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SwapRent (SM) – A New Alternative for Property Owners

(Strictly Confidential)

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ABSTRACT

This article describes the new patent pending SwapRent (SM) concept and its derivative consumer finance products for property financing, hedging and investments as alternatives to the traditional real estate transactions and mortgage products. A special granular indexing methodology is also created for this new type of property derivatives trading and hedging instrument.

“SwapRent (SM)” is a new invention of an alternative way between the buying/selling and the renting of a real estate property for property owners. The idea is to provide a very simple way in the mind of the property owners to let them protect the gains in their home or commercial property equity value. As long as a property owner has the mental capability to sign a contract to purchase a house or to sign a lease to rent an apartment he or she will have the ability to sign a SwapRent (SM) contract in order to stay out of the price fluctuation of his/her home or a commercial building that he/she owns for a short or long period of time. The homeowners or commercial property owners do not need advanced knowledge or education in derivatives or any other sophisticated institutional capital markets instruments in order to make the SwapRent (SM) transactions.

SwapRent (SM) has two major roles in the new real estate risk management industry – one is to act as a superior OTC property derivatives instrument in the inter-bank and institutional dealing community, the other is to act as bridge between the esoteric institutional derivatives market and the vast consumer finance market. As a result SwapRent (SM) was also intentionally designed to be a consumer-oriented financial product to be offered to the retail consumers such as homeowners or commercial property owners of office buildings, apartment complexes, warehouses, retail shops ... etc. for them to use is as a simple hedging tool. At the same time SwapRent (SM) could also allow investors to use the same service (in an opposite position) to establish an exposure in the potential property value appreciation or depreciation of a particular type of properties in a particular neighborhood. Banks could be engaged to either be the middlemen in between the property owners and investors or simply as credit guarantors.

The business idea is to design and create a very simple concept and method for property owners to simply “rent” (“SwapRent (SM)”) (to pay a “rent” or to pay a “SwapRent (SM)”) to stay in) their own house for a certain period of time and therefore to achieve the objective of not having a potential loss or gain in their home equity value during that same time period, while continuing the existing legal ownership.

Currently the only business method available to a property owner to lock in the gains or loss in the home equity value is to do a “sale and lease back” transaction. This includes the real sale transaction and the renting from the new owner of a house that the property owner had been



occupying. The high transactional cost associated with it as well as the tax and legal considerations are usually the deterrents for property owners to widely accept it as a temporary tool for the purpose of simply locking in the financial gains or loss for a specified period of time. Using exchange traded futures and options could be another way but it does not offer a necessary close hedging ratio and the method is way too complicated for most normal homeowners without advanced derivatives knowledge and experience.

Despite its unique capability to bring the unsophisticated homeowners or commercial property owners into the derivatives market due to its simplicity and user friendliness SwapRent (SM) is by no means just a retail product. Its institutional uses far out rank the currently existing instrument such as a TRS or PRS. From a technical stand point, SwapRent (SM) is like a synthetic "rent" or "yield" for properties, similar to the concept of the lease rate trading for gold. Through the SwapRent (SM) trading we could develop a fixed vs. floating synthetic property "yield" swap market itself for both the residential and the commercial properties. The floating SwapRent (SM) market could connect to the current PRS market if they both use the same granular like-kind property neighborhood indices introduced here. The fixed SwapRent (SM) market will be able to provide much more useful information such as implied forward price information for properties. That is the relationship dictated by the interest rate parity. Through the unique REIO (AG and DP SwapRent) trading the options market could be easily developed first and hence the information about implied volatilities. Trading forwards and options will no longer remain wish list items or simply punting games among speculators if they are developed using this systematic SwapRent (SM) approach. The current "forward start" TRS or PRS contract is not really a true traditional forward contract. In addition the main arguments for liquidity is that through SwapRent (SM) trading arbitrage opportunities could exist when SwapRent (SM) levels are compared to the actual rental levels in the real world of the similar like kind properties in the same neighborhoods, for both residential and commercial properties. The existence of arbitrage opportunities is vitally important in growing any new derivatives markets.

As a derivatives instrument, SwapRent (SM) could be used with any kind of indices. However, the special usefulness of SwapRent (SM) for hedgers could be demonstrated when a special set of granular indices is created. These granular indices are based on a concept of the weighted average price information per square area of the "smallest definable neighborhoods of like-kind properties" and their aggregates in any country.



BACKGROUND AND PROBLEMS OF THE EMERGING REAL ESTATE RISK MANAGEMENT INDUSTRY

The American real estate market is currently the world's largest financial market. The total value of residential real estate alone is reaching 24 trillion dollars and growing; however, as sophisticated as the U.S. financial market is, the American homeowners up until now still cannot hedge the equity value in their homes adequately and properly. A home represents the largest single asset for most individuals, and the associated accumulated equity in the home constitutes a substantial part of their financial net worth. However, real estate is subject to price fluctuation, both upward and downward. Particularly downward price fluctuations can have a significant adverse effect upon the net worth of homeowners.

Currently, the only method available to a homeowner to lock in the gains or loss in the home equity value is to do a "sale and lease back" transaction. This includes a real estate sale transaction and the renting from the new owner of a house that the homeowner had been occupying. The high transactional cost as well as the tax and legal implications associated with this are usually the deterrents for homeowners to widely accept "sale and lease back" as a tool for the purpose of locking in the financial gains or loss for a specified period of time.

Although the housing market has been very strong in the past few years due to very low interest rates as well as many innovative payment-reducing mortgage products, the real estate prices at some point in the near future may start to decline. When that happens, the homeowners/investors will have no other way to protect the erosion of their asset value, other than selling the property outright; however, what is best for the households financially may not be the best for the family's overall welfare due to this disruption of forced sell-off and relocation.

At the present time, there is no efficient means for an individual homeowner to protect the value of the investment in his home when residential real estate values are declining. Traditionally, the homeowner either waits to sell his house when the real estate markets recover and the homeowner can make a profit on the sale, or if forced to move due to job changes or other relocation pressures, the homeowner sells at a loss. This lack of protection tool for financial price risks is in contrast to the situation for other means available to protect his investment, such as traditional homeowners' insurance policies that cover destruction or damage to the house from a variety of causes.

High income or wealthy people can afford and would be interested in buying insurance for downside property value risk protection. While there has been a market demand for many years for additional insurance coverage against market declines in house values, insurance companies have been reluctant to write such home-equity insurance policies for a variety of reasons. The problem of an insurance policy that directly protect against a decline in a particular value of a home is that of "moral hazard," since many factors influencing the value of a home are under the direct control of the homeowner. If the homeowner fails to adequately maintain the house and property, or makes decorative or other changes that are idiosyncratic in nature, then a decline in the value of the property will inevitably result. Yet, it would be difficult for an insurance company to objectively prove under some default provision in the insurance policy what portion of the house's reduced sale price was due to these "homeowner controlled" factors. Thus, a homeowner with a home equity insurance policy would be tempted to fail to maintain the property because the homeowner would face little financial risk from his/her lack of care. As we shall see below by using a neighborhood index as a benchmark for property prices there could be an easy way out to let the homeowners hedge away the beta and not the alpha of their properties to avoid these "moral hazard" issue.



Another problem is that buyers of homes who paid too much for the property would have a special incentive to take out a home equity insurance policy due to the probability that they could not sell the house for the same price, at least within the relatively near future. This is called the “adverse selection problem.” A home equity insurance policy would therefore place this risk squarely on the insurance company. Yet another problem would be a home equity insurance policy holder who neglected to make reasonable efforts to obtain market value for his house at the time of sale because they know the insurance company would make up the difference. These reasons have made home equity insurance policies unfeasible.

Low income or poor people do not worry so much of the downside property value risk as much as do high income people because what they need is usually a shelter, a place to sleep. It does not matter much if the value declines as long as they have the ability to pay the monthly mortgage payments so that they can continue to stay in the house. Nor do they treasure the future uncertain potential upside appreciation as much as do rich people – they would rather treasure more cash at hands. Therefore this kind of clientele represents what constitutes the existing market demand for Shared Equity Mortgage (SEM), Shared Appreciation Mortgage (SAM) or even Reverse Mortgage and Home Equity Conversion Mortgage (HECM) markets in many parts of the world. It should be recognized that in the U.K., these carry different names such as Home Reversion Scheme, Life Time Mortgages and Home Income Plan, etc. Low income people, including senior and retired people, are more interested in current income than any future uncertain appreciation potential which may or may not even be realized. They would be interested in selling uncertain future appreciation potential so that they can get a monthly income which they could use for a mortgage payment subsidy or other purposes.

In many states or foreign countries (for example, the U.K. and Australia) the government usually sets up task force and incentive programs for non-profit or commercial entities to provide such an subsidies to potential homeowners so that the homes would be much more affordable. However, the current products offered to the consumers such as the SEM, SAM or Reverse Mortgages and HECM are not satisfactory because they do not offer the same economic benefits that derivatives could traditionally offer that would be much better than non-derivatives cash financial instruments could ever provide. As we shall see below that the advantages of derivative version over the traditional ones are their short-term flexibility and the reversible nature through trading in the secondary market. In addition they could be offered to borrowers without any particular age, income, credit or LTV restrictions.

In addition to the need of providing an efficient hedging tool against tangible real estate investments, there is a need to enable investors to synthetically invest in real estate. These investors may be interested in diversifying their institutional and individual portfolios to include real estate, which is not closely correlated to equities and many other investment vehicles, or they may be interested in balancing their real estate portfolio by investing in real estate in a disparate geographic region. To invest in real estate now, one must actually purchase the real estate. However, selling and buying real estate is an inherently inefficient and expensive process, making it exceedingly difficult for investors to efficiently invest capital in desirable real estate holdings. Furthermore, to truly diversify a commercial real estate investment portfolio, one would need to purchase different types of real estate in many different geographic markets, which would make the costs to execute such a real estate investment strategy exorbitant. Moreover, once purchased, such real estate holdings need to be maintained and managed, which can substantially further increase these costs.

