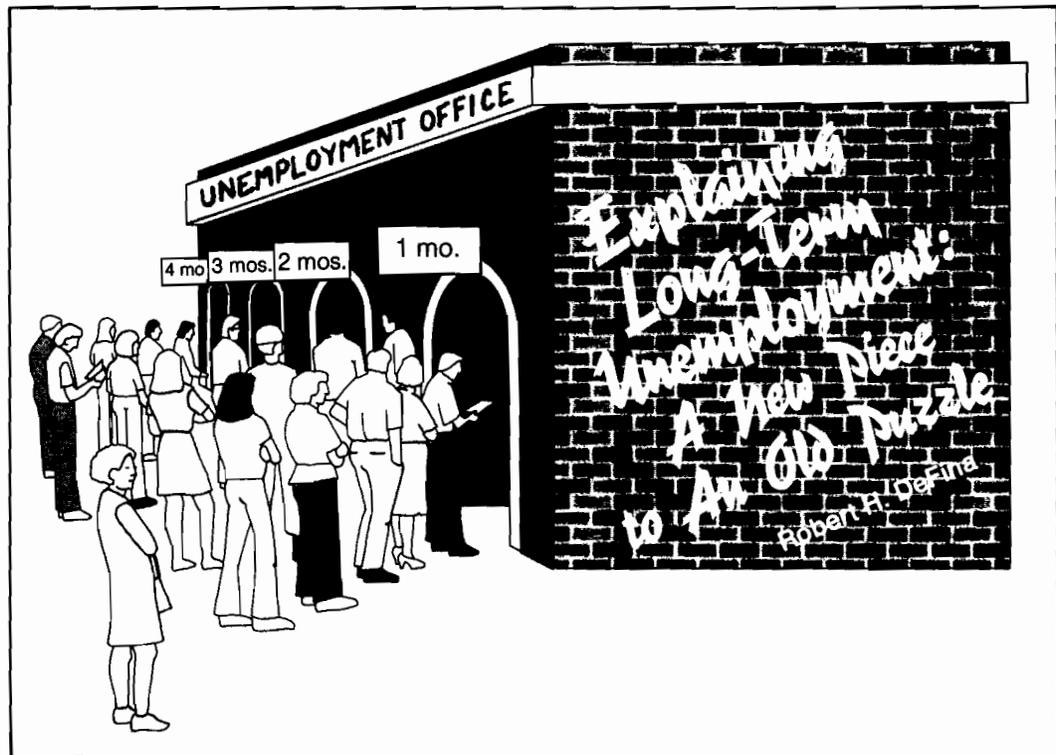
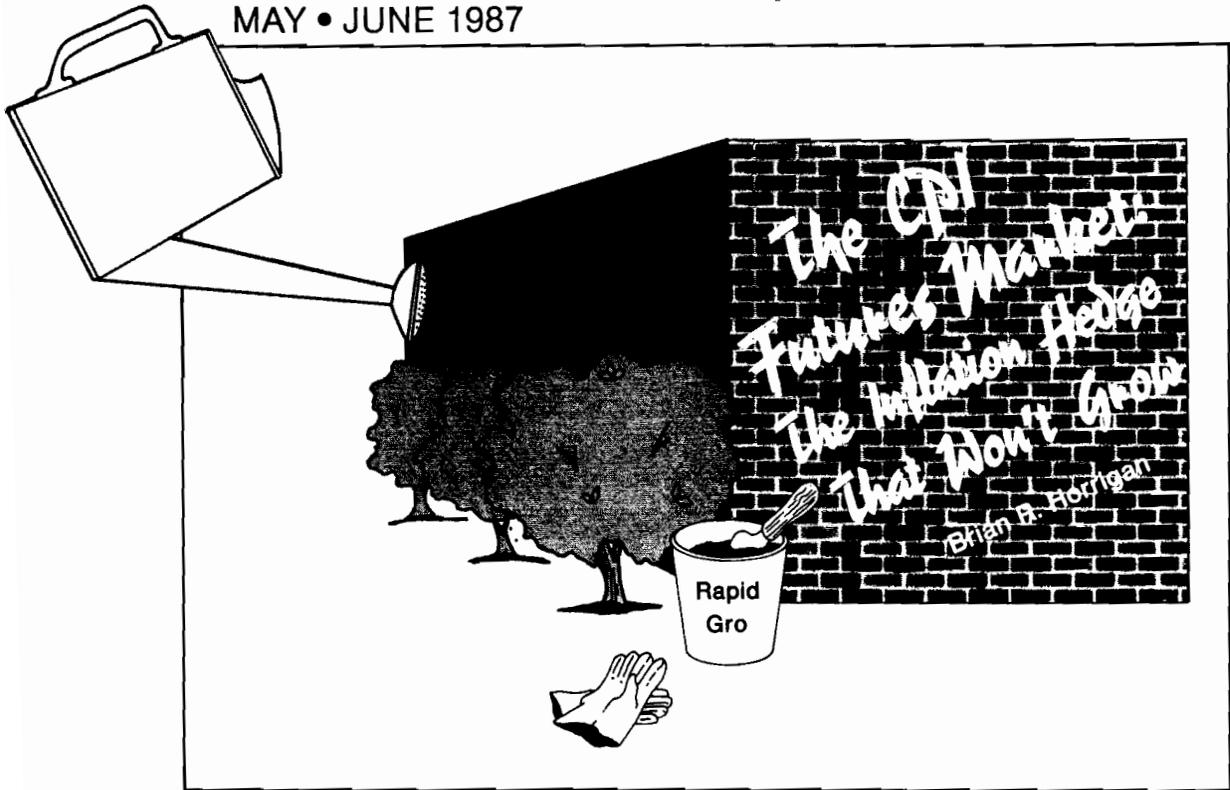


