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WORKSHOP IN HEALTH ADMINISTRATION STUDIES

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"Medical Care Futures Contracts: Is Health Insurance Just Another Commodity?"

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MEDICAL CARE FUTURES CONTRACTS
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INTRODUCTION:

Current financial risk management techniques do not provide buyers and sellers of health insurance and medical care services sufficient protection against unexpected price changes. Medical care futures contracts offer new hedging opportunities to increase their protection against these financial risks. This paper describes how to design and use these hedging instruments.

Commodity futures contracts can be designed explicitly to hedge volatile group health insurance premiums, capitated hospital prices, and capitated health professional prices, principally physician services. Traditional fee-for-service and other payment methods may be cross-hedged in these medical care futures contracts.

CURRENT FINANCIAL RISK MANAGEMENT TECHNIQUES:

Insurance Companies -- Broadly speaking, insurance companies have two techniques for managing their financial risk. First, they can reinsure risk. Reinsurance is a form of hedging as they pay reinsurance companies to share the risk of insuring the health care claims of a client. Some or all the loss (gain) in the insurance market is offset completely or partially by the gain (loss of reinsurance premium) in the reinsurance market.

Second, they can self-insure. If expenses are greater than premiums, they lose money, and vice-versa. To mitigate the risks of self-insuring, the insurance company can

- 1) raise the premiums in the next time period
- 2) cross-subsidize health insurance losses from other lines of business

- 3) charge different health insurance premiums to different customers depending on their willingness to pay.

The limitations of these methods include:

- 1) reinsurance monopoly pricing opportunities
- 2) customers' unwillingness to pay higher premiums and their search for alternatives like self-insurance or reduced benefits
- 3) limited number or profitability of other lines of business to subsidize health insurance losses.

Employers -- These companies face unexpected increases in insurance premiums and medical services prices with few alternatives to fixed prices to mitigate these rising prices.

Reducing benefits, self-insuring, joining business groups to negotiate better prices, and other strategies are costly in terms of management expertise and other corporate resources to administer, plan, and coordinate these programs and groups. There is enormous disappointment among employers in their individual and collective efforts to force or negotiate greater cost effectiveness of some managed care initiatives like HMO's.

Sellers of Medical Services -- Notwithstanding the disappointed expectations of many buyers, the aggregate effect of their efforts has been to increase competition among sellers. Whether a hospital or physician group, many of these organizations face reduced profit opportunities. Efforts to diversify product lines, develop effective national and local marketing strategies, restructure through mergers and acquisitions, and other strategies are costly and have had mixed results.

If insurance and managed care companies, employers, and sellers of medical services can hedge their financial risk in the futures markets, these limitations and disappointments can be mitigated or even avoided.

FUTURES CONTRACTS AND HEDGING:

What is a Futures Contract? -- With the purchase (sale) of a futures contract the buyer (seller) agrees now to pay (receive payment) a specified price for a specified product at a specified location and delivery time in the future. The delivery time in the future can be as soon as the current month to more than one year away.

If the buyer (seller) later sells (buys back) its contracts before the original delivery date, the original obligation to buy (sell) is nullified. Of course, the price of the futures contract may change between the initial purchase (sale) and the subsequent sale (purchase).

A health insurance futures contract could be priced monthly for group health insurance for 50 to 100 employees for one year. At \$300 per month per employee the market value of an insurance futures contract for 50 employees would be \$180000. Similarly, capitated hospital and physician services futures contracts could be priced monthly for 50 or more employees for one year.

What is Hedging? -- A futures contract is designed so the level of and changes in its price match, as closely as possible, the level of and changes in the price in the regular market (assuming there is just one market).

Hedging usually combines regular business obligations to buy or sell with opposite futures obligations to sell or buy. With opposite positions, a change in price leading to a loss in one market offsets either exactly or partially a gain in the other market. To simplify the following discussion and emphasize hedging principles, all price changes in one market exactly equal price changes in the other market, a "perfect hedge".