An early instance of an attempt to provide such a financial instrument, however imperfect, was a futures contract on residential real estate prices in the United Kingdom in May 1991 that was initiated by the London Futures and Options Exchange, which has since evolved into Euronext, Postbus 19163, 1000 GD, Amsterdam. Trading in this contract was promptly suspended in



October 1991, however, when it became apparent that few homeowners were availing themselves of an exchange-based system, despite the presence of unstable residential real estate prices in England, and the exchange was required to artificially support trading values in the futures contract to mask this deficit in customer usage.

The real estate index derivative instruments that currently exist are generally classified into exchange-based futures and options for residential real estate and OTC market-based Total Return Swaps (TRS) and Price Return Swaps (PRS) for commercial real estate. A summary of the prior exchange-based futures and options contract design and business methods for residential properties in the U.S. is in an article in the Los Angeles Times, "Entrepreneur Sees a Futures Market for Homeowners" (Sunday, 20 April 2003).

The Chicago Mercantile Exchange, 20 South Wacker Drive, Chicago, Illinois 60606 (CME) subsequently launched similar housing futures and options contracts in May 2006. As of the end of 2006, the CME has only done a \$340 million notional amount of the 1500 trades for a \$24 trillion underlying U.S. residential market. On the OTC markets side for commercial properties, in the United Kingdom, as of the end of 2006 there has been about a billion pounds of notional amount of TRS and PRS being done on Investment Property Databank's, 1 St John's Lane, London, EC1M 4BL, England (IPD) All Property Index (API) and other sub-indices after a few years of experimenting since its inception in 2001. In the U.S., as of the end of 2006 two index swap trades have been done on the NPI (National Property Index) published by NCREIF (National Counsel for Real Estate Investment Fiduciaries) and arranged by Credit Suisse, Paradeplatz 8, 8070 Zurich, Switzerland. None of these experimental markets had generated sufficient momentum or critical mass to make it a success so far. Other attempts to utilize traditional disaster or calamity insurance concepts by putting up reserve such as those employed in the life or auto insurance industry have also not succeeded.

These concepts and first few real estate index derivative instruments of TRS and PRS were originally borrowed from the OTC equity swaps market. When applied to the property markets, the TRS and PRS have many deficiencies. Due to the diverse regional or de-centralized nature of the real estate markets within many countries as well as the relatively unsophisticated nature of these residential real estate asset class owners as compared to the more financially savvy participants in the equity markets, it became apparent that the property markets definitely need new, more innovative derivatives instruments, new index design, and new business methods to address these issues properly. In addition, treating real estate properties simply as equities which typically have uncertain future variable yields in the form of dividends are not sufficient to develop more sophisticated derivatives markets such as forwards and options. Therefore, there exists a need to innovate more suitable derivative instruments that could make it possible to treat real estate properties more like fixed coupon bonds as well.

One problem with the exchange-based contracts are that they are more suitable for speculators, investors or institutional middlemen such as inter bank traders who may desire to use them for hedging in order to turn around and offer other types of more consumer friendly products in the future. These exchange-based contracts themselves are by nature very complicated to use and therefore unsuitable for the average consumers/homeowners. As for the current OTC market, the TRS and PRS are also not very intuitive to most people. They are difficult to understand, even for the industry professionals. A typical trade quote for a TRS is that one party is willing to offer a counter-party the total return (composed of price return calculated based on an index during the contract period and an income stream paid usually quarterly during the same contract period) while receiving from the counterparty a quarterly floating rate such as 3-month LIBOR plus a "spread". An example of a "spread" could be 250 basis points annually as an arbitrary example.



In the case of a PRS, there is no income component for the same contract and therefore one party will only pay a quarterly "spread" to the counter-party. Although it appears that the fixed "spread" is on a floating basis as it had evolved from and still is related to a TRS, there is ambiguity whether it could be applied to fixed rate differentials as well. No implied forwards could be derived from this "spreads" information. The trading and quoting convention is more like those of trading floaters (bonds with floating interest rates) or those in cross currency basis swaps as examples in the cross currency swap markets).

To make matters worse the market does not even have a standard in utilizing PRS. In Hong Kong the first property derivatives trade was done earlier in February 2007. The inter-dealer broker that promoted the deal opted a way of quoting and trading PRS which is similar to how TRS is typically traded elsewhere, i.e. using the "spread" added to a quarterly floating interest rate such as 3M HIBOR as the quarterly payments that the investors have to pay to the property owners, despite no income stream is paid from the property owners to the investors in the case of a residential property index which the trade was based on.

For example, the following are quotes for the NCREIF index swaps in the US commercial properties market on 28 September 2006:

Size	Index (2 Year Reference)	Bid / Offer (*)
25mm x 25mm	NPI Capital Value Return	15.0 / 40.0
10mm x 10mm	Industrial vs. Retail Total Return	0.0 / 30.0
20mm x 10mm	Office vs. Retail Total Return	60.0 / 90.0
10mm x 10mm	Office vs. Industrial Total Return	30.0 / 60.0
10mm x 10mm	Apartment vs. Retail Total Return	40.0 / 70.0
10mm x 10mm	Apartment vs. Industrial Total Return	10.0 / 40.0

(*) Stated in bps/quarter

Size	Index (2 Year Reference)	Bid / Offer (**)
25mm x 25mm	NPI Total Return	L + 250 / L + 350

Size	Index (3 Year Reference)	Bid / Offer (**)
25mm x 25mm	NPI Total Return	L + 200 / L + 300

Size	Index (1 Year Reference)	Bid / Offer (**)
10mm x 0mm	Office Total Return	L + 350 / NA

(**) Stated in bps/year ; L is 3-month Libor

All capital value & property type swap trades will either settle forward or use the calculated spread feature as described in the presentation.

All Total Return Trades will start January 2007.

No Upfront Fee to enter trade.

Table 1 - NCREIF Spread Markets, Thursday, 28 Sep 2006 08:44:41-0400

As explained above the concepts and conventions may have derived from other esoteric institutional derivatives market such as the equity swaps market. As the equity market may be more dominated by sophisticated institutional investors, these investors may not have that much trouble with it; however, when TRS and PRS are borrowed and applied to the property markets they do not offer a good fit because the bulk of the properties are still in the hands of the unsophisticated home-owners and real-estate investors who are typically not familiar with the derivatives market. As could be easily understood that there is no way anyone can approach a



70 year old home owner to ask him to do a TRS or PRS trade quoted above in order for him to manage his home equity. Similarly it will be equally challenging to convince the same homeowner to open a margin account to trade futures in order to protect his home property value. Both the existing OTC and exchange-based contracts are way too complicated to be products for the consumers.

In addition, TRS and PRS themselves from a professional and technical standpoint are very basic swapping instruments to exchange the return on one asset with a variable future yield to the return of another asset also with variable future yield. TRS and PRS do not offer many hedging functions traditionally offered by derivatives on many other asset classes, such as forwards and options. The economic functions they provide are simply synthetic spot trading, spot hedging or asset re-allocation, even with a forward starting date. Therefore there exists a need for newer trading instruments that will provide the true hedging functions of forwards and options for real estate.

To use an analogy in foreign exchange (FX) trading, TRS and PRS are like spot trading or spot hedging: spot trading or hedging are ineffective to a corporate hedger or institutional investors who have hedging needs. They need over-the-counter FX forward contracts and FX options contracts to do so. Therefore, there exists a need to develop the true forwards and options equivalents in the property derivatives market. In addition, instead of simply talking about them as wish list items, there exists a need to invent a systematic methodology to create the “no arbitrage” pricing for both the forwards and options contracts that could provide economic value and convenience for the hedgers as well as the internal risk management capabilities for the financial institutions who act as middlemen and product providers.

In summary, it would be desirable to provide a bridge between the esoteric institutional derivatives world and the vast homeowner’s consumer finance market. It would also be desirable to accelerate the evolutionary process for the property derivatives market by introducing prudent business methods for conducting forwards and options concepts and equivalent instruments to the market.

THE PROPOSED SOLUTIONS

SwapRentSM

“SwapRent (SM)” is a new patent pending invention of an alternative way between the buying/selling and the renting of a real estate property for property owners. The idea is to provide a very simple way in the mind of the property owners to let them protect the gains in their home or commercial property equity value. As long as a property owner has the mental capability to sign a contract to purchase a house or to sign a lease to rent an apartment he or she will have the ability to sign a SwapRent (SM) contract in order to stay out of the price fluctuation of his/her home for a short or long period of time. The homeowners do not need advanced knowledge or education in derivatives or any other sophisticated institutional capital markets instruments in order to make the SwapRent (SM) transactions.

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warehouses, retail shops ... etc. for them to use is as a simple hedging tool. At the same time SwapRent (SM) could also allow investors to use the same service (in an opposite position) to establish an exposure in the potential property value appreciation or depreciation of a particular type of properties in a particular neighborhood. Banks could be engaged to either be the middlemen in between the property owners and investors or simply as credit guarantors.

The business idea is to design and create a very simple concept and method for property owners to simply "rent" ("SwapRent (SM)") (to pay a "rent" or to pay a "SwapRent (SM)" to stay in) their own house for a certain period of time and therefore to achieve the objective of not having a potential loss or gain in their home equity value during that same time period, while continuing the existing legal ownership.