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## **The CPI Futures Market: The Inflation Hedge That Won't Grow . . . . . 3**

*Brian R. Horrigan*

Several new financial instruments designed to hedge the value of investments against a variety of uncertainties have been introduced into the markets, and many have flourished. One instrument that has not had much success, however, is the CPI futures—a futures contract whose value is based solely on the Consumer Price Index, the most widely quoted measure of inflation in the U.S. Some economists have hailed it as a tool to allow households, businesses, and investors to shed their inflation risk at low cost; some even have predicted it could become the largest-volume contract in the country. Yet, the daily volume of contracts traded so far is minuscule, compared to other futures contracts. When such a good idea fails in practice, several factors are probably involved, but perhaps the overriding factor is that inflation risk itself has not been a serious concern in recent years.

## **Explaining Long-Term Unemployment: A New Piece to An Old Puzzle . . . 15**

*Robert H. DeFina*

According to some theories about labor markets, long-term unemployment simply shouldn't happen. If the labor market is a typical auction market, people will bid for jobs, and employers will hire the lowest bidders. Therefore, whoever wants to work should be able to find a job simply by bidding the lowest wage. A new view suggests that something else is going on inside labor markets that prevents potential workers from landing employment this way. The "efficiency wage hypothesis" argues that employers may not find it most profitable to take the lowest bids on wages. Instead, they may find that by paying *higher* wages, they may be getting more productivity, and therefore, more profit, out of their workers.

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# The CPI Futures Market: The Inflation Hedge That Won't Grow

*Brian R. Horrigan\**

Twenty years of persistent inflation in the United States have brought many proposals for coping with inflation. On June 21, 1985, the Coffee, Sugar, & Cocoa Exchange in New York offered a new way: a futures contract whose value is based solely on the Consumer Price Index (CPI), the most widely quoted measure of

inflation in the U.S. This newly authorized futures contract provides investors and businesses a means of hedging against inflation risk, that is, the uncertainty caused by inflation. Until the CPI futures contract was invented, there was no direct means to hedge against inflation risk. While some so-called inflation hedges—such as real estate, precious metals, or stocks—may offer some long-run, imperfect protection against inflation, they are often highly risky investments in the short run. But the final value of a CPI futures contract is determined solely by the actual value

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of the CPI, which allows investors and businesses to trade on and hedge against pure inflation risk.

Academic economists have been urging the creation of a CPI futures market for over a decade, ever since economists Michael Lovell and Robert Vogel first proposed the idea in 1973.<sup>1</sup> The benefits of having such a futures market have been noted by many eminent economists, including Milton Friedman, Paul Samuelson, and Robert Barro. These benefits include giving households and businesses the means to shed their inflation risk at low cost, allowing investment decisions to be made on the basis of profitability without regard to possible future inflation, and permitting people to save without the concern that their savings could be hurt by inflation.<sup>2</sup>

But despite the early enthusiasm of economists, the CPI futures market has had very little activity. There are probably several reasons for the low activity. For example, the CPI may be an inadequate measure of inflation for many households, while businesses may have other ways to hedge against inflation risk. Furthermore, the CPI futures market, unlike other futures markets, has no underlying asset which is storable or traded on an active spot market, which reduces the opportunities for arbitrageurs and speculators to participate in the market. Finally, inflation risk has become small compared to other types

of price risk for many businesses. So, though it may be a good idea in theory, in practice the CPI futures market seems unlikely to attain greater volume unless inflation risk becomes much more significant than it is currently.

#### INFLATION RISK

A typical contract in this country—be it a financial contract such as a loan, a labor contract specifying an hourly wage rate, or a standard business contract requiring payment for work completed—is written in nominal terms, promising the payment of cash by one party to another in the future. Inflation—the increase in the average level of prices of goods and services—reduces the purchasing power of money over time. Businesses or investors who make contracts involving the future payment or receipt of cash are subject to inflation risk if they cannot precisely predict the future price level.<sup>3</sup> Those making contracts try to protect themselves against inflation by negotiating their contracts in light of their anticipations of future inflation. If everybody who agrees to a contract correctly anticipates the inflation, everybody will get what he expected in real terms. But if the inflation turns out differently from what two parties anticipated when they agreed to a contract, one of the parties loses wealth in real terms while the other gains.

Consider, for example, a financial arrangement in which someone borrows at a *nominal* interest rate of 9 percent, while the inflation rate is 6 percent. In that case, the *real* interest rate is 3 percent—9 percent more dollars buys 3 percent more goods and services after the price level rises by 6 percent. The inflation rate might, however, turn out as high as 10 percent or as low as 2 percent, even though the lender's best guess for the inflation rate is 6 percent. If the inflation rate turns out to be 10 percent, the lender gets a real interest rate of -1 percent (the 9 percent

<sup>1</sup>M. Lovell and R. Vogel, "A CPI-Futures Market," *Journal of Political Economy* 81 (July/August 1973) pp. 1009-1012. A futures market trading on the CPI was independently proposed by L. Ederington, "Living With Inflation: A Proposal for New Futures and Options Markets," *Financial Analyst Journal* (January/February 1980) pp. 42-48, and Milton Friedman, "Financial Futures Markets and Tabular Standards," *Journal of Political Economy* 92 (February 1983) pp. 165-167.

