Summary Comparison Of Real Estate Investment And Total Foreign Direct Investment

Equation	Constant		Inflation Rate Differential (INF)		Savings Rate Differential (SAV)		Foreign Exchange Rate (FE)		Change in Exchange Rates (ΔFE)		Dummy Variable Constant (D)		Dummy Inflation Rate Differnetial (DINF)		Dummy Savings Rate Differential (DSAV)		Dummy Exchange Rate (DFE)		Dummy Change in Exchange Rates (DΔFE)	
	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)	Real Estate Investment (REI)	Total Foreign Investment (TFDI)
C1			*	*	(*	*)*	*													
C2	*	*	*	*	(*	*)			*	*										
UK1	*	*		*	(*)		(*	*)												
UK2	*		*	*	(*	*)														
UK3	*	*			(*)		(*	*)												
UK4	*		*	*	(*	*)														
UK5											(*	*)	*	*				(*)		
UK6											(*	*)	*	*	(*)					
J1			(*	*)		(*)														
J2		*	(*	*)		(*)														
J3			(*	*)		(*)														
J4		*	(*	*)		(*)														
J5						(*)					(*	*)	(*	*)	(*	*)	*			
J6		*				(*)					(*	*)	(*	*)	(*)					
P1		*	(*	*)																

*Parentheses indicate signs opposite from those hypothesized

The most unexpected finding is the positive impact on foreign real estate investment (except for Canada) of a strengthening U.S. dollar when exchange rates are measured as levels. When changes in exchange rates are tested, opposite results occur. This finding suggests that foreigners expect their currencies to continue to depreciate *vis-a-vis* the dollar, making future increases in local currency returns more than enough to offset the increases in local currency costs for investment projects.

In no instance is the savings rate differential, when it carries the hypothesized sign, significant at .05. The impacts from the inflation rate differential, when significant, are as predicted for Canada and the United Kingdom but not for Japan and Panama. Only weak evidence is found that the change in exchange rates is a better explanatory variable than the level of exchange rates.

The most important finding relates to the impact of foreign exchange and foreign investment controls in the United Kingdom and Japan. Their importance is reflected in the coefficients of both the constant and multiplicative dummy variables. In general, the relaxation of controls reduces foreign investment in U.S. real estate.

A comparison of foreign direct investment in real estate and total foreign direct investment reveals few differences in their determinants.

The findings suggest that other factors are important in foreigners' decision-making processes. Although economic determinants play a significant role, the direction of their impacts is not always as predicted by theory. Foreign participation in the United States real estate market must be analyzed within a more comprehensive framework that explicitly incorporates such factors as political risk and diversification benefits. Because political risk assessment techniques remain rudimentary and portfolio diversification analysis is impaired by inadequate data, additional extensive, theoretical and empirical research is necessary to analyze the complex issue of foreign real estate investment flows to the U.S. market.

NOTES

1. Part of this increase may be illusory and reflect the improved reporting procedures that were undertaken to comply with the requirements of the International Investment Survey Act of 1976. However, the real estate component of foreign direct investments probably understates the actual amounts invested in U.S. real estate because only investments by real estate operators, lessors and developers are included in this category. See *Survey of Current Business*, August, 1978 [reference no. 3], p. 40 for further details regarding the estimates.

2. See Ricks and Racster [reference no. 15] for an interesting comparison of restrictions on foreign ownership of real estate in the United States and in other selected countries.

3. From 1979 to 1983, 90 percent of all reported investment originated in Canada, the United Kingdom, West Germany, the Netherlands, Netherlands Antilles and Japan [reference no. 1, p. 8]. The selection of countries was determined as follows: Canada because of its geographical proximity, the United Kingdom because it is a representative of Western European investment, Japan because it is the only Far Eastern country that is making significant investments in the United States and Panama because it is the only developing country with appreciable activity in the U.S. real estate market for which comparable data are available.