Currently the only business method available to a property owner to lock in the gains or loss in the home equity value is to do a "sale and lease back" transaction. This includes the real sale transaction and the renting from the new owner of a house that the property owner had been occupying. The high transactional cost associated with it as well as the tax and legal considerations are usually the deterrents for property owners to widely accept it as a temporary tool for the purpose of simply locking in the financial gains or loss for a specified period of time. Using exchange traded futures and options could be another way but it does not offer a necessary close hedging ratio and the method is way too complicated for most normal homeowners without advanced derivatives knowledge and experience.

The banks or other financial institutions such as mortgage lenders or home equity loan lenders could either be involved as middlemen or simply as guarantors of the credit exposures associated with such transactions. They could in turn manage the credit exposure for themselves by using many existing banking products such as collaterals, mortgages or HELOCs to support these new types of transactions.

Here is a typical example, among many other possible variations. A homeowner bought a house three years ago for \$500,000. The current market value is about \$800,000. He/She could enter into a "SwapRent (SM)" transaction in which he/she will make a SwapRent (SM) weekly, bi-weekly, monthly or quarterly payment to an investor for the next two years while he/she will be protected from the ups and downs of the house value for that two years period. The investor will receive the weekly, bi-weekly, monthly or quarterly SwapRent (SM) payment and pay the homeowner a weekly, bi-weekly, monthly or quarterly funding cost payment based on, as an example, the 3-month LIBOR rate or simply a fixed interest rate for the duration of the contract.

The SwapRent (SM) could be expressed an annualized percentage, say 2% for easy trading and quoting purpose (the same way as the funding cost, say 5%) but will be calculated by multiplying the house value and prorate it for a monthly (or quarterly) actual payment amount (in the same way as the funding cost). The SwapRent (SM) payments and the funding cost payments could offset and be netted against each other so only a netted payment is to be paid either to the homeowners or the investors each week, each bi-weekly period, each month or each quarter, depending on the local market practices.

Two years later at the end of the SwapRent (SM) contract the house value could either rise to \$1,000,000 or drop down to \$600,000, for example. The ending value of the house could be determined based on a methodology under a preset mutual agreement to be calculated through either a real appraised value or using an index (such as SPIM explained below). Since the real appraised value has the potential moral hazard problem an index approach is much preferred. If the house value is \$1,000,000 the gain of \$200,000 will belong to the investor and the homeowner will have to cash settle it by borrowing further from the mortgage on the house and pay the amount to the investor, for example. The bank could simply either increase the original



mortgage amount (see HELM/PELM and FVCM below) based on SwapRent (SM) contractual agreement or simply view it as a further draw-down of the homeowner's HELOC (home equity line of credit) if one has been set up already.

The suggested evolution of the tax treatment for the tax authority in the future is as follows (subject to future tax authority ruling of course). The homeowner's cost basis for tax purpose could be increased to \$700,000 (instead of the original cost basis of \$500,000) after the cash settlement payment at the end of the contract. If the house value drops down to \$600,000 at the end of the SwapRent (SM) contract then the homeowner will be paid by the investor for the \$200,000 difference (\$800,000 minus \$600,000) and therefore achieving the objective of home equity value protection. The homeowner's cost basis in this case could be decreased down to \$300,000 in this case (subject to future tax authority ruling of course) and continue to own the house with a then current market value of \$600,000. He/She could enter into another new SwapRent (SM) contract for another say 1, 2, 3 or 5 year period with another investor or alternatively he/she could decide to sit on it and stay put for the time being without any further SwapRent (SM) transactions. The bank may have asked the investor along the way to put up more collaterals so that to ensure by the settlement date of the SwapRent (SM) contract the investor will have the necessary cash to pay out to the homeowner should the house value drops. This is very similar to a share margin trading account or an FX margin trading account that have been widely available to investors for years. Alternatively, banks and brokerages houses can offer the index linked structured notes. (see PILN/REILD below)

The SwapRent (SM) rates, expressed and quoted as an annual percentage number per each neighborhood such as a ZIP code or postal code neighborhood area throughout each country will be quoted and traded on an Internet portal site <http://www.SwapRent.com> or be disseminated through other data and information providers. A typical bid/offer example could be like 3.75%/3.5% for ZIP code area 90210 in the US or for postal code area W1K 2HP for the UK with a corresponding per sq ft weighted average price of \$750 or a per sq ft price of 350 pounds.

Here is a more technical look at SwapRent (SM). In a typical SwapRent (SM) transaction the property owner will pay a synthetic "rent" while an investor will receive the synthetic "rent" so that price fluctuations based on an index will be transferred to the investor. The SwapRent (SM) levels that are traded will reflect more than just a conventional rent concept; the synthetic "rent" will incorporate the aggregation of yield derived from the actual rents (if any), risk premium of holding property equity, transaction costs, tax considerations, and overall supply and demand sentiments at a particular point in time. Therefore, this traded synthetic "rent" will have no direct, straightforward relationship with the actual rent yield that the property owner may have been able to collect. The difference could be like what a coupon (actual rent) is to a fixed rate bond of certain maturity versus what the current term structure yield level (synthetic rent) is to similar bonds of similar maturities traded in the capital markets. In return, the property owner/hedger will receive a funding cost that for example can be expressed as a floating rate such as 3-month or 6-month London Inter-Bank Offered Rate (LIBOR) calculated based on London fixing at the settlement dates or a fixed rate such as the swap rate from the interest rate swap market for a maturity that matches the duration of the SwapRent (SM) contract. An investor who takes the opposite position will receive the price changes expressed through the settlement of the difference in property value during the holding period in addition to receiving the SwapRent (SM).

An arbitrage opportunity may exist if the synthetic "rents" are priced out of line and, therefore, market equilibrium could be achieved as a result of these arbitrage transactions. For example, if by paying the synthetic "rent" based on the index of a particular like kind property neighborhood for the notional amount of a particular buy-to-let condo that a property owner actually owns in that neighborhood, an almost no-risk arbitrage profit could be made by simply physically renting out the buy-to-let condo and collecting a real rent, if the real rent is much higher than the synthetic



“rent”. Then many similar transactions will keep happening until the synthetic “rent” rises to a certain level so that, after considering all the transactional costs involved, no such risk-less arbitrage opportunities may exist any more. The existence of arbitrage opportunities that enhance market liquidity will be a key success factor to building any new derivatives market.

Through offering trading liquidity, the SwapRent (SM) transactions and other related derivative instruments will make it possible for traditional institutional investors such as corporate pension funds and insurance companies for example to treat property equity as a separate and distinct investment asset class, especially in the case of residential real estate properties which has never been properly treated as such in the past.

Mathematically, for a SwapRent (SM) contract on any real estate properties, within a particular holding period (with +/- signs from an investor’s perspective),

Total Returns = IBCR + Generic SwapRent – FC

or from a property owner’s perspective,

Total Returns = - IBCR – Generic SwapRent + FC

where IBCR is the index based capital returns component of the SwapRent (SM) contract and FC is the mortgage funding cost.

The Generic SwapRent is the synthetic “rent” that represents the yield component of the SwapRent (SM) contract. The synthetic “rent” could be quoted in fixed yield format for the entire product maturity or it could be quoted as floating yield format for a particular floating period such as a 3-month reset, a 6-month reset or an annual reset within the entire product maturity. For practical purpose a fixed “rent” market will provide important information for the further development of the implied forwards and options markets.

The mortgage funding cost could be expressed either in floating interest rates or fixed interest rates for any particular currency. Floating interest rates and fixed interest rates are interchangeable through the interest rate swap market in that particular currency. As the synthetic “rents” of the present invention will be able to derive the crucial synthetic fixed “rent” information of different maturities of groups of properties represented by a particular neighborhood or region (like the yield curve term structure concept of interest rate products), the synthetic floating “rent” information could also be derived in a similar way by a slight modification of simply specifying the synthetic “rents” to be traded to express a particular floating period, say 3-month, 6-month or annual periods. The synthetic floating “rents” thus created in the present invention will be able to connect to the existing PRS market conventions should a PRS market be developed on these lower level, granular property indices as well.

Since SwapRent (SM) contracts will be able to create both the synthetic fixed “rents” of different product maturities (term structure) and the related synthetic floating “rent” of different floating periods within the different product maturities of the groups of the properties of a neighborhood or region, a fixed verses floating swap market of SwapRent (SM) itself could be further developed through traded information from these synthetic fixed and floating “rent” markets.

REIO – Real Estate Index Option

Variation of different levels of SwapRent (SM) trading itself could provide the optionality that the end-user property owners may be interested in.



The conventional understanding of a call and put option could be expressed in levels of trading of SwapRent (SM) contracts (all in percentage of the notional amount, +/- signs are from the property owner's perspective) as follows:

Short Call Option Premium = (- AG SwapRent + Funding Cost)

Long Put Option Premium = (- DP SwapRent + Funding Cost)

Shorting a generic SwapRent (SM) contract is equivalent to a combined short call option position and a long put option position

Therefore (from the property owner's perspective)

- Generic SwapRent + Funding Cost

= (- AG SwapRent + Funding Cost) + (- DP SwapRent + Funding Cost)

= - DP SwapRent - AG SwapRent + 2 * Funding Cost

Or (from the investor's perspective)

+ Generic SwapRent

= + DP SwapRent + AG SwapRent - Funding Cost

To be stated in plain language, this means that a Generic SwapRent (SM) contract represents the 100% give-up of the future appreciation and a simultaneous 100% of downside protection. The two legs of the long DP SwapRent and the short AG SwapRent combined together makes a Generic SwapRent a perfect short position against the original long property position and hence the "hedge" concept is realized. But the SwapRent (SM) contracts do not have to be traded with both transaction legs at the same time and hence the optionality concept is realized.