<sup>2</sup>These eminent economists gave the CPI futures market enthusiastic endorsements in: Milton Friedman and Rose Friedman, *Tyranny of the Status Quo*, (San Diego, CA: Harcourt Brace, 1984); Paul Samuelson, *Economic Index Futures: An Introduction to the Concept of Shifting Macroeconomic Risk*, Coffee, Sugar, & Cocoa Exchange, Inc., June 14, 1983; and Robert Barro, "Futures Markets and the Fluctuations in Inflation, Monetary Growth, and Asset Returns," *Journal of Business* 59 (April 1986) pp. S21-S38.

<sup>3</sup>Inflation risk here means not only that the average price level may rise unexpectedly, but also that it may fall unexpectedly.

nominal interest rate that the lender contracts for minus the 10 percent inflation rate.) Alternatively, if the inflation rate turns out to be 2 percent, the lender gets a real interest rate of 7 percent (the 9 percent nominal interest rate minus the 2 percent inflation rate). Even if the nominal interest rate is certain, an uncertain inflation rate produces an uncertain real interest rate.

Unanticipated inflation creates redistributions of the real wealth of businesses and investors, and the greater the variance of unanticipated inflation, the greater the redistributions and the greater the inflation risk it creates. The newly developed CPI futures market offers one way for businesses and investors to cope with inflation risk.

### THE BASICS OF THE CPI FUTURES MARKET

**The CPI.** The CPI, a monthly measure of the average level of prices of consumer goods and services, generates the most widely quoted measure of inflation in the United States. The CPI is compiled and published by the Bureau of Labor Statistics (BLS), and measures the month-to-month change in the cost of buying a fixed market basket of goods and services, such as food, clothing, shelter, and transportation. In January 1978, the BLS started publishing two versions of the CPI, one new and the other a continuation of the original series which was started in 1919. The CPI futures market uses the original CPI—now called the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W)—since it is the basis for cost-of-living adjustments in labor contracts, many lease agreements, and Social Security benefit payments.<sup>4</sup>

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<sup>4</sup>The new version of the CPI, the Consumer Price Index for All Urban Consumers (CPI-U), covers everyone covered by the CPI-W plus salaried workers, the self-employed, and those not in the labor force, among others. (In the text, just "CPI" is used for simplicity to represent the CPI-W.) Both price series are very highly correlated, so that there is little significance to the fact that the more narrow definition of the

The CPI-W is released at the end of the third week of each month. The CPI is presented in index form, with the average level of prices in 1967 set at an index value of 100.0. Each CPI announcement reveals the average of prices sampled throughout the preceding month. Once released, the CPI is never revised. The inflation rate is calculated as the percentage change in the CPI. For example, the average CPI-W for 1985 was 323.4 and for 1984 was 312.2, so the inflation rate in 1985 was about 3.6 percent.

**The CPI Futures Contract.** A CPI futures contract is a standardized agreement in which one party to the contract pays the other an amount of money determined by the level of the CPI at the time that the CPI is announced. CPI futures contracts are traded at the Coffee, Sugar, & Cocoa Exchange in New York, which sets certain rules and regulations concerning the trading of the contracts and which standardizes the characteristics of the contracts, such as the size, the method of settlement, minimum price fluctuations, and so forth.<sup>5</sup> (See CPI FUTURES CONTRACT FEATURES, p.6, for details on the characteristics of the market.) The Exchange guarantees the performance of each contract traded at the Exchange, so that buyers and sellers need not worry about the creditworthiness of those on the opposite side of the trade.

A CPI futures contract amounts to a bet between two people on the future value of the CPI. A useful way to understand how the market works is to "walk through" a typical transaction. Suppose on December 3, 1986, you want to buy a CPI futures contract settling in April 1988. You contact your broker to discover the current "price" of that contract. Essentially, the "price" of the contract represents the market's consensus on

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price index is used in the CPI futures market.

For more detailed information about the CPI, see Department of Labor, *BLS Handbook of Labor Statistics*, (June 1985) and *BLS Handbook of Methods*, Vol. II (April 1984).

<sup>5</sup>A good introduction to the subject of futures markets can be found in R. Kolb, *Understanding Futures Markets*, (Glenview, IL: Scott, Foresman, and Company, 1985).

### CPI Futures Contract Features

<b>Exchange</b>	The Economic Index Market of the Coffee, Sugar, & Cocoa Exchange at 4 World Trade Center in New York
<b>Regulator</b>	Commodity Futures Trading Commission
<b>Trading Hours</b>	9:30 a.m. to 2:30 p.m., New York time
<b>Trading Unit</b>	The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W), with the value of the index equal to 100.0 in 1967
<b>Settlement Day</b>	The day that the Bureau of Labor Statistics announces the value of the CPI-W
<b>Settlement Price</b>	\$100 times the value of the CPI-W
<b>End of Trading</b>	Trading in the futures contracts ends at the close of trading two business days prior to the settlement day
<b>Minimum Fluctuation</b>	Prices are quoted to two decimal places, and the minimum price fluctuation is .01—one basis point. The dollar value of one basis point is \$10.00
<b>Daily Price Limit</b>	300 basis points (\$3,000 per contract) above or below the preceding day's settlement price for contracts in the same delivery month
<b>Position Limits</b>	The maximum net short or long position is 4,000 contracts
<b>Original Margin Requirements</b>	\$1500 per contract, subject to change

what the value of the announced CPI for March 1988 will be. (The March CPI is announced in April; the CPI futures contract is settled after the announcement.) So your broker tells you that the market collectively predicts that the March 1988 CPI will be, rounded, 346.9.<sup>6</sup>

<sup>6</sup>The CPI futures market offers contracts going out as far as three years, so that inflation risk three years out can be hedged against. In fact, to the extent that inflation risk more than three years out is correlated with inflation risk at three years or less one can, in effect, hedge against inflation risk more than three years out.