4. Unfortunately, these figures are reported only on an annual basis. Because no attempt is being made to identify seasonal effects, it is assumed these quantities occur evenly throughout the year.

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ADDITIONAL AND REDUCED DEMAND/ AMENITY AND DISAMENITY INCREMENT RECAPTURE: CONSIDERATIONS OF URBAN CONTAINMENT POLICY

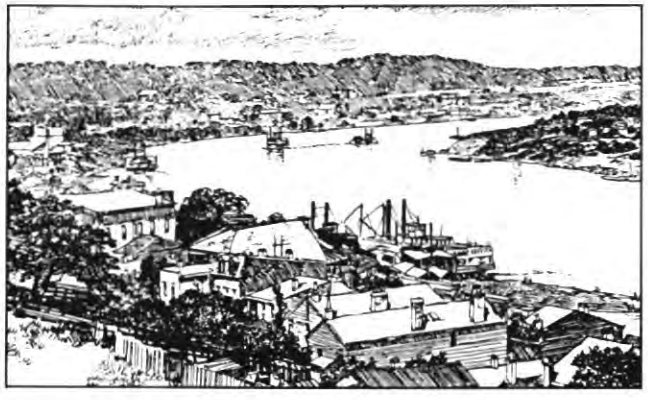
The property tax structure may be used to illeviate inequitable amenities and disamenities and improve urban containment programs.

by Arthur C. Nelson

Urban containment policy aims to concentrate urban development and prevent development of agricultural and other rural land. Within urban areas, this policy intends to focus development. Because of it, urban land values rise, and there is additional fiscal capacity to pay for the services and facilities that are needed to accommodate more intense development. This effect—the additional demand increment—may be recaptured: property owners pay more taxes but receive more services. In contrast, rural land values fall, but there is no real loss in fiscal capacity because the policy does not intend to increase the quantity or quality of services to rural areas. This effect—the reduced demand increment—also may be recaptured: property owners pay fewer taxes but receive fewer services. Both of these outcomes of policy are expected.

There are, however, other policy effects that are not intended and that may not be recaptured. Urban land near rural land is more valuable than other urban land for the views, scenery and privacy it enjoys. This effect is an amenity increment which may not be recaptured. Farmland near urban development is less valuable than other farmland because of the restrictions to agricultural production which urban development imposes. This effect is a disamenity increment which may not be recaptured (even though recapture of the disamenity increment would be negative). However, the increments to value that are caused by policy ought to be recaptured: property owners inflicted with disamenity increments ought to be compensated by a recapture of amenity increments.

The example used in this article discusses whether any given property tax structure is prepared to recapture land value increments that are attributable to urban containment policies in Oregon. This state has been selected



because its land development policies have been designed explicitly to alter urban and rural land values. In brief, Oregon has a statewide planning program which attempts to contain urban growth, focus urban development, discourage urban sprawl and prevent speculation of fertile farmland for nonfarm uses (Leonard, 1983; DeGrove, 1983). The state has received national acclaim for this effort (*Planning Magazine*, 1982). Oregon's land development policy has had demonstrable effects on land value; it has created: an additional demand for urban land and a reduced demand for rural land; an amenity (or positive) land value increment that is realized by urban land close to rural land; and a disamenity (or negative) land value increment that is realized by rural land close to urban development (Knaap, 1985; Nelson, 1986).

The opportunity for recapturing the additional and reduced demand increments within Oregon's property tax structure are obvious. Urban land value has indeed risen because of the policy. There is, therefore, the opportunity to recapture the additional demand increment as a stream of additional property tax payments. Then there is the additional fiscal capacity to pay for the services and facilities that are needed to accommodate more intense development.

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On the other hand, rural land value has indeed fallen because of the policy. Nonetheless, there is the opportunity for this policy effect also to be recaptured in the form of a reduced demand increment as a stream of reduced property tax payments. There is reduced capacity to pay for services and facilities, but there is reduced need for those services and facilities. These forms of increment recapture have been realized by local government in Oregon.