Since the funding cost is a given fixed parameter at any given point in time the trading level of AG or DP SwapRent itself will determine the value of the call or put option premium based on the same notional amount of the property value expressed as a percentage of the property value.

The Generic SwapRent trading levels will usually be driven by the market supply/demand and expectation factors. For a simple numerical example let's say when the funding cost is at 5% and the SwapRent is trading at 2% of the property value. Based on a \$800,000 value of property it means the property owner who has entered into a 2 year SwapRent contract will receive \$40,000 (5% of \$800,000) every year (divided in monthly cash flow exchange) from the investor and will pay \$16,000 (2% of \$800,000) to the investor. The property owner will have a positive cash in-flow of \$24,000 every year (\$2,000 per month).

In a rising market where most people expect the property value will increase in the near future the Generic SwapRent trading level tend to be very low and usually below the funding cost level. In this case it is called a "positive carry" for the property owners because the netted monthly cash flow exchange will be a net credit to the property owners as a cash in-flow as demonstrated in the example above. On the other hand, this situation can be referred to as a "negative carry" for the investors. The Generic SwapRent could even be trading at a negative level if the market is really driven by a bullish euphoria. That could mean that the property owners will be paid so much by



the investors to house sit for the investors so that the property owners would be willing to give up the very likely, though still uncertain, future upside appreciation potential to the investors for a certain period of time.

On the other hand in a declining market the Generic SwapRent trading levels will be very high and usually will be higher than the funding cost level, say 7%. In this case the annual payment that the property owner will have to pay would be \$56,000 to the investor and it will result in a netted annual \$16,000 cash out-flow for the property owner. This situation is called a "negative carry". This could mean the property owners will have to pay up to other investors in order to pass on the very high and undesirable depreciation risk to the investors given the very strong bearish market expectation.

Whether it is trading at 2% or 7% when the funding cost is at 5% a generic SwapRent (SM) contract will demand that both the potential upside appreciation is given up from the property owner to the investor and the potential downside depreciation is at the same time passed on from the property owner to the investor as well.

Paying an AG SwapRent (Appreciation Give-up SwapRent) contract alone on another hand will only demand that the property owner to give up the potential upside appreciation to the investor while maintaining the downside depreciation risk. If that is the case the AG SwapRent trading level could understandably be at a very low level say 1% or 0% and could even be trading at a negative level say -3%. Using the -3% example, we can see that in this case the property owner will receive a netted 8% (= 5% - (-3%)) annual cash in-flow (maybe paid monthly) from the investor in order to give up the uncertain future potential appreciation to the investor. The property owner's existing real mortgage payment could be at say 6.5% (5% of 3-month LIBOR plus a credit spread of 1.5% for example). Add another assumed annual 1% of property tax the property owner's carrying cost for owning the property is 7.5%. This means the property owner will be paid a net 0.5% (= 8% - 7.5%) for staying in his/her own home for him/her to consider that he/she is well compensated for giving up some uncertain future appreciation that may or may not even be realized at all. In the mean time the property owner gets to use the property "rent-free".

Using the same numerical example above, it will come up to \$333.33 (= 0.5% * \$800,000) of a monthly check of income, after the entire mortgage and property tax bill has already been paid for by the investor, for the property owner to manage (house sit) the property for the investor. Although the future uncertain appreciation potential has been handed over to the investor that may or may not be realized, the property owner whereas is accruing equity for sure while his/her mortgage being paid down by the investor during the contract period. Not a bad deal at all. If this is still not good enough, when AG SwapRent is trading at -5% it may start generating some interests as the monthly income check jumps up to \$1,666.66.

Whether the AG SwapRent will be traded at -3% as in the example, at say -5% (high appreciation expectation) or at say 0% or 1% (low appreciation expectation) will totally be determined by the free market force which is usually driven by supply/demand, future expectation and the existence of any arbitrage opportunities based on these yield differentials. When this happens the property owner will not only have free housing, but also free accumulation of property equity and a monthly check of \$1,666.66 for spending money. He/She may not even need a job anymore! All he/she will give up for getting all this is some uncertain future upside appreciation potential that may or may not even be realized for the short contract period. If for some reason he/she changed his/her mind after committing to this transaction, he/she could simply unwind it any time by paying a bid/offer spread assuming the market parameters have not moved. Whether the AG SwapRent will be traded at -3% as in the example, at say -5% (high appreciation expectation) or at say 0% or 1% (low appreciation expectation) will be determined by



free market forces which are usually driven by supply/demand, future expectation, and the existence of arbitrage opportunities based on these yield differentials.

The best application of AG SwapRent is that it could be the much better improvement or replacement business method for the current Shared Equity Mortgage (SEM), Shared Appreciation Mortgage (SAM), and the Reverse Mortgage (RM) or the Home Equity Conversion Mortgage (HECM) markets. It should be recognized that in the U.K., these carry different names such as Home Reversion Scheme, Life Time Mortgages and Home Income Plan, etc. The advantages offer by AG SwapRent are those of the usual typical advantages of derivative instruments over their cash instrument equivalents, for example, their shorter term and the reversible nature of the transaction in addition to the savings on transaction cost as well as the avoidance of legal title transfer and its associated tax events. In addition, there wouldn't be any age, income, credit or LTV restrictions.

Again the 8% (= 5% - (-3%)) annual net cash in-flow paid monthly to the property owner could be considered the short Call REIO premium.

The opposite thing could be said about the other half of a generic SwapRent transaction, i.e. a DP SwapRent (Depreciation Protection SwapRent) contract in that it will only award the property owner the potential downside protection from the investor while maintaining the unlimited upside appreciation potential. This is a desirable economic feature to have and therefore the property owner will understandably pay up for gaining this advantage. In this case the DP SwapRent trading level could understandably be traded at a very high level, say 10%.

Using the 10% as an example, we can see that the property owner will receive a netted -5% (= 5% - 10%) of the property value. It will be represented as an annual (maybe paid out monthly) cash out-flow to the investor in order to get the future depreciation protection from the investor. This -5% of property value could be considered the cost of owning a put REIO premium.

Considering the same previous total property owner's existing carrying cost example for owning the property is 7.5%. This means the property owner will be paying a net of 12.5% (= 5% + 7.5%) for retaining the property without any worry of potential downside depreciation risk while occupying the property "rent-free" and accumulating home equity for free.

Again the investors will have to be satisfied that for him/her to consider that he/she is well compensated for assuming the uncertain future depreciation loss that may or may not be realized. Whether the DP SwapRent will be traded at 10% as in the example, at say 12% (high depreciation expectation) or at say 5% or 4% (low depreciation expectation) will again be totally determined by the free market force which is usually driven by supply/demand, future expectation and the existence of any arbitrage opportunities based on these yield differentials.

There exists a constraint that Generic SwapRent = DP SwapRent + AG SwapRent - Funding Cost as previously explained above. When the numbers from the examples above are plugged in, $2\% = 10\% + (-3\%) - 5\%$, the relationship holds true.

The best application of DP SwapRent is for those risk-averse conservative property owners who will treat their property not just as a shelter but also as financial assets that they own and therefore may be more willing to pay to buy protection against the potential financial loss. They are usually high income-earners who are able, and therefore more likely interested in doing so. As will be made clear by detailed explanations below, this cost of acquiring the downside protection insurance could easily be financed through some simple combination strategies where both AG SwapRent and DP SwapRent are employed simultaneously again.



Used alone, either AG or DP SwapRent will provide economic value to the property or home owners by providing either the 100% upside give-up in order to get present cash in-flow as compensation or to have 100% downside protection if they want to pay for a peace of mind. On the other hand, investors on the other side of the transaction get to buy a future appreciation opportunity of the property that they are interested in through the same instruments or they could get some present cash in-flows in order to underwrite a potential risk that may or may not even be realized in the future. These economic benefits are well known in the use of options on many other assets class. The Generic, AG and DP SwapRents facilitated the same economic benefits to the property owners and investors for their property transactions for the first time.

The value they provide does not only reside in when they are used alone. They provide much more versatility when utilized in a combined format as in many option “strategies”. Here are some examples.

In a combination the AG amount and the DP amount do not have to be the same. For example, if the property value is worth \$1,000,000, the AG SwapRent contract notional amount could be for \$400,000 and the DP SwapRent contract notional amount could be for \$800,000 or vice versa. All other combinations are also possible.

In a combination the AG starting/maturity date and the DP starting/maturity date do not have to be the same. For example, the AG SwapRent may start immediately and end in 3 years and the DP SwapRent could start in one year and end in 5 years or vice versa. All other combinations are also possible.

In a combination the AG starting value (strike price) and the DP starting value (strike price) do not have to be the same. For example, the AG SwapRent could start giving up the value from 25% above (or 10% below) the current or future starting value and the DP SwapRent could start protecting only from 20% below (or 5% above) the current or future starting value. All other combinations are also possible. These contract property values could be determined by an index, for example.

Due to the various strategies of combinations of AG and DP SwapRents based on the views of the property owners (and the investors), there may be netted upfront cash payouts/payments or monthly cash inflows/outflows to and from the property owners (and the investors).

Theoretically speaking, the generic SwapRents (SM) trading provides the implied forward value for the property. This could be derived from the interest rate parity. In addition, having the information of the AG and DP SwapRents trading levels the implied option volatility could be further derived from some simple conventional option pricing models assuming they are applicable to the property as an asset class.