The next step is to purchase the contract via the futures Exchange from somebody who is willing to sell. Even though your CPI futures contract is not settled with cash until April 1988, the Exchange requires that you post \$1,500 "margin" when you agree to the contract. The margin is a "good faith" deposit made with the broker to guarantee that you comply with the terms of the futures contract. Since the margin may earn interest while it is held by the broker, you do not necessarily sacrifice earnings by posting it.

In addition to posting margin, you must also

**Brokerage Fees** Brokerage fees are negotiable, vary from broker to broker, and depend on the number of futures contracts entered into. The fee for a single "round trip"—opening and closing a position on one CPI futures contract—is likely to be in the \$25 to \$75 range currently.

**Available Contract Months** CPI futures contracts continue for three years at any time. Contracts are traded for quarterly settlement (January, April, July, and October) during the 12-month period from the current trading date and for semi-annual settlement (July and January) during the period beyond 12 months but less than 36 months beyond the current trading date. For example, a user of the CPI futures market on June 23, 1986 would have the following futures contracts available:

SETTLEMENT MONTH

July 1986	October 1986	January 1987	April 1987
July 1987		January 1988	
July 1988		January 1989	

The settlement of a CPI futures contract is based on the CPI-W measured in the previous month.

On the first business day following the expiration of any January or July contract, trading begins in the relevant January or July contract three years hence. On the first business day following the expiration of an April or October contract, trading begins in the relevant April or October contract one year hence.

**Extensions** The Coffee, Sugar, & Cocoa Exchange has filed a request to modify the nature of the CPI futures contract. The Exchange wants a new contract that trades not on the level of the CPI-W, but on the percentage change (that is, the inflation rate) of the CPI-W. The underlying value of the contract will be \$1,000,000 and prices will be quoted in thousandths of a percent with the minimum tick being 0.005 percentage points, with each 0.01 change in the projected inflation rate equaling \$25 and each tick being \$12.50 per contract. So if the inflation rate comes in one percentage point higher than specified in the inflation futures contract, the gain to the buyer is \$2,500. The economics of the proposed contract are identical to the existing contract.

pay your broker a fee for his efforts. The size of the fee is negotiable and can vary with the size of the transaction. Currently, broker fees run between \$25 and \$75 for entering into and settling a single CPI futures contract.

Between the time you buy the contract and the day you settle the contract, the market value of your contract is likely to change. As new information about the economy comes to light, participants in the CPI futures market will revise their beliefs about the March 1988 CPI. If the participants come to expect more inflation, they will expect the March 1988 CPI to be higher than

they previously thought, in which case the market value of the April 1988 CPI futures contract will rise. In that case, you will receive capital gains on your contract. These gains are added to your margin account on a daily basis as the contract is "marked to market," and you are free to withdraw those gains. But suppose market participants come to expect less inflation; then the April 1988 CPI futures contract falls in value. You consequently suffer capital losses on your contract, and those losses are subtracted from your margin. If your margin shrinks below a specified "maintenance level" (which is 75 per-

cent of the initial margin in the CPI futures market), you must post additional margin to bring the margin back to its original level. If you fail to make the margin call, your broker liquidates your position immediately at the going market price.

Now comes settlement day in April 1988. You and the seller of the contract must settle with cash. If the CPI comes in higher than the CPI specified in the futures contract, you make money. The person who sold you the contract pays you the difference between the announced and contracted value of the CPI, times \$1,000. For example, if the CPI comes in at 343.5 while the contracted value of the CPI is 341.5, you receive \$2,000, that is,  $(343.5 - 341.5) \times \$1,000$ . Similarly, if the CPI comes in lower than the contracted value, you lose money; if the CPI comes in at, say 338.5, you would have to *pay* the seller of the contract \$3,000. Thus, your gains and losses in the CPI futures market depend on the difference between the announced value of the CPI and the market's expectations of the CPI as embodied in a CPI futures contract, not just on the increase in the CPI.<sup>7</sup>

Finally, you can liquidate your position in the CPI futures market before settlement day simply by taking an offsetting futures position of the same size. For example, if you bought 20 CPI futures contracts whose settlement day is in April 1988, you need only sell 20 CPI contracts with the same settlement day in order to close out your position and realize the gain or loss on that date on your initial investment.

It might seem that the CPI futures market is simply a gambling pit that belongs in Atlantic City rather than in New York, and indeed, for those who take purely speculative positions in futures markets, the analogy is apt. But the CPI

futures market also allows investors and businesses to hedge themselves against pure inflation risk.

#### HOW THE CPI FUTURES MARKET CAN LOCK IN A REAL INTEREST RATE

Trillions of dollars worth of financial contracts in the United States are written in nominal terms and hence are subject to inflation risk. The CPI futures market offers those involved in financial contracts the opportunity to hedge against that inflation risk and thereby lock in a real interest rate on their investments. Some examples indicate how this can be done.