Even though the effects of urban containment policy have been found, the ability of the property tax structure to recapture amenity and disamenity land value increments is not obvious. The first part of this commentary summarizes the major features of Oregon's property tax structure that may influence the ability of local governments to recapture land value increments created by urban containment policy. This summary is followed by a discussion of the theory behind and evidence of the additional demand and the amenity and disamenity increments that are attributable to Oregon's urban containment policies and an explanation of how some of these increments may be recaptured and equitably distributed.

Oregon's Property Tax Structure And Increment Recapture

Under Oregon law, local governments (cities, counties, school districts, park and recreation districts, local infrastructure improvement districts, fire districts, etc.) rely on a *tax base* to finance the majority of their expenditures. The tax base is the amount of revenue that any given local government is authorized by its electorate to collect from a tax on property. The tax base may be increased by up to six percent per year without special authorization from the electorate. However, special levies may be authorized by the electorate to raise additional revenue by a temporary tax on property. Special levies may be used for capital, bond retirement or operating expenses.

The tax rate, or *millage*, at which the value of property is assessed is determined annually as the quotient of the tax base plus special levy authorizations and the aggregated assessed value of property within the taxing jurisdiction. The tax rate assessed on any given property anywhere in the state (and indeed anywhere within the same city and county) varies, depending on how many local governments claim that the property lies within their jurisdiction and depending on the level of expenditures that has been authorized by the electorates of these jurisdictions for any given year. In addition, the tax rate may vary from year to year if inflation or growth raises aggregate property values within a jurisdiction.

If the electorate does not authorize a proportional increase in the tax base or special levies, then the property tax rate can go down. On the other hand, a reduction in the property tax rate usually presages a willingness by the electorate to later increase the tax base or authorize special levies and thereby raise the property tax rate back to an accustomed level. A declining tax rate thus implies both an increasing demand for services and an increasing capacity to pay for those services. In this commentary, the discussion of increment recapture concerns the change in the local government property tax revenue capacities which result from increments.

The major departure from this scheme is Oregon's farmland taxation program. Like many states, Oregon differentially assesses farmland for property tax purposes. The assessed value of qualifying farmland is its annual net income (akin to annual land rent), which is determined by the state's department of revenue based on such factors as soil fertility, climate and location. In practice, the rate of taxation of the fair market value of farmland is about 10 to 15 percent of the rate of taxation of nonfarmland; thus, the owners of nonfarm property essentially subsidize the property tax payments of the owners of farmland.

The Effects Of Urban Containment Policy On Land Value

Oregon's urban containment program rests on two cornerstones: the containment of urbanization within urban growth boundaries (UGBs) and the preservation of farmland in greenbelts solely for farm uses (Gustafson, *et al.*, 1982). In the first regard, Oregon's program intends to segment the urban/rural fringe land market into urban and rural submarkets so those who desire to purchase land for urban uses will do so only in urban areas and those who desire to purchase land for farm uses will do so only in rural areas. This objective is accomplished by limiting urban services and facilities to the areas that lie within UGBs.

UGBs are drawn with several criteria in mind, including the projected future population of the urban area; the possibility of encouraging a greater intensity of development within urban areas; the capacity of existing or future public facilities and services to accommodate the future population; and the possibility that without UGBs important agricultural and other rural lands would be subject to sprawling urban development. The UGBs are, therefore, attempts to barricade urban development by policy.

Agricultural land is preserved outside UGBs through rather restrictive planning and zoning, especially in the Willamette Valley. Because 3/4 of the state's 2 1/2 million residents live within the narrow, 100-mile by 30-mile Willamette Valley—one of North America's most fertile regions—Oregon's planning program intends to protect valley farmland from urban speculation and development. This goal is accomplished by imposing exclusive farm use zoning on prime agricultural farmland throughout the valley in order to create greenbelts around and between urban areas. Formally, this is conservancy zoning (Rosser, 1978), and it creates greenbelts out of privately held land without compensation.