OTC Options and Forwards

As previously mentioned, important “no arbitrage” pricing information of over-the-counter forwards and options trading contracts could be provided by the trading levels of Generic SwapRent as well as AG SwapRent and DP SwapRent. Theoretically speaking, the trading of the fixed Generic SwapRent provides the implied forward value for the property. This could be derived from the interest rate parity. In a simple example, the interest rate parity dictates the relationship between the forward price (F) of t days in the future, two fixed yields (Ya and Yb) and a spot price (S) in the following formula: $F / S = (1 + Ya * (t / 365)) / (1 + Yb * (t / 365))$. So with the fixed synthetic “rent” and the fixed-rate funding cost for a given product period as well as the current price of the property, the fair value implied forward price of the property could easily be derived.



In addition, having the information of the AG and DP SwapRent trading levels, an effective options market could be actually started. In addition, the vital statistics of implied option volatilities could be further derived from some simple conventional option pricing models, assuming they are applicable to the property as an asset class, and subsequently applied to more sophisticated ways of developing more exotic kinds of option-oriented property derivatives. As a result, trading forwards and options will not just remain wish list items to talk about for the property markets or blind punting games with no reasonable ways to figure out what the fair value pricing is. There will exist arbitrage opportunities constrained by the interest rate party or any simple option pricing models that may be able to apply to the property as an asset class. The financial institutions who provide such products to the end users will also be able to manage their own internal market making and trading risks better by having these fair value pricing methodologies and the necessary means to mark-to-market their positions.

REIDeX.com (Real Estate Index Derivatives eXchange)

A trading forum can be provided for the Generic SwapRent, the AG SwapRent and the DP SwapRent as well as other generic swaps, forwards, options, and swaptions contracts on real estate indices. As an example an Internet portal site serves as an on-line exchange that offers price indications and execution capabilities for buyers and sellers of SwapRent (SM) contracts.

Tables 2-5 set forth examples of such an on-line exchange that offers price indications for buyers and sellers of SwapRent (SM) contracts. Table 2 sets forth an example listing for Generic SwapRent trading levels for Los Angles, California. The listing includes the designated area, an index settlement (in U.S. Dollars) for the area, and the bid/offer for various terms of Generic SwapRents.

	Index Settlmnt	1 YR	2 YR	3 YR	...	5 YR	...	10 YR	...
Neighborhood 1	350	2.5/2.3	2.5/2.3	2.6/2.4		2.5/2.2		2.4/2.2	
Neighborhood 2	325	2.5/2.3	2.6/2.3	2.5/2.3		2.3/2.1		2.6/2.3	
Neighborhood 3	330	2.5/2.3	2.5/2.3	2.6/2.4		2.4/2.2		2.5/2.3	
Neighborhood 4	250	2.0/1.8	2.2/2.0	2.3/2.0		2.3/2.0		2.4/2.1	
Neighborhood 5	200	1.9/1.6	1.9/1.7	2.1/1.9		2.2/2.0		2.3/2.0	
...	
Neighborhood 26	650	2.5/2.3	2.7/2.5	2.8/2.6		2.6/2.3		2.3/2.0	
Neighborhood 27	725	2.7/2.5	2.8/2.6	2.8/2.5		3.2/3.0		3.3/2.9	
...	
Neighborhood 38	1500	3.3/3.1	3.3/3.2	3.5/3.2		3.7/3.5		3.8/3.6	
Neighborhood 39	1750	3.5/3.3	3.6/3.4	3.7/3.5		3.5/3.2		4.2/3.9	

Table 2 – Los Angles

Table 3 sets forth an example listing for DP SwapRent for Hong Kong. Again, the listing includes the designated area, an index settlement (in Hong Kong Dollars) for the area, and the bid/offer for various terms of DP SwapRents.

	Index Settlmnt	1 YR	2 YR	3 YR	...	5 YR	...	10 YR	...
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Neighborhood 1	3500	8.5/8.3	8.5/8.3	8.6/8.4		8.5/8.2	8.4/8.2	
Neighborhood 2	3250	8.5/8.3	8.6/8.3	8.5/8.3		8.3/8.1	8.6/8.3	
Neighborhood 3	3300	8.5/8.3	8.5/2.3	8.6/8.4		8.4/8.2	8.5/8.3	
Neighborhood 4	2500	8.0/7.8	8.2/8.0	8.3/8.0		8.3/8.0	8.4/8.1	
Neighborhood 5	2000	7.9/7.6	7.9/7.7	8.1/7.9		8.2/8.0	8.3/8.0	
...	
Neighborhood 26	6500	8.5/8.3	8.7/8.5	8.8/8.6		8.6/8.3	8.3/8.0	
Neighborhood 27	7250	8.7/8.5	8.8/8.6	8.8/8.5		9.2/9.0	9.3/8.9	
...	
Neighborhood 38	15000	9.3/9.1	9.3/9.2	9.5/9.2		9.7/9.5	9.8/9.6	
Neighborhood 39	17500	9.5/9.3	9.6/9.4	9.7/9.5		9.5/9.2	10.2/9.9	

Table 3 – Hong Kong

Table 4 sets forth an example listing for AG SwapRent for London. Again, the listing includes the designated area, an index settlement (in British Pounds) for the area, and the bid/offer for various terms of AG SwapRents.

	Index Settlement	1 YR	2 YR	3 YR	..	5 YR	..	10 YR	...
Neighborhood 1	350	-2.3/-2.5	-2.3/-2.5	-2.4/-2.6		-2.3/-2.5		-2.2/-2.5	
Neighborhood 2	325	-2.4/-2.6	-2.5/-2.7	-2.3/-2.5		-2.4/-2.6		-2.5/-2.7	
Neighborhood 3	330	-2.3/-2.5	-2.4/-2.6	-2.3/-2.6		-2.3/-2.6		-2.6/-2.8	
Neighborhood 4	250	-2.4/-2.6	-2.3/-2.5	-2.4/-2.7		-2.5/-2.7		-2.7/-2.9	
Neighborhood 5	200	-2.2/-2.5	-2.4/-2.7	-2.5/-2.8		-2.2/-2.5		-2.6/-2.8	
...	
Neighborhood 26	650	-3.1/-3.3	-3.2/-3.4	-3.5/-3.7		-3.3/-3.5		-3.2/-3.4	
Neighborhood 27	725	-3.3/-3.5	-3.3/-3.5	-3.4/-3.6		-3.4/-3.7		-3.3/-3.7	
...	
Neighborhood 38	1500	-3.3/-3.5	-3.3/-3.5	-3.4/-3.6		-3.6/-3.8		-3.6/-3.9	
Neighborhood 39	1750	-3.4/-3.6	-3.4/-3.6	-3.4/-3.7		-3.5/-3.8		-3.5/-3.8	

Table 4 – London

Table 5 sets forth an example listing for Generic SwapRent for commercial properties in New York. The listing includes the designated property type (apartment, hotel, industrial, office, retail, etc.), an index settlement (in U.S. Dollars) for the area, and the bid/offer for various terms of Generic SwapRents.

	Index Settlement	1 YR	2 YR	3 YR	...	5 YR	...	10 YR	...
Apartment 1	350	2.5/2.3	2.5/2.3	2.6/2.4		2.4/2.2		2.4/2.2	
Hotel 1	325	2.5/2.3	2.6/2.3	2.5/2.3		2.3/2.1		2.6/2.3	
Industrial 1	330	2.5/2.3	2.5/2.3	2.6/2.4		2.4/2.2		2.5/2.3	
Office 1	250	2.0/1.8	2.2/2.0	2.3/2.0		2.3/2.0		2.4/2.1	
Retail 1	200	1.9/1.6	1.9/1.7	2.1/1.9		2.2/2.0		2.3/2.0	



...	
Apartment 6	650	2.5/2.3	2.7/2.5	2.8/2.6	2.6/2.3	2.3/2.0	
Hotel 6	725	2.7/2.5	2.8/2.6	2.8/2.5	3.2/3.0	3.3/2.9	
...	
Office 8	1500	3.3/3.1	3.3/3.2	3.5/3.2	3.7/3.5	3.8/3.6	
Retail 8	1750	3.5/3.3	3.6/3.4	3.7/3.5	3.5/3.2	4.2/3.9	

Table 5 – New York

SwapRent.com

While the trading forum described above will be a market place of execution of orders of SwapRent (SM) contracts, a information forum can also be provided with price displays of the various last trades information of the Generic SwapRent, the AG SwapRent and the DP SwapRent as well as other generic swaps, forwards, options, and swaptions contracts on real estate indices. As an example of such an information forum, an Internet portal site serves as an on-line forum that offers last trades information of SwapRent (SM) contracts.

In a typical example, a Japanese investor sitting in front of his computer in his apartment in Tokyo could search SwapRent.com via the Internet to find a house in a tony neighborhood of suburban Paris. By checking the Generic SwapRent trading levels, he is interested in receiving Generic SwapRent to establish a long position to lock in the present property value and become a quasi buy-to-let landlord in a sense. In order to complete the transaction in which he is interested, he could then click on an online advertising icon of a local broker or a bank, for example, which may be put along side the web pages of the country and city he visited and in which he was interested. That advertising icon will take him to the broker's or the bank's local web site home page for him to open an account to execute the trades in which he is interested, either through electronic means or simply through the conventional ways of phone calls, emails, postal mails or faxes

This information forum will have the special ability to attract eye balls since property owners around the world would be interested to know where the SwapRent (SM) contract trading levels are currently traded in their neighborhoods for a variety of reasons. Equally, the index settlement information is also important to know in order to find out the current value of their properties in their neighborhoods. Therefore, SwapRent.com is suitable to be run as a stand alone ad-based Internet e-commerce business. The ad revenue will primarily come from the various middlemen such as banks, brokers and real estate agents and other information providers who are involved in the new industry created by SwapRent (SM).