**Hedging an Investment With the CPI Futures Market.** Suppose in June 1990, a financial institution—let's call it the Retirees' Investment Fund (RIF)—invests \$1,000,000 in 1-year Treasury bills bearing a known, fixed nominal yield of 9 percent, which means RIF receives \$1,090,000 in principal and interest in June 1991. Now suppose in June 1990, the CPI has a value of 100.0 and the CPI futures contract selling in June 1990 and settling one year later has a price of 106.0, so the expected inflation rate implicit in the 1-year futures contract is 6 percent.<sup>8</sup> By buying the appropriate number of CPI futures contracts, RIF can lock in a 3 percent real return on its investments. To find the number of futures contracts RIF must buy, divide the amount of money subject to inflation risk—in this example, \$1,090,000—by the settlement value of one CPI futures contract—in this example, \$106,000—covering the month in which the T-bills mature. So dividing, we get approximately ten contracts. Since fractions of contracts cannot be purchased, RIF buys ten contracts.

Table 1 shows how the real yield on RIF investment is affected by inflation. Suppose that inflation is 6 percent during the 12 months following June 1990. In that case, RIF neither gains nor

<sup>7</sup>The Coffee, Sugar, & Cocoa Exchange has filed a request to modify the nature of the CPI futures contract. The Exchange wants a new contract that trades not on the level of the CPI-W, but on the percentage change (that is, the inflation rate) of the CPI-W. The economics of the proposed contract are identical to the existing contract.

<sup>8</sup>In the example in the text, the CPI for June 1990 is set at 100.0 for convenience, a number below the current value of the CPI.

**Table 1**

Investment to Be Hedged: \$1,000,000 in 1-year T-Bills, bought in June 1990	Price of a 1-year CPI Futures Contract in June 1990: 106.0, an implicit expected inflation rate of 6%
Nominal Return on the T-Bills: 9%, yielding \$90,000 in interest in addition to the principal repayment of \$1,000,000 in June 1991	Number of CPI Futures Contracts Purchased: 10
CPI in June 1990: 100.0	Assumed Brokerage Fee Per Contract: \$25

**Three Scenarios for Settlement After Announcement of June 1991 CPI**

<u>CPI In June 1991</u>	<u>June-June Inflation Rate</u>	<u>Payment On CPI Futures<sup>a</sup></u>	<u>Total Payment<sup>b</sup></u>	<u>Total Real Payment<sup>c</sup></u>	<u>Total Real Yield<sup>d</sup></u>
1. 106.0	6%	\$0	\$1,089,750	\$1,028,066	2.81%
2. 110.0	10%	\$40,000	\$1,129,750	\$1,027,046	2.70%
3. 102.0	2%	-\$40,000	\$1,049,750	\$1,029,167	2.92%

<sup>a</sup>If the CPI rises by 6 percent, RIF receives nothing on its futures contracts and gets a real yield of approximately 3 percent on its investment in T-bills. If the CPI rises by 10 percent, RIF *receives* \$4,000 on each CPI futures contract it bought [ $\$1,000 \times (110.0 - 106.0)$ ], for a total of \$40,000 on 10 contracts. If the CPI rises by 2 percent, RIF *pays* \$4,000 on each CPI futures contract it bought [ $\$1,000 \times (102.0 - 106.0)$ ], for a total payment of \$40,000 on the 10 contracts.

<sup>b</sup>The total payment is the sum of the payment on the T-bills (which is always \$1,090,000) and on the CPI futures contracts, less the brokerage fee for the 10 futures contracts (which is \$250). The payment is rounded to the nearest dollar. Taxes are not considered here because people have different tax brackets.

<sup>c</sup>The real payment is the total payment divided by the CPI, expressing the payment in June 1990 dollar values.

<sup>d</sup>The real yield is found by dividing the real payment by \$1,000,000—the initial principal—and subtracting 1. The real yield is always about 3 percent because the payment on the CPI futures contracts almost completely offsets the gain or loss in purchasing power on the T-bills caused by inflation being different from the 6 percent implicit in a 1-year CPI futures contract. The hedge is not perfect because fractions of contracts cannot be purchased.

loses on its futures contracts because the actual CPI turns out to equal the CPI specified in the futures contract. RIF gets about a 3 percent real return on its combined investment in T-bills and CPI futures. If, instead, the inflation rate is 10

percent, RIF ends up with a real return of -1 percent on its T-bills instead of a 3 percent real return (-1 percent real interest rate = 9 percent nominal interest rate minus 10 percent inflation). But RIF *gains* on the CPI futures contracts that it

bought, and the gain about offsets the real loss on the T-bills, so that the real return on the T-bills plus the CPI futures contracts is about 3 percent. On the other hand, if there is a 2 percent inflation rate, then RIF *pays* on its futures contracts. At the same time, the lower inflation creates a 7 percent real interest rate on the T-bills (7 percent real interest rate = 9 percent nominal interest rate minus 2 percent inflation). The loss on the CPI futures contracts offsets the real gain RIF makes on its T-bills, so that, once again, the real return on the T-bills plus the CPI futures contracts is about 3 percent. By buying the right number of futures contracts, RIF can insure itself against inflation risk and lock in a real interest rate on its T-bills.<sup>9</sup>

**Borrowers Can Hedge As Well.** Who is selling the futures contracts that RIF is buying? If RIF reduces its inflation risk when it lends money by also buying CPI futures contracts, do the businesses that sell the contracts increase their inflation risk? Perhaps, but not necessarily. Consider a hypothetical corporation selling 1-year discount bonds (that is, bonds which do not bear coupons) which bear a nominal yield of 9 percent.<sup>10</sup> The corporation is in a position similar to RIF's—it is certain about the nominal interest it will pay, but it is uncertain about the real interest it will end up paying because it cannot forecast the inflation rate perfectly. If inflation comes in unexpectedly high, the real value of the corpo-

ration's debts is unexpectedly reduced, and if inflation comes in unexpectedly low, the real value of the corporation's debts is unexpectedly increased—the reverse of the position of RIF. The corporation, like RIF, can shed that inflation risk in the CPI futures market—but it does so by *selling* CPI futures contracts, not buying them as RIF did.