Additional And Reduced Demand Increments

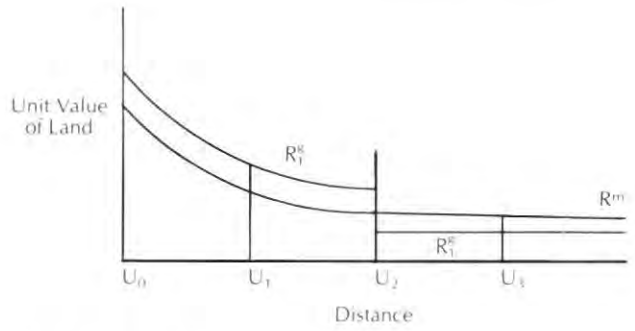
If a regional policy concentrates development within an urban area, then property values will rise throughout the urban area and land values will fall in the rural areas (Lafferty and Frech, 1978). In the absense of an urban containment program, any notable differences between land values of adjoining parcels will be explained by location, size, socioeconomic factors and physical and

environmental factors. However, if a program uses a UGB and zoning policies to differentiate between urban and rural land, it creates a gap in the otherwise continuous locus of land values at the UGB (Whitelaw, 1980).

Figure 1, illustrates how an urban containment program segments the land market into urban and rural submarkets by creating an additional demand increment in the urban land market and a reduced demand increment in the rural land market. In the figure, the land value gradient changes from R^m to R_1^g, where R^m represents the unrestricted locus of land values along the urban/rural fringe, and R_1^g represents the locus of land values resulting from the same forces that affect R^m but also including the increment that results when urban land uses are denied locations beyond the UGB (u_2). As a result of an urban containment program, the value of land beyond the UGB (u_3) shifts downward because this land is denied urban development and it therefore is less valuable than land that is open to urban development. On the other hand, the value of land within the UGB (u_1) shifts upward because an additional demand for urban land has been created. Evidence of this gap effect is provided by Knaap (1982) in his study of metropolitan Portland, Oregon, and Nelson (1985) in his study of Salem, Oregon—both major urban areas in the Willamette Valley.

FIGURE 1

Additional and Reduced Demand Increment



Amenity Increment

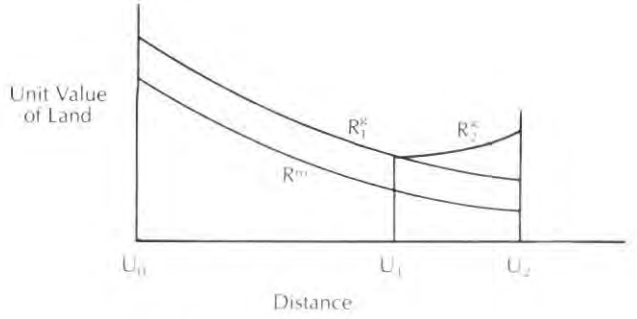
By preventing the urbanization of rural land, urban containment programs can create greenbelts surrounding urban areas. Correll, *et al.* in 1978 noted that greenbelts provide an urban area with a variety of public goods, such as air cleansing, flood control, food and wood production, recreation and scenery, and that these benefits are internalized throughout the urban area. In addition, greenbelts provide certain quasi public goods, such as pleasant views and privacy, which are enjoyed exclusively by urban land that is adjacent to them or nearby. This bundle of quasi public goods is internalized as an amenity increment in the urban land market.

Until recently, amenity increments have been detected only in urban land markets when the greenbelts, or other open spaces, were owned in fee simple by public agencies or were otherwise in the public domain (see, e.g., Li & Brown, 1980; Diamond, 1980; Brookshire, et al., 1980; Brown & Pollakowski, 1977; Blomquist & Worley, 1981; Correll, *et al.*, 1978). In Oregon, however, greenbelts have been created by conservancy zoning and not by fee acquisition or acquisition of development rights.