PELM – Property Equity Locking Mortgage
HELM – Home Equity Locking Mortgage

PELM or HELM is a new generation of mortgage products for banks and other mortgage lenders to offer to commercial real estate property owners or homeowners.

This group of new mortgage products will help provide a flexible financing and therefore allow property owners and home owners to lock in their equity value in the property they own for the duration of the property equity locking period contractually established either through a derivative transaction such as a total return swap (TRS), a price return swap (PRS) or simply a SwapRent (SM) contract.



Due to the fact that the property owner has agreed to give up the equity gain in his/her property through a derivative transaction (such as TRS, PRS or SwapRent (SM)) the equity-gain lost and paid out to his derivatives counter-party will be reflected as an automatic increase of the borrowing amount his PELM . Under this same equity locking derivative contract he/she will also be paid by the equity-loss amount by his/her derivatives contract counter-party. This amount received will be used to automatically reduce his/her borrowing amount in the PELM or HELM. In effect, the borrower/property owner gives the lending financial institution a permission to let the financial institution treat the borrower's net equity in his/her property as the collateral for putting on such a property derivative transaction.

From the inception of the PELM/HELM contract, either through a refinance or a new application or simply through a "switching-on" of an existing any kinds of the conventional mortgages, the borrowing amount will fluctuate automatically up and down in tandem with the asset value of the property. The frequency of marking-to-market update could be decided by the financial institutions to be either annually, quarterly, monthly, weekly or even daily given the capabilities of the index employed in the products.

The gearing ratio or leverage ratio, usually expressed as LTV (Loan-To-Value) ratio in banking terms, will behave opposite to the traditional way and will never exceed 100% as what would happen in a traditional mortgage. This feature of "positive Delta" (and its associated Gamma) of LTV versus property value as compared to those of the conventional mortgages will provide financial institutions improved credit risk management features. In conventional mortgages the LTV will increase when the property value declines and therefore could be considered to possess "negative Delta". Products like this will tremendously diversify the credit risks in their mortgage loan portfolios. Up until today no banks have been able to manage their credit risks properly in a real estate downturn or collapse. After PELM/HELM are offered it will open a new possibilities of options of risk management tools and strategies for banks and other lenders to utilize to keep themselves healthy and sound. The savings from the reduced amount of regulatory risk capital required to back-up the credit risk or the lending portfolio will also be substantial in certain jurisdictions.

In order to stabilize the monthly cash flow of mortgage payments for the borrowers the PELM or HELM could be designed in a variety or different ways to help accommodate. For example, the monthly mortgage payments could be selected by the property owner to change to interest only when the property asset value increases as the borrowing amount has automatically increased with the increase in asset value. Even negative amortization could be a possible way to bring down the monthly cash flow amount in this extreme case. When the property asset value declines the borrowing amount will decrease as well and therefore the monthly payment could be activated as to include an amortization amount. This variation example is to make the monthly payments smoother and more stable no matter how the asset value of the property itself fluctuates through the borrowing period.

This product will be especially popular when the traditional real estate market is near its peak cycle. So far there has been no any other financial lending products offered to borrowers where in a declining real estate market both the borrowers and the lenders (if the lender does not act as the real estate index derivative product counter-party itself and continues to retain that particular exposure instead of laying it off to other counter-parties either individually or on a portfolio basis) will benefit from an actual decline of even collapse of the real estate property markets.

Since the property values risk would be hedged away through the SwapRent (SM) contracts which are built in these new mortgage products, the borrowers will be able to demand a narrower credit spread or credit premium from the lenders and therefore make property ownership more affordable for the economy as a whole. The lenders would bear less property value risks on



these new mortgage products and should be more than happy to comply. As explained above, there would not be a case that the LTV of these new mortgage products will be higher than 100%. In addition, the mortgage insurance premium would be much less should one still be required by the lenders. The private and government sponsored entities that traditionally offer such mortgage insurance products will stand to benefit as well from both these new mortgage products and the SwapRent (SM) hedging contracts.

Here is a typical example, among many other variations. A homeowner bought a house three years ago for \$500,000. He may have borrowed a traditional mortgage of an amount of \$400,000 (LTV = 80%, Home Equity (HE) = \$100,000). The current market value is now at \$800,000 (LTV = 50%, HE = \$400,000). He/She could enter into a home equity protection derivative transaction such as a SwapRent contract, an OTC TRS or PRS. At the same time the bank will arrange the HELM together with the derivative transaction to support and facilitate this derivative transaction. Therefore, the derivatives transaction itself could be considered built into this new mortgage product of the present invention.

Two years later at the end of the SwapRent (SM) or other derivative contract the house value could either be \$1,000,000 or \$600,000, for example. The ending value of the house could be determined based on a preset mutual agreement either through the real appraised value or using an index (such as median price per square foot or sq meter in a particular ZIP code neighborhood, for example). If the house value rises to \$1,000,000 (LTV = 40%, HE = \$600,000 before considering the hedge) the gain of \$200,000 will belong to the investor and the homeowner will have to cash settle it by an increase in the borrowing amount of his/her HELM on the house and pay the amount to the investor, for example. The LTV will increase to 60% and the HE will stay unchanged at \$400,000 after settling on the hedge. The homeowner's cost basis for tax purpose may be increased to \$700,000 (instead of the original cost basis of \$500,000, this is just the guessing of future most rational tax treatment, subject to future real authoritative tax rulings).

If the house value drops down to \$600,000 (LTV = 66.7%, HE = \$200,000 before considering the hedge) at the end of the two year SwapRent or other derivative contract then the homeowner will be paid by the investor for the \$200,000 difference (\$800,000 minus \$600,000) and therefore achieving the objective of home equity value of \$400,000 lock-in protection after settling on the hedging contract. This \$200,000 will be used automatically to reduce the borrowing amount per the original HELM contract. The LTV will decrease to 33.3% as the borrowing amount will be only \$200,000 now. The homeowner's cost basis will be decreased down to \$300,000 (subject to future authoritative tax rulings) in this case and he/she will continue to own the house with a then current market value of \$600,000. He/She could enter into another new SwapRent (SM) contract or other derivatives contract together with a simultaneous extension of the existing HELM or for another say 3 or 5 year period with another investor or he/she could decide to sit on it for the time being without any further SwapRent (SM) or other derivative transactions. In this case the HELM could either stay on and act just like a traditional mortgage or it could be refinanced (or switched off) into another traditional mortgage on his/her property.

The PELM and HELM could be used either to support a property or home equity locking transaction such as SwapRent (SM), TRS or PRS or they could be offered directly from banks or other types of lenders to the property borrowers. In the latter case, the banks will simply manage the property or home equity exposure as they normally manage their other treasury or capital markets exposure in a dedicated dealing desk. In this case the PELM or HELM will itself assume the property or home equity protection function to the property or home owners. This means the property or home owners do not necessarily have to source the equity locking SwapRent (SM) or other derivatives transactions on their own but rather rely on banks and other lenders to offer both financing and home equity protection at the same time through PELM or HELM. The lending



financial institution can extract out and lay off this risk in the inter-financial institution market by transacting other offsetting real estate index derivative transactions with another counterparty. Alternatively, the lending financial institution can warehouse the exposure on a portfolio basis for a period of time and lay off the netted exposures with another counter party from time-to-time upon its speculative trading and risk management decisions.

PELM or HELM do not need to be offered at the same full amount of the approved LTV. That means PELM or HELM could be offered to cover only part of the approved LTV amount in conjunction with another more traditional mortgage on the same property of home. That means PELM or HELM could be offered to cover only part of the approved LTV amount in conjunction with another more traditional mortgage on the same property. Another way of looking at it is that the notional amount of the property equity protection part of PELM or HELM does not need to cover the entire 100% of property or the starting mortgage borrowing amount: the notional amount could be just a fraction of it. On another hand, a leveraged transaction where the notional amount of the property equity protection could be much higher than the current value of the property is also theoretically possible but may not be practical to be offered as this would entail heavy speculative exposures for both the property owners and the lending financial institutions under those jurisdictions whose regulators may be more conservative.

FVCM – Future Value Choice Mortgage

Many different variations of option trading/investment strategies could be built within PELM or HELM types of mortgage products for banks and other mortgage lenders to offer to commercial real estate property owners or homeowners that would provide utility that do not exist in any other products in the past.

Property owners can choose to add various percentage amount of the property value either only Appreciation Give-up (AG) or only Depreciation Protecting (DP) feature in the PELM or HELM or various combinations of both within a PELM or HELM.

In both AG and DP PELM there will be different starting dates and maturity dates for both to have a contract period that will not be longer than the underlying PELM. It could be activated repeatedly many times during the life of a PELM when the first few transactions expired.

In both AG and DP PELM there will be a starting value and an ending value to determine the value appreciation amount or value depreciation. The value could either be determined through an actual appraisal or through geographical neighborhood index such as those created under the SwapRent (SM) Property Indexing Methodologies (SPIM). In the case of indexing the value is determined from the multiplication of the property value with the index percentage change during the contract period.

In a combination the AG amount and the DP amount do not have to be the same. For example, if the property value is \$1,000,000 the AG PELM could be for \$400,000 and the DP PELM could be for \$800,000 or vice versa. All other combinations are possible.

In a combination the AG starting/maturity date and the DP starting/maturity date do not have to be the same. For example, the AG PELM may start immediately and end in 5 years and the DP PELM could start in three years and end in 10 years or vice versa. All other combinations are possible.