Borrowers, as well as lenders, can hedge themselves in the CPI futures market. In fact, businesses that both borrow and lend, like insurance companies and banks, can profitably use the CPI futures market to lock in a real interest rate on both their assets and liabilities.<sup>11</sup> In addition, nonfinancial businesses also can protect themselves from the inflation risk that arises in ordinary business operations. For example, a business that submits a fixed nominal bid to construct a building is vulnerable to changes in inflation while construction is underway. Another example, examined below, concerns a business that negotiates an indexed labor contract with its employees.

**The CPI Futures Market Assists Indexing.** Consider the case of a hypothetical firm called the American Steel Company (ASC). Because the price level grows at an uncertain rate, both the ASC and its employees, members of the Steel Union, are subject to risk about the real value of the long-term labor contract they negotiate. Suppose ASC signs a labor contract with the union that includes a cost-of-living adjustment (COLA) clause that automatically adjusts wages proportionately to the CPI. While this indexation protects workers' real wages, it may

<sup>9</sup>There is a slight problem with this example. One-year T-bills bought at the end of June 1990 mature at the end of June 1991 when the investors receive the face value of the T-bills. However, a CPI futures contract covering the CPI of June 1991 does not settle until the end of the third week in July 1991 when the Bureau of Labor Statistics announces the value of the June 1991 CPI. Thus, there is a lag between receiving the cash from the T-bills and receiving (or paying) cash for the CPI futures contract, so the CPI futures market cannot provide a perfect hedge against unanticipated inflation. The inability to buy fractions of contracts also prevents perfect hedging.

<sup>10</sup>A discussion of coupon bonds is more complex; for details of hedging coupon bonds, see Todd Petzel and A. Fitzsimons, *Bank Utilization of Inflation Futures*, (NY: Economic Index Market of the Coffee, Sugar, and Cocoa Exchange, 1985).

<sup>11</sup>Currently, financial institutions can use interest rate futures to reduce significantly the risk to their cash flow that comes from unexpected variations in the nominal interest rate. (See Michael Smirlock, "Hedging Bank Borrowing Costs With Financial Futures," this *Business Review* (May/June 1986) pp. 13-23.) However, even if a financial institution completely immunized its cash flow against nominal interest rate risk, it would still be exposed to inflation risk because unexpectedly high inflation would reduce the real value of its cash flow—a risk that could be shed in the CPI futures market.

expose ASC to inflation risk if the price of steel is not highly correlated with the CPI. (For some firms, the prices of their products can fall as the CPI rises, as happened in recent years with oil, some foodstuffs, and industrial metals.)<sup>12</sup> What can ASC do? With the CPI futures market, it can offer its workers indexed contracts without increasing its inflation risk.

When ASC signs an indexed contract with its workers, it can simultaneously buy the appropriate number of CPI futures contracts, and thereby protect its profits against unanticipated inflation. Suppose the inflation rate implicit in the CPI futures market is 6 percent. If foreign competition does not allow ASC to raise its steel prices by more than 6 percent, then each percentage point that inflation rises above 6 percent increases labor costs (and reduces profits) via the COLA. But ASC's extra labor costs are offset by the gains on its CPI futures contracts. And if inflation comes out unexpectedly low, ASC's lower labor costs are offset by its losses on the CPI futures contracts.<sup>13</sup>

#### **IF CPI FUTURES ARE SUCH A GOOD IDEA, WHY IS THE VOLUME SO LOW?**

Shortly after the CPI futures contract was introduced, Milton Friedman stated that it could become "the largest-volume contract in the country."<sup>14</sup> Yet, the market's activity has been small, especially when compared to other futures markets. For example, on December 2, 1986, the volume of the CPI futures market was zero, while the coffee and S&P 500 futures markets, two representative futures markets, traded 3,800 and 109,749 contracts, respectively.

<sup>12</sup>Further analysis of the advantages and disadvantages of indexation can be found in Brian Horrigan, "Indexation: A Reasonable Response to Inflation," this *Business Review*, (September/October 1981) pp. 3-11.

<sup>13</sup>The hedge is imperfect because the payroll is paid out every week, so that complete inflation protection would involve buying a series of contracts maturing at different dates through the year.

<sup>14</sup>Quoted in *Institutional Investor*, (January 1986) p. 17.

And the open interest—the total number of futures contracts not settled or closed out—on the same day was 58 on the CPI futures market, while on the coffee and S&P futures market the figures were 15,322 and 146,005 contracts, respectively. These values are typical for other days, also. Clearly, this market is not catching on. Why has the market failed in practice, so far, and under what conditions may it yet succeed? While no definitive answers are available, several factors may play important roles.