Nelson (1984) theorized that the amenity increment would be found in an urban land market even when privately held greenbelts were created by conservancy zoning or when no direct compensation was made to owners of rural land. He found empirical support for the theory in the Salem, Oregon region. Figure 2 shows that when an urban containment program creates greenbelts adjacent to or near urban development that extends to a UGB, the urban land market will value proximity to the UGB as an amenity increment. This amenity increment occurs in addition to the additional demand increment. In Figure 2, the amenity increment takes the form of R_2^g which slopes upward from the UGB (u_1) to the urban development area (u_2).

FIGURE 2

Amenity Increment



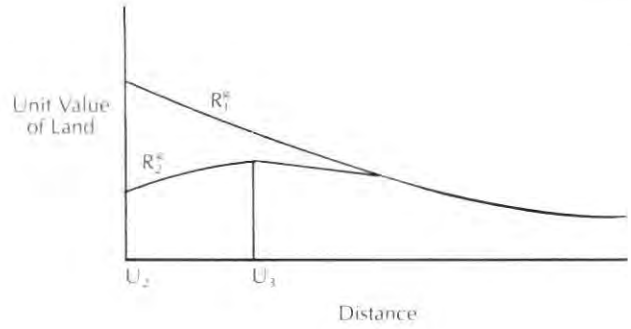
Disamenity Increment

The value of rural land proximate to urban development is based on speculative and agricultural use components. When government action imposes conservancy zoning on rural land for the purpose of creating greenbelts, it removes the speculative use component of rural land; so only the agricultural use component remains (Boal, 1970; Rosser, 1978). However, urban residents impose production-inhibiting externalities on farmers. These externalities include nuisance restrictions on the use of fertilizers, pesticides and herbicides; hours of operation; field practices that produce dust and change drainage patterns; and the use of streets and highways to transport goods and machinery. Other externalities include trespassing when nearby residents trample fields and/or help themselves to produce and the killing of small farm animals when pets run loose. This bundle of externalities is internalized in the rural land market as a disamenity increment, and the resulting value of rural land situated beyond the UGB declines. Sinclair in 1967 theorized that the value of land for agricultural use declines with proximity to urban development. Based on his study of Salem, Oregon, Nelson in 1984 was the first to find evidence of

this theorized relationship. Figure 3 shows that in the absence of an urban containment program, the value of rural land will be R^m. However, if an urban containment program effectively removes the speculative use component from the rural land market, the resulting agricultural use land value gradient will be R_2^g, and a disamenity increment will be created.

FIGURE 3

Disamenity Increment



Increment Recapture Within A Property Tax Structure

The traditional mechanism for recapturing land value increments that are attributable to land use policies has been the property tax assessment and collection system; that is, an increase in land value results in a proportional increase in the propety tax collection capacity of benefiting jurisdictions. In Oregon, however, an increase in urban land values resulting from urban containment efforts makes the property tax rate fall because total property tax revenues remain unchanged. This outcome is not notable except when one considers that a principal purpose of urban containment programs is to make the delivery of urban services more efficient (Real Estate Research Corporation, 1974). If efficiencies are realized and total public spending for urban services becomes lower per unit of delivery than might have been the case without an urban containment effort (a debatable contention, according to Altshuler, 1979), then either the eventual property tax savings will become capitalized in the urban land market, resulting in even higher property values over time (Bahl, 1968; Shoup, 1970), or the increased property tax collection capacity of the urban area will be exploited in order to improve the quality of the physical and social environment.