In a combination the AG starting value and the DP starting value do not have to be the same. For example, the AG PELM could start giving up the value from 25% above (or 10% below) the



starting value and the DP PELM could start protecting only from 20% below (or 5% above) the starting value. All other combinations are possible.

Due to the various strategies of combinations of AG and DP based on the views of the property owners, there may be netted upfront cash payouts/payments or monthly cash inflows/outflows to and from the property owners.

For banks' risk management the underlying PELM or HELM should automatically monitor the property value risks and the lender's exposure in FVCM by marking to market periodically and varying the outstanding mortgage borrowing amount against the property as contractually agreed in order to make sure that the options or derivatives strategies employed by the property owners as agreed by the underwriters will never lead to negative equity for the property owners.

Banks and mortgage lenders could pass on the property value exposure derived from AG and DP contracts within a PELM through its property derivatives trading desks to other institutional or retail traders/investors.

Whereas the appraisal method maybe possible the small geographical neighborhood indexing approach such as those created under SPIM may be a much better choice since it could avoid the moral hazard typically involved in an insurance policy.

The generic SwapRents (SM) transactions could also be combined together with the various REIO trading/investment strategies within a AG or DP PELM/HELM.

As an ultimate example of the benefits of FVCM for homeowners, a homeowner can ask a bank to switch on and convert his existing mortgage with a bank to an FVCM. Based the neighborhood index value for a neutral way of valuing his/her property today he/she can choose to give up 50% of the uncertain upside appreciation of his/her property for the next two years in order to get a downside protection insurance coverage of 80% of his/her property for the next three years. All these transactions will be executed at the same time with "zero" cost to the homeowner given the favorable conditions of the market parameters.

PILN – Property Index Linked Note REILD - Real Estate Index Linked Deposit

The structured notes could be created for incurring property value risk and return exposures using SwapRents (SM) and REIOs. For the sake of the simplicity of calculation that could be easier to illustrate the points, a one-year maturity of non-leveraged structured note is used as examples below, assuming the following current market conditions:

Bid/Offer

One year Depo rate: 4%/4% (ignoring minor spreads)

One funding cost: 5%/5% (ignoring minor spreads)

One year SwapRent in Neighborhood ABC: 2.5%/2.0%

One year SwapRent in Neighborhood DEF: 3.5%/3.0%

Property Price Index for Neighborhood ABC at the beginning of the year: 300

Property Price Index for Neighborhood ABC at the end of the year: 360 or 240

Property Price Index for Neighborhood DEF at the beginning of the year: 600

Property Price Index for Neighborhood DEF at the end of the year: 660



The following structured notes could be constructed per investors' market views as follows.

I.) Examples using Generic SwapRent exposures:

1.) Note Buyer Bullish SwapRent PILN

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: 1% (= 4 + (2 - 5))%

Principal Repayment at Maturity: $100\% * [1 + (X - 300) / 300]$

One year later, if the index for Neighborhood ABC settles at 360 the principal will have a positive 20% return of profit.

One year later, if the index for Neighborhood ABC settles at 240 the principal will have a negative 20% return of loss.

2.) Note Buyer Bearish SwapRent PILN

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: 6.5% (= 4 + (5 - 2.5))%

Principal Repayment at Maturity: $100\% * [1 + (300 - X) / 300]$

One year later, if the index for Neighborhood ABC settles at 360 the principal will have a negative 20% return of loss.

One year later, if the index for Neighborhood ABC settles at 240 the principal will have a positive 20% return of profit.

3.) Differential Returns SwapRent PILN favoring Neighborhood ABC

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: 2.5% (= 4 + (2 - 5) + (5 - 3.5))%

Principal Repayment at Maturity:

$100\% * [1 + (X - 300) / 300 + (600 - Y) / 600]$

One year later, if the Neighborhood ABC index settles at 360 and DEF settles at 660 the principal will have a positive 10% return of profit.

4.) Differential Returns SwapRent PILN favoring Neighborhood DEF

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: 4.5% (= 4 + (5 - 2.5) + (3 - 5))%

Principal Repayment at Maturity:

$100\% * [1 + (300 - X) / 300 + (Y - 600) / 600]$

One year later, if the Neighborhood ABC index settles at 360 and DEF settles at 660 the principal will have a negative 10% return of loss.

The structures could be further leveraged in order to create more property price change impact to the degree that the principal amount will not be entirely eroded by marking to market during the holding period for the prudent risk management practice by the issuers.



The risks inherent in PILNs could be hedged off through outright SwapRent trading. For every PILN structured and sold by the issuer there will be a matching SwapRent or a matching combination of SwapRents exposure that could be offset entirely or partially by outright SwapRent or REIO trading with another counter-party. They will be the way to hedge the component risks. Otherwise, the PILNs could simply be traded in the secondary market to lay off the position risks.

II.) Examples using AG and DP SwapRent (REIO) exposures:

Additional info on current market conditions:

One year AG SwapRent in Neighborhood ABC: -3.0%/-3.5%

One year DP SwapRent in Neighborhood ABC: 10.5%/10.0%

Property Price Index for Neighborhood ABC at the beginning of the year: 300

Property Price Index for Neighborhood ABC at the end of the year: 360 or 240

1a) Note Buyer Bullish AG SwapRent PILN

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: -4.5% (= 4 + (-3.5 - 5))%

Principal Repayment at Maturity: Max <math>100\% * [1 + (X - 300) / 300]>, 100\%>

One year later, if the index for Neighborhood ABC settles at 360 the principal will have a positive 20% return of profit.

One year later, if the index for Neighborhood ABC settles at 240 the principal will remain unchanged at 100%.

1b) Note Buyer Bearish AG SwapRent PILN

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: 12% (= 4 + (3.0 + 5))%

Principal Repayment at Maturity: Min <math>100\% * [1 - (X - 300) / 300]>, 100\%>

One year later, if the index for Neighborhood ABC settles at 360 the principal will have a negative 20% return of loss.

One year later, if the index for Neighborhood ABC settles at 240 the principal will remain unchanged at 100%.

2a) Note Buyer Bearish DP SwapRent PILN

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: -1.5% (= 4 + (-10.5 + 5))%

Principal Repayment at Maturity: Max <math>100\% * [1 - (300 - X) / 300]>, 100\%>

One year later, if the index for Neighborhood ABC settles at 360 the principal will remain unchanged at 100%.

One year later, if the index for Neighborhood ABC settles at 240 the principal will have a positive 20% return of profit.



2b) Note Buyer Bullish DP SwapRent PILN

Notional Amount: Any Practical Minimum Amount

Currency: USD

Coupon: $9\% (= 4 + (10 - 5))\%$

Principal Repayment at Maturity: $\text{Min } <100\% * [1 - (300 - X) / 300], 100\%>$

One year later, if the index for Neighborhood ABC settles at 360 the principal will remain unchanged at 100%.

One year later, if the index for Neighborhood ABC settles at 240 the principal will have a negative 20% return of loss.

Further leverage, combinations or exotic structures such as quanto currency exposure, digital options pay-off, ... etc. are possible variations.

PILNs or REILDs could be marketed to both institutional and retail investors or speculators with a view on the property or real estate markets either in a particular neighborhood, towns, cities, states, regions or countries depending on the indices used.

PILNs and REILDs could also be marketed either to long hedgers (anticipatory hedge) who may be current renters in a particular neighborhood or to short hedgers who are currently already property owners in a particular neighborhood in a certain country.

SwapRent (SM) Property Indexing Methodology (SPIM)

SwapRent (SM) Property Indexing Methodology (SPIM) was developed to create a global indexing services to capitalize on the recent new but fast growing development in the property derivatives as well as the property index linked mortgages and structured notes business. Specifically the indices created using this methodology will be able to both provide the lower level granular indices which offer higher hedging correlation to property owners for their index derivatives hedging trades and for the use in index linked mortgages, and the higher level broad indices that could be more convenient for derivatives trading and the index linked structured products created for investors and speculators. This methodology will apply to both residential and commercial real estates.

Through this innovative design there will be a transparent mathematical relationship that the combined granular smaller indices could be made close to one larger broad level index in terms of property exposure. This will be a vital unique feature in the index construction that will make the index more suitable for index derivatives trading. It will also help the design for the financial index linked mortgage products as well as structured notes and deposits. For example, the retail short hedging interest exposures extracted from 200 or 300 index linked mortgage products such as HELM/PELM and FVCM could be offset-able from the property value risk perspective with very little basis risk by one large long interest in a broad level index of SwapRent (SM) trading or from the long interest of a broad level index built into a index linked structured investment product such as PILN/REILD.

The index created this way will be able to drill down to the smallest possible homogeneous groups or neighborhoods of like kind properties that could be defined either by a ZIP code in the US, postal codes in many other countries, housing developments or suburbs in many foreign countries or a smaller entity within each of them. It could also be other smaller possible neighborhood elements defined by other unconventional methodologies such as census



collection districts, electoral council area and satellite geo-spatial image area of like kind property structures, ... etc.

The index could also be easily scaled up to a larger broad level index by combining smaller indices and simply going through the same transparent weight averaging relationship in order to cover much larger geographical area with more number of properties.

No matter it is at the national level, the regional level, smallest neighborhood level, large or small area, the indices will all be calculated as a rolling moving average price to avoid potential manipulation or extraordinary events. The rolling moving average method can also provide a more frequently updated index level for derivatives contract trading as well as for the daily settlements of index linked mortgage products and index linked investment structured products. Therefore all these property derivatives trading and structured mortgage or investment products could easily be marked to market on a daily basis which will be very useful for the required risk management practice of banks or other investment funds. This feature will greatly promote the popularity of use and hence the liquidity of these index based products.