**The CPI May Not Be a Relevant Measure of Prices For Many.** The CPI measures how the price of a representative "basket" of goods and services purchased by American consumers has changed over time. But many American consumers probably purchase a basket of goods and services that is very different from that measured by the CPI. If the prices of different goods and services rise and fall by very different amounts, the inflation rate faced by individual families may be significantly different from the inflation rate as measured by the change in the CPI. In that case, protection against unexpected changes in the CPI would have little value in stabilizing the cost of living for many families. Economist Robert Gordon gave an example of how widely spread price increases are among different commodities: "Someone who spends equal shares of his income on rent, TV sets, telephone calls, eggs, and whiskey, would have experienced a price increase since 1967 of only 51 percent, or a compounded rate of only 3.2 percent per year. Someone else who spends equal shares on steak, potatoes, coffee, fuel oil, and mortgage interest, would have experienced an increase since 1967 of 321.3 percent, or a compounded rate of 11.7 percent per year."<sup>15</sup>

**Businesses May Prefer Cross-Hedges.** For a new futures contract to be successful, it is not

<sup>15</sup>Robert J. Gordon, "The Consumer Price Index: Measuring Inflation and Causing It," *The Public Interest* (Spring 1981) p. 117. Also see Robert P. Hagemann, "The Variability of Inflation Rates across Household Types," *Journal of Money, Credit, and Banking* (November 1982) pp. 494-510.

enough that the contract provide an opportunity for hedging against commodity price risk. A new futures contract must provide opportunities for reducing risk that are significantly greater than the opportunities that already exist in other futures markets. Consequently, many businesses "cross-hedge," meaning that they hedge against price risk for one commodity by buying or selling futures contracts for a similar commodity that has an active futures market. For example, one reason for the failure of the barley futures market is that grain dealers found that they could hedge against barley price risk in the corn futures market. The hedge is imperfect since barley prices fluctuate relative to corn prices, but the grain dealers preferred using the corn futures market which was far more active and "liquid" than the barley futures market. An analogous situation could exist for the CPI futures market, namely, that businesses reject the perfect CPI hedges available in the CPI futures market for less perfect hedges in more liquid futures markets. Futures markets in industrial and precious metals and in financial instruments allow some hedging against CPI risk, and businesses may well prefer to work in those familiar and active futures markets to shed (imperfectly) some of their inflation risk.<sup>16</sup>

**Reduced Inflation Uncertainty Retards the CPI Futures Market.** Businesses face two different types of price risk: inflation risk, in which all prices rise together, but at an uncertain rate, and relative price risk, in which different prices rise and fall relative to each other, even though the average of all prices may not change at all. Both types of risk affect the real income of businesses. To see this, consider the economic situation of a wheat farmer who is sure about the size of his

wheat crop but is uncertain about prices. The farmer's real income can be reduced either by a fall in the price of wheat he sells or by an increase in the prices of the consumer goods he buys. If the price of wheat remains very stable while the CPI rises erratically, the main uncertainty about the farmer's real income is inflation risk, and the farmer can reduce that risk in the CPI futures market. But if the CPI is stable while the price of wheat is volatile, the farmer can protect his income by shedding his price risk in the wheat futures market. Eliminating the risk from wheat prices would eliminate virtually all of his uncertainty about his real income, so there would be little reason for the farmer to use the CPI futures market.

For the CPI futures market to be considered worth the costs of using it (in time and trouble as well as in brokerage costs), there must be sufficient uncertainty in the CPI to expose many people to significant inflation risk. A reduction in inflation risk compared to relative price risk could be an important reason for the lack of interest in the CPI futures market, since the level of inflation and expectations of inflation dropped significantly after 1980. Economists have documented that the level of inflation is positively correlated with inflation uncertainty both in this country and in other countries, and some economic theories predict that the correlation between inflation uncertainty and the level of inflation will persist. Since people expect a lower inflation rate in the near future, people should also expect inflation to be more predictable and inflation risk to be less important.<sup>17</sup> As inflation

<sup>16</sup>This point about the role of cross-hedging in determining the success of futures contracts is argued in Deborah G. Black, "Success and Failure of Futures Contracts: Theory and Empirical Evidence," Monograph Series in Finance and Economics 1986-1, Salomon Brothers Center for the Study of Financial Institutions, Graduate School of Business Administration, New York University, 1986.

<sup>17</sup>See John B. Taylor, "On the Relation Between the Variability of Inflation and the Average Inflation Rate," *Carnegie-Rochester Conference Series on Public Policy*, (Autumn 1981) pp. 57-86. Also see Stanley Fischer, "Relative Shocks, Relative Price Volatility, and Inflation," *Brookings Papers in Economic Activity*, 2 (1981) pp. 381-431, and A. Steven Holland, "Does Higher Inflation Lead to More Uncertain Inflation?" *Federal Reserve Bank of St. Louis Review* (February 1984) pp. 15-26.

Stanley Fischer, *Indexing, Inflation, and Economic Policy* (Cambridge, MA; The MIT Press, 1986) pp. 301-320, ob-

and inflation risk have subsided, many, and perhaps most, businesses are in the same position as the wheat farmer—they find that the risk to their real profits comes from the variability of their own prices relative to the CPI, not from the variability of the CPI, and they use futures markets to reduce their relative price risk rather than to reduce their inflation risk. There have been other futures markets that have become inactive because of the low level of price volatility, such as the one for fresh eggs. The same could happen, and may already be happening, to the CPI futures market.