There is some evidence that these increments are being recaptured (Nelson and Knaap, 1987). However, amenity and disamenity increments are not likely to be anticipated by public tax assessment officials. Consider the increment to urban land at or near the UGB, which is a windfall that accrues only to urban land that is adjacent to or near the UGB and is created solely by public planning policy. This increment is not likely to be recognized by county property tax assessors for two reasons. First, until recently, the existence of this amenity has not been postulated in theoretical literature, let alone demonstrated in empirical efforts. Thus, one function of this commentary is for public officials to know of the possibility that urban containment programs can create an amenity increment quite apart from the simple additional demand increment. Since this amenity increment accrues exclusively to urban land adjacent to or near greenbelt areas, a case might be made that the amenity increment at least ought to be recognized for property tax assessment purposes.

Second, the amenity is difficult to detect. The amenity increment declines markedly as the distance from the UGB increases; it disappears within about one mile of the Salem UGB, for example. Since the comparable property appraisal approach used by county assessors averages like properties, it is not especially sensitive to location anomalies such as the one posed by UGBs. Still, when one considers that assessors do indeed take into account views and distance from garbage disposal sites, the consideration of a greenbelt distance factor should not be difficult.

Then there is the problem that the disamenity increment is not recaptured. It is one thing for public policies to raise or lower land values for general classes of land, but it is quite another to allow some owners of urban land to exclusively enjoy amenities (see Figure 2) while condemning some owners of rural land to exclusively suffer disamenities (see Figure 3). For the moment, there is no evidence that disamenity increments are recaptured in the form of lower assessed farmland value because Oregon's farmland assessment practices are not designed to identify or account for it.

Conclusion

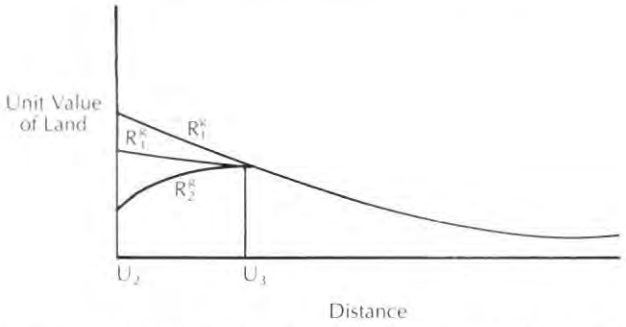
A proposal now is being made to use the increment recapture ability of local property tax structures to more equitably distribute these increments. If local governments really intend to create lasting, long-term greenbelts out of privately held farmland outside UGBs, then that land or its development rights must be purchased; otherwise, urban development pressures may lead to conversion of those greenbelts over time. An increment recapture scheme may be employed to assess those properties that receive amenity increments in order to compensate those properties that receive disamenity increments (Hagman & Misczinski, 1978). Mechanically, the amenity increment may be recaptured through property taxation, and the additional tax revenues may retire the general obligation bonds that were used to acquire the development rights of farmland.

What is the value of farmland development rights acquired for greenbelt purposes? There are ample legal and economic arguments that farmland development rights should not include speculative development use value. The value of these rights should be based on the difference between the observed value of farmland that is intended strictly for agricultural use and the expected value of the farmland without urban externalities. This is

illustrated in Figure 4, which shows that the speculative use value of farmland beyond the UGB (u_2) is the difference between R_1^g and R_3^g. In the figure, R_2^g is the farmland value gradient that occurs when urban externalities impose disamenities that reduce farmland production and thereby reduce value. The real value of urban externalities on farmland is the difference between R_2^g and R_3^g.

FIGURE 4

Value of Urban Externalities on Farmland Near the Urban Growth Boundaries



The effect of this scheme is to assure owners of urban land that the benefits that accrue from proximity to greenbelts will be retained in the long term through community ownership of the development rights of farmland. Owners of greenbelt land are compensated for the loss of the production value that is attributable to urban externalities. However, without accurate increment determinations, increment recapture is not likely to occur. Inequitable distribution of amenities that create value windfalls and disamenities that cause value wipeouts will go unabated, and opportunities for making urban containment more effective may be lost.

NOTES

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