If an employer has, say, 1000 employees, hedging the premium for group health insurance benefits would require 20 futures contracts. This assumes each futures contract is for 50 employees and any change in the price of health insurance is matched exactly by a change in the price of health insurance futures contracts. If, suddenly, the health insurance premium per year for the 1000 employees were to change adversely by \$20 per month, the health insurance futures contract would change positively by \$20 per month. The change in one price is offset by the same change in the other price.

Consequences of Hedging -- Hedging reduces financial uncertainty. By combining futures and regular contracts, the volatility (variance or standard deviation) of the difference in the two prices is substituted for the volatility of the regular contract price when there is no hedging. The greater the correlation of prices the less the volatility of the price difference.

Hedging increases business flexibility because pricing decisions are separated from purchasing decisions. Buyers and sellers often have strong expectations of the direction of change of prices in the short-run (few weeks) to intermediate-run (several months). Unpriced contracts can be signed stipulating the price, which can be hedged, will be selected months before or

after the start of the contract benefit period.

Hedging encourages new marketing initiatives. Buyers and sellers can agree to let the one with the strong expectations of the direction of future price changes wait to pick a price after it changes for the benefit period, as long as the other one hedges. A competitive opportunity to increase market share exists for the seller willing to customize pricing decisions for its buyers.

A HEALTH INSURANCE FUTURES CONTRACT:

Hedging Premiums in Inflationary Markets -- Suppose the insurance company does not want to offer its customer a fixed price contract because it wants the higher premium an expected inflationary market will produce. Instead of hedging as much as a year in advance of the start of the benefit period, it would rather simply wait as long as it can to get the highest expected premium. What can the employer do to hedge against the expected rising premiums the insurance company seeks to gain by waiting?

An employer and health insurance company sign a group health insurance contract on July 1, 1989, for a one year benefit period starting January 1, 1990. The monthly premium for the one year contract is not specified on the day of signing. Rather, any time six months before (July 1, 1989) to six months after (June 30, 1990) the start of the benefit period the employer or the insurance company can pick a contract price linked by a mutually agreed premium or discount to the futures market price for July 1990.

The insurance company expects the regular premium to rise to \$300 or more. Since the employer is hurt financially by rising premiums, it must buy futures contracts to protect itself. The July 1990 futures price is \$300. The employer buys enough contracts at \$300 to cover its expected number of employees during the benefit period.

If the futures price later goes to \$310, the employer sells the futures contract for \$310 for a \$10 profit. The insurance company now offers regular group health insurance for \$310. The employer pays \$310 to the insurance company, but it also has the \$10 futures gain to offset the \$310 premium for a net premium of \$300.

Alternatively, if the futures price goes to just \$290, the employer sells the futures contracts for \$290, suffering a \$10 loss. But the insurance company offers group insurance benefits for \$290. The \$10 futures loss added to the \$290 insurance premium yields a net premium of \$300. Whether premiums rise

more or less than expected, the employer has locked-in a \$300 price.

Hedging Premiums in Deflationary Markets -- Suppose the employer and the health insurance company expect premiums actually to fall before or after the start of the benefit period due to intense competition between managed care and traditional insurance companies. In this case the employer would not want a fixed price in advance of the start of the benefit period. The employer would want to wait as long as possible to pick the smallest possible expected premium. Meanwhile, the insurance company, to protect itself, must sell futures contracts.

Any time between July 1989 and July 1990 the health insurance company accepts the price, based on the July 1990 futures price, the employer picks. The insurance company sells July 1990 futures contracts on July 1, 1989, for \$300 to protect itself from the expected falling price.

Later, competition indeed lowers prices slightly to \$290; the employer speculated correctly competition would lower premiums. The insurance company buys back at \$290 the futures contracts it sold for \$300 earlier and offers the employer group insurance benefits for \$290 for the benefit period. The insurance company gets a net premium of \$300 (\$290 from the employer plus the futures market gain of \$10).

Hedging in Uncertain Markets -- If they are both uncertain about the direction of change of prices, they can both hedge. They can flip a coin to determine who gets to pick the price. Because it fears prices will fall, the insurance company sells futures contracts. Because it simultaneously fears prices will rise, the employer buys futures contracts.