**There is no underlying asset for the CPI futures contract.** A futures market cannot succeed unless it attracts businesses that wish to hedge against the price risk of the commodity traded in the futures market. But it is hard for a futures market to survive by attracting only hedgers. Generally, it helps a futures market to attract arbitrageurs and speculators, who add “liquidity” to the futures market. By buying and selling futures contracts continually, arbitrageurs make it cheaper for hedgers to buy or sell futures contracts whenever they want, which in turn attracts more hedgers to the futures market. Furthermore, they make the futures market more “efficient,” in the sense that information is reflected in futures prices more quickly. A problem for the CPI futures market may be that there is no underlying asset for the futures contract, as there is for virtually every other futures contract traded. This feature inhibits arbitrageurs and speculators from participating in the CPI futures market to the same extent they participate in other futures contracts.

Consider a commodity like wheat, which is sold in both spot markets and futures markets. If

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serves one measure of the relative importance of inflation risk and relative price risk can be found by comparing the variance of the CPI inflation rate with the variance of the stock market rate of return; the former is smaller than the latter by a factor of the order of 100. Referring to the introduction of CPI-indexed bonds, he comments that “inflation uncertainty is relatively trivial and insufficient to make the introduction of a new financial asset worthwhile.” The same point applies to the use of the CPI futures market.

the price of a wheat futures contract is high enough relative to the spot price of wheat, arbitrageurs can make money by buying and storing wheat and simultaneously selling a wheat futures contract. On settlement day, the arbitrageur must deliver the wheat promised in the futures contract at the price specified in the contract, but the arbitrageur has already purchased the wheat destined for delivery. Since the selling price of the wheat as specified in the futures contract is above the price at which the arbitrageur purchased the wheat, the arbitrageur makes enough money to cover the cost of storing the wheat and still have some profit—a risk-free profit, since the selling price of wheat is set by contract. What is true for wheat futures in this regard is also true for other commodity futures and for interest rate and stock price futures. Arbitrageurs can supply futures contracts upon demand without exposing themselves to significant risk as long as they can buy the asset that underlies the futures contract.

But if it were impossible to store wheat for future delivery, the arbitrageur would take on the risk of a potentially significant wealth loss when he sold the wheat futures contracts. An arbitrageur who sold wheat futures contracts would have to wait until the futures contract matured, and buy wheat in the spot market for delivery to the owner of the wheat futures contract. If the spot price of wheat rose above the futures price of wheat by settlement day, the arbitrageur would lose wealth. This risk would inhibit arbitrageurs from selling wheat futures contracts and would depress the volume of activity in the wheat futures market. The ability to buy and store the asset underlying a futures market encourages the participation of arbitrageurs, which enhances the liquidity of the market.

Unfortunately for the CPI futures market, it is impossible to buy and store the basket of goods and services whose price the CPI measures; there are hundreds of goods and services in the CPI basket, some of which (like ice cream) can be stored only at great cost and others (like

haircuts) which cannot be stored at all. Since arbitrageurs cannot buy and store the CPI basket while selling the CPI futures contract, they absorb inflation risk when they sell the contract, which they may not want to do. Thus, the potential supply of CPI futures contracts is limited in a way that other, more successful futures markets are not.

Speculators also prefer futures markets for which there is an underlying asset. For most of the commodities or assets traded on futures markets, there are active spot markets in which there is constant adjustment of prices as new information is discovered about the future value of the commodities and assets. The new information about spot prices is useful for speculators seeking to take a risky position in futures markets. The CPI market basket is not traded in active spot markets, so there is no continuous price data available on the CPI. The CPI is announced once a month, whereas for many commodities the prices are announced (on their trading floors) every minute. The lack of continuous price information discourages speculators from entering the CPI futures market, which further reduces the liquidity of the market.

There is indirect evidence for the argument that the absence of an underlying asset explains why market interest in the CPI futures market is so low. The New York Futures Exchange now trades a futures contract that, like the CPI futures market, is settled on a cash basis and whose settlement value is determined by a price index. The price index is the Commodity Research Bureau's (CRB) index of futures prices for 27 key commodities. There are active futures and spot markets in each of the 27 commodities in the CRB's futures price index, so that there are underlying assets for the new futures contract introduced by the New York Futures Exchange. The volume of trading and the open interest in the CRB index futures contract has been much higher than that in the CPI futures market. On December 2, 1986, for example, the volume and open interest were 225 and 1,380, respectively,

in the CRB index futures market, while the volume and open interest were zero and 58, respectively, in the CPI futures market. The CRB index futures market has been no more successful than the CPI futures market in attracting hedgers, so far. But arbitrageurs and speculators have been able to use the CRB index futures market because of the presence of underlying assets that are actively traded and that may be stored, and they have been more willing to use the market because of the greater price volatility, which may explain why the CRB index futures market has greater activity than the CPI futures market.

## CONCLUSIONS

The introduction of a futures market trading contracts based on the value of the Consumer Price Index—enthusiastically endorsed by prominent economists—has made available to businesses and investors a means of trading and hedging against inflation risk. The CPI futures market has not been a great success, however. Its volume and open interest have been very low. The novelty of the contract, the inadequacy of the CPI for measuring inflation risk, the existence of cross-hedges for the inflation risk of many households, and the lack of a storable underlying asset for the contract are undoubtedly some of the reasons for the market's low trading volume. But the most important reason for the failure of the market to be used in a big way is probably that current inflation risk is not very significant relative to all of the other risks that investors and businesses must manage. Given the costs of using the CPI futures market, most investors and businesses probably believe that their scarce resources are better spent coping with the more significant risks they face. However, if inflation becomes higher and more erratic, as it was in the 1970s, inflation risk will again become significant, and many investors and businesses may turn to the CPI futures market to cope with it.