A.) SwapRent (SM) Residential Property AeFT Index Construction Examples (using ZIP code in the US as the smallest definable neighborhoods of like kind properties for examples)

In the U.S., the ZIP (Zone Improvement Plan) codes are a developed and convenient form of describing neighborhoods for the postal service. The ZIP code methodology has been well accepted in various parts of our daily life. The most important value of using ZIP code oriented index is that it is easily understood and accepted by property owners as they can identify which neighborhoods they belong to by the ZIP codes. In regions outside the U.S., comparable postal codes, housing developments or suburbs to which property owners relate can be utilized.

If we use the basic neighborhood element of a ZIP code (postal code in countries other than US) to create the per square foot (or meter) property weighted average price information we can scale up and expand to a much bigger region by simply including more than one ZIP code in the same weight averaging relationship. Examples of potential indices are AeFT USA, AeFT East Coast, AeFT New York Tri-State, AeFT California, AeFT Bay Area, AeFT SoCal or going down to more specific level, AeFT Upper East Side Manhattan, AeFT Gold Coast Chicago, AeFT South Beach Miami, AeFT Newport Beach Single Family Houses, AeFT Santa Monica Condos or even ZIP code specific indices, AeFT 90210, AeFT 92879 SFH ... etc. if the more precise single ZIP code neighborhood have enough potential users for the SwapRent (SM) or other structured derivative contracts. It could be quite normal that each of the popular indices created this way will be composed of more than one ZIP code and most likely it could be at a town level composed of 5 to 10 or even more ZIP codes of neighborhoods. So the desirable contract index size for SwapRent (SM) or other property derivatives trading could be determined by a balance between the requirement for hedge ratio by the hedging property owners and the commercial viability of liquidity concerns for such derivatives contracts and the index linked structured mortgage or index linked structured investment products.

Examples for commercial properties could be AeFT Office Mid-town Manhattan, AeFT Apartment West Los Angeles, AeFT Hotel Miami, AeFT Warehouse Chicago, AeFT Retail Metropolitan NYC... etc.

B.) The Methodology



The index construction is based on the weighted average of per square area (foot or meter, etc.) prices adjusted by property attributes within the neighborhood. The weighting could be based on the square footage to produce the capital value for the like-kind properties selected in the smallest definable neighborhood area. Once the smallest identifiable neighborhood area are defined and calculated, the larger area indices will be created using the same weighted averaging methodology without any further adjustment in a bottom up approach to reach the higher broader levels and all the way up to a national level index. The weight averaging methods to create larger area index could be similar to how the common popular stock indices are created although the weights are different. In this case the smallest definable like-kind property neighborhood could be considered each individual stock.

Since the indices are calculated on a rolling moving average basis, as the new transactions happen each day, even with time delay to account for the official recording and registration process, the indices will be able to provide a new value each day on a rolling basis, unless there are no any new transactions at all during the entire sequential number of days that are used to calculate the moving average within the defined neighborhood or region. In that case the index for that neighborhood simply stay unchanged in that extreme case.

During the properties selection process, representative properties will be selected to represent that particular neighborhood. As much as possible the data will be comprehensive to cover all the stable properties in a neighborhood but outliers could be excluded so that less index revision will be necessary in the future. As new housing developments are established and old neighborhoods are destroyed by fire or other natural disasters within the neighborhood they will be either added or deleted accordingly in future index revisions.

The captured changes in transaction prices of the properties within a neighborhood will be adjusted for by its quantified property attributes. The property attributes could be as broad as characteristics such as the types of properties (condos, town homes vs single family houses) if there are not enough to be treated separately in another definable neighborhood of like-kind properties, or down to other individual property characteristics such as square footage, year built, number of bedrooms/bathrooms, number of garages/swimming pools, lot sizes, views, ocean/lake front, high floors/low floors, distance to shopping centers and school districts, crime statistics ... etc.

The property attributes adjustment process will smooth the change in the individual neighborhood index between time periods to account for the fact that different properties with different attributes may have different volatility than the rest in a rising or a declining market. This way the index created for the smallest definable neighborhood will be an index that can reflect a group of quasi-homogeneous properties without any disturbances of either uneven volatilities between properties with different attributes or the compositional changes through time in the neighborhood.

Once the smallest identifiable neighborhoods in a country are all defined and calculated they will represent the lowest level that the set of indices can drill down to. When scaling up, the square footage weight averaged indices of larger neighborhoods, towns, cities, states, regions and eventually national level can easily be created in this bottom up approach. The total capital value of all the selected property stocks within an area could be arrived by simply multiplying the total square footage of that area with the aggregated per square foot index of that particular area. These indices thus created would carry special meanings to investors and other financial market participants. For example, investors can simply continue to use the square foot (meter or other measures) to decide how much to invest in a particular area, in the same conventional way they conduct the underlying cash market real estate property investments. These indices could be sliced and diced to accommodate for all kinds of research, analysis, derivatives contract trading,



index linked structured products settlements, ... etc. that are either currently available or to be created in any possible future innovation.

For commercial properties the smallest definable neighborhoods of like-kind properties could be defined as groups of similar offices, retail shops, apartment complexes, industrial warehouses and hotels in a specific area of a town or a city. Other wise the methodologies could be very similar.

SwapRent (SM) Transactions Examples

The following are simple examples of real estate index derivative products of the present invention (with 20 basis point example spread):

Assume a 3 month LIBOR at 3% in August 2002. The size is 1 square foot. The cash index for ZIP code comprised region 92879 is 135 in August, 2002; the cash index for 92860 is 155 in August, 2002; and the cash index for 91210 is 875 in August, 2002. The bid and offer for a 2-year real estate index derivative product could be quoted as SR2: 2.5% / 2.3%, to be cash-settled on quarterly basis in order to mark-to-market the collateral; however, the SwapRent (SM) contract could be unwound before maturity at any time after the initial establishment of the position.

There can be a minimum (for example, 20 basis points) spread for each SwapRent (SM) contract of different maturities or of different ZIP code comprised regions for either the brokerage format or the exchange format.

For a 3000 square foot house, a hedger needs 3000 real estate index derivative products. Assume one year later the cash indices are 92879 at 115; 92860 at 125; and 90210 at 655. The 3 month LIBOR could be trading at 4% in August 2003. The bid and offer for a 1-year real estate index derivative product could be quoted as SR1: 3.8% / 3.6%.

For ZIP code area 92879, the sample transactions for the hedger would be:

Notional value hedged: $3,000 * \$135 = \$405,000$

Value drops to $3,000 * \$115 = \$345,000$

Property value lost = - \$60,000

Index value holding period capital returns = $-(115 - 135)/135$ hedged = - 14.81%

Plus one year of 4 quarterly 3 Month LIBOR committed to receive at August 2002, assumed constant through the year at 3% - the 2-Y, SR2 committed to pay, 2.5% = 0.5%

Plus the new unwinding 1-Y, SR1 trade committed to receive at August 2003, 3.6% - previous 2 - Y SR2 committed to pay for another one more year, 2.5% = 1.1%

Total value hedged = capital returns + income + unwinding cost = $(405,000) * (14.81% + 0.5% + 1.1%) = 66,460.50$

Total loss for the investor = capital returns + income + unwinding cost = $(405,000) * (-14.81% - 0.7% - 1.5%) = - 68,890.50$

For ZIP code area 92860, the sample transactions for the hedger would be:

Notional value hedged: $3,000 * \$155 = \$465,000$

Value drops to $3,000 * \$125 = \$375,000$

Property value lost = - \$90,000

Index value holding period capital returns = $-(125 - 155)/155$ hedged = - 19.35%

Plus one year of 4 quarterly 3 Month LIBOR committed to receive at August 2002, assumed constant through the year at 3% - the 2-Y, SR2 committed to pay, 2.5% = 0.5%



Plus the new unwinding 1-Y, SR1 trade committed to receive at August 2003, 3.6% - previous 2 - y SR2 committed to pay for another one more year, 2.5% = 1.1%

Total value hedged = capita l returns + income + unwinding cost = (465,000) * (19.35% + 0.5% +1.1%) = 97,417.50

Total loss for the investor = capital returns + income + unwinding cost = (465,000) * (-19.35% - 0.7% - 1.5%) = - 100,207.50

For ZIP code area 90210, the sample transactions for the hedger would be:

Notional value hedged: 3,000 * \$875 = \$2,625,000

Value drops to 3,000 * \$655 = \$1,965,000

Property value lost = - \$660,000

Index value holding period capital returns = - (665 - 875)/875 hedged = - 24.00%

Plus one year of 4 quarterly 3 Month LIBOR committed to receive at August 2002, assumed constant through the year at 3% - the 2-Y, SR2 committed to pay, 2.5% = 0.5%

Plus the new unwinding 1-Y, SR1 trade committed to receive at August 2003, 3.6% - previous 2 - y SR2 committed to pay for another one more year, 2.5% = 1.1%

Total value hedged = capita l returns + income + unwinding cost = (2,625,000) * (24% + 0.5% +1.1%) = 672,000

Total loss for the investor = capital returns + income + unwinding cost = (2,625,000) * (-24% - 0.7% - 1.5%) = - 687,750.00

In the three examples above, revenue could be generated from spread between bid and offer of products traded, in these examples, using a minimum 20 basis point profit on each initial and unwinding trade (in and out):

For ZIP code 92879 = 2 * 0.2% * \$405,000 = 2 * \$810 = \$1,620

For ZIP code 92860 = 2 * 0.2% * \$465,000 = 2 * \$930 = \$1,860

For ZIP code 90210 = 2 * 0.2% * \$2,625,000 = 2 * \$5,250 = \$10,500

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