A HOSPITAL FUTURES CONTRACT:

Assume a monthly capitation price is paid to a hospital by an insurance company or HMO whether or not an employee is admitted. Let the hospital futures contract price also be a monthly capitation price. How can an insurance company hedge a hospital capitation price it must negotiate? How can a hospital hedge its negotiation with the insurance company?

The hospital could sell futures and offer an unpriced contract to the insurance company the same way the insurance company could offer an unpriced contract to the employer. The health insurance company faces the same problem of locking-in a price as the employer did when it was looking ahead to hedge insurance premiums. Therefore, it buys hospital futures contracts to

hedge unexpected increases in the capitation rate.

A PHYSICIAN SERVICES FUTURES CONTRACT:

Assume a monthly capitation price is paid to a physician group by an insurance company or HMO whether or not an employee is treated by members of the group. Let the physician services futures contract price also be a monthly capitation price.

How can an insurance company hedge a regular physician services price it must negotiate? How can a physician services group hedge its negotiation with the insurance company? The insurance company hedges its physician services rate negotiations the same way it hedges hospital capitation rate negotiations, which is also the same way the employer hedged itself against untoward changes in health insurance premiums. The physician group hedges itself the same way the insurance company hedged itself as it sold group health insurance benefits to the employer.

LOCKING-IN PROFIT MARGINS & "HEDGING THE CURE":

Locking-in Profit Margins -- When insurance companies and HMO's have fixed prices for employers and fixed prices from hospital and physician group suppliers, they naturally lock-in profit margins without hedging in the futures markets. When they hedge in the futures markets unpriced health insurance contracts and unpriced capitation contracts they pay for hospital and physician services, they also lock-in a profit or operating margin.

Two other industries use futures markets to lock-in profit margins. Soybean processors hedge the margin between raw soybean purchases from farmers and their sales of soybean meal and oil to food companies with soybean, soybean meal, and soybean oil futures contracts. It is called "hedging the crush" in reference to the crushing soybeans into meal and oil.

Petroleum refiners hedge the margin between their purchases of crude oil from producers and sales of heating oil and gasolines to downstream distributors with crude oil, heating oil, and leaded and unleaded gasoline futures contracts. It is called "hedging the crack" in reference to catalytic cracking of crude oil into refined products.

"Hedging the Cure" -- I propose calling simultaneously hedging purchases of medical care services and sales of insured or managed care services "hedging the cure". Hedging the cure locks-in profit margins for insurance companies and HMO's that today's toolkit of financial risk management techniques cannot

lock-in in the absence of fixed input and output prices.

An insurance company is waiting to negotiate premiums with employers and also negotiate with hospitals and physician groups for capitation prices for the same benefit period. Negotiations must include an operating margin to cover administrative expenses and provide a profit.

Let the insurance company expect to pay \$200 per month for capitated hospital services and \$60 per month for capitated physician services. For simplicity's sake, there are just these two categories of cost; so total costs are \$260. It wants a \$40 margin, so it must get a \$300 monthly premium for the group health insurance the employer will buy. The insurance company wants to lock-in this \$40 margin as much as a year in advance of the start of the benefit period.

Current health insurance futures prices for delivery one year from now are \$300. The corresponding hospital and physician services futures prices are \$200 and \$60, respectively. To hedge against falling insurance premiums, the insurance company sells health insurance futures contracts for \$300. To hedge against rising hospital and physician services prices, the insurance company buys, respectively, hospital futures contracts for \$200 and physician services futures contracts for \$60.

A \$40 margin is locked-in. Any deviations from a \$300 premium to the employer are offset by a gain or loss on the health insurance futures contract. Any deviations from a \$200 hospital price and \$60 physician price, respectively, are offset by a gain or loss on the hospital and physician services futures contracts. The insurance company has "hedged the cure".

A variation of hedging the cure for an insurance company is hedging hospital and physician services prices but offering a fixed regular price to employers for health insurance. An insurance company offers an employer \$300 fixed price contract but has unpriced contracts with hospitals and physician groups. It buys hospital and physician services futures contracts for \$200 and \$60, respectively. The insurance company has locked-in a \$40 margin because any variations in hospital and physician services prices are hedged and the price for insurance is fixed at \$300.

Hedging the cure increases financial certainty for insurance and managed care companies in periods of volatile medical care price inflation. Securing their finances, they can pay more attention to marketing, quality assurance, and other key factors for success in their markets. Locking-in profit margins and reducing financial uncertainty is a powerful competitive advantage.

FUTURES CONTRACTS DELIVERY INSTRUMENTS:

All futures contracts must have a delivery instrument to guarantee trading of the contract accurately prices the underlying asset and is therefore a good hedge. Contracts can be settled by cash, a receipt good for a physical commodity, or by the physical commodity itself. Stock index futures contracts use cash settlement. Gold futures contracts use vault receipts redeemable for gold bullion. Crude oil futures contracts deliver real crude oil ("wet barrels") at storage terminals and pipelines in Cushing, Oklahoma.

Cash settlement and receipt delivery in theory are possible for medical care futures contracts. Another possible delivery instrument for the medical care futures contracts is asset backed securities (ABS).

The remainder of this paper briefly describes how asset securitization may be used by health insurance companies to hedge group health insurance pricing risk. Even though hospital and physician services futures contracts can be designed to use ABS as the delivery instrument, only securitized health insurance premiums will be examined.

ABS for a health insurance futures contract could take the form of obligations or bonds issued by a financial services company that collateralizes them with purchases of receivables from health insurance companies. Investors purchase the ABS from the financial intermediary just as they might purchase U.S. Treasury bills, notes, or bonds. When the ABS mature, the financial intermediary redeems them.

INCENTIVES FOR CREATING ASSET BACKED SECURITIES:

There are two incentives for creating asset backed securities: to provide hedging opportunities and to lower the cost of borrowing.

A health insurance company is awarded on July 1, 1989, a three year unpriced contract starting January 1, 1990. During the six month period before and after the start of each calendar year, the employer and the insurance company have agreed the latter will pick the contract price based on the July 1990, 1991, and 1992 futures prices, respectively. To lock-in a profit margin, the insurance company hedges the insurance premium and its input hospital and physician services prices.

Notwithstanding the unpriced contract, the employer agrees to make regular payments to the insurance company, subject to later adjustment for under- or over-payment after the price is

picked. The regular payments can be paid every month, quarter, or other, mutually agreed, specified period.

An alternative to waiting to receive its regular premiums is selling those receivables to a financial intermediary that in turn issues collateralized ABS. They include pass-through certificates, obligations, preferred stock, or commercial paper. The receivables can be sold by the insurance company to the financial intermediary immediately after the contract is awarded, and the entire value of the three years paid, less any transaction costs.

As a result, the cost of funds can be reduced for the insurance company mainly because its opportunity cost of traditional equity based lending is reduced. It can use the proceeds for business operating expenses or investments to earn additional profit.

The health insurance company wants to get an unpriced contract from the employer, get paid initially by the financial intermediary, and then hedge to protect itself against falling insurance premiums. How can this be done?

VARIABLE PRICE ASSET BACKED SECURITIES:

Highly correlated futures, ABS, and current group health insurance prices are necessary for successful hedging. The health insurance premium futures contract prices off floating price ABS. The ABS price off estimates of the current premium of insured medical services. If the current premium changes for any reason, the other two prices must change to minimize basis risk (the difference between the futures price and the regular price) and to maintain hedgeability and liquidity.

The ABS must have a floating price to guarantee high correlation with the other two prices. That means the ABS could be a asset backed obligation, similar to a bond or note, with a variable or floating price based on price inflation for group health insurance benefits.

How does the variable price work? The financial intermediary sells the obligations to investors at the beginning of the three year period. At the end of the period, it redeems the obligations from them at a variable price reflecting the change in group health insurance premiums during the period for the insurance company.

To estimate at any time the current premium and, therefore, changes in the premium over the three year period, the insurance company and the financial intermediary agree:

- 1) to sample the former's paid claims on a regular basis from a particular employer or from a pool of similar employers
- 2) to use the sample to calculate the current premium for insured medical services, in effect, a spot insurance price.

The spot price is the price the insurance company would sell short-term health insurance to any company (adverse selection held constant) on any given day. For example, claims filed in the most recent sampling period might justify a \$300 spot price, even though \$275 might have been picked earlier for an unpriced contract.

Credit enhancement of the ABS by letters of credit or surety bonds supplied by reputable third-party financial institutions would minimize deliberate deception in these calculations.

To summarize, the insurance company sells its receivables from the three year contract to a financial intermediary at a mutually agreed, fixed price. The former receives its funds, and the latter now owns the receivables, payable over the next three years. Then the financial intermediary sells the obligations to investors at a floating redemption price. At the end of the three years, the financial intermediary redeems the obligations at a price reflecting changes in insurance premiums.

WHO HEDGES AND WHY?:

The employer, health insurance company, financial intermediary, and investors may hedge. To hedge, the employer buys futures contracts because it fears premiums will rise. To hedge, the insurance company sells futures contracts because it fears premiums might fall. To hedge, the financial intermediary buys futures contracts because it sold variable price ABS that can be redeemed at a later date at a higher price if premiums rise. To hedge, the investors sell futures contracts because they fear prices might fall or not rise as much as necessary to avoid opportunity losses.

Fortunately, investors in the ABS are not concerned with hedging by the health insurance company or the financial intermediary because the ABS are credit enhanced by the receivables and perhaps by letters of credit or surety bonds from third party institutions. Moreover, if the investors stand for delivery in the futures market, the clearing corporation guarantees delivery performance by all buyers and sellers.

Since futures contracts do not usually trade beyond one to two years, all hedgers will have to roll-over positions during the life of the ABS.

Overall, the employer, insurance company, financial intermediary, and investors benefit with ABS:

- 1) the employer locks-in an acceptable premium.
- 2) the health insurance company locks-in an acceptable premium and gets an up-front, lump-sum payment.
- 3) the financial intermediary earns fee income for buying the insurance company's receivables and originating hedgeable ABS. If a secondary market develops in ABS, profitable trading opportunities may exist, as well.
- 4) the investors get hedgeable investment opportunities with superior credit enhancement.

OTHER HEDGING OPPORTUNITIES:

Retiree, Long-term Care, & HIV/Aids Benefits -- ABS allow the insurance company to offer priced or unpriced contracts of various maturities for particular health insurance product lines like retiree, long-term medical care, and HIV/Aids, not to mention active employees. For example, the insurance company might offer one, two, and three year unpriced or fixed price contracts for one or more of these benefit groups.

If benefit groups insurance premiums do not correlate well enough, separate insurance futures contracts could be designed for each market segment. In the limit the medical care futures markets could come to resemble the financial futures markets with several contracts trading to hedge niche medical care services markets with low price correlation among market segments.

Self-insured Employers -- The logic and mechanics of hedging health insurance premiums for insured employers and health insurance companies with ABS also apply to hedging employee medical claims expenses for self-insured employers.

Self-insured employers can pay a fixed fee to a financial intermediary to assume financial responsibility for all claims, regardless of costs. The financial intermediary sells asset backed, variable priced obligations to obtain funds to pay the self-insured employer's employee medical claims. The cash flow from the employer to the financial intermediary is used to pay off the obligations when they mature. The financial

intermediary and investors hedge to avoid losses.

Government Capitated Payment Programs -- HMO's could offer fixed capitation rates to the Health Care Financing Administration (HCFA) for Medicare recipients enrolled in managed care programs. The HMO then acts just like the insurance company that also offers fixed price contracts to employers. It sells the receivables to a financial intermediary, who in turn sells variable priced ABS to investors.

As a result, HCFA gets predictable budgets for the term of the fixed price contract. The HMO hedges the cure with the hospital and physician services futures contracts. The financial intermediary and investors hedge to avoid losses.