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Natural Gas Supply Association

October 26, 2009

Mr. David A. Stawick
Secretary of the Commission
Three Lafayette Centre
1155 21st Street, NW
Washington, DC 20581

COMMENT

Re: Natural Gas Supply Association Comments on Whether 13 ICE Natural Gas Contracts Perform SPDC Functions (Federal Register Dockets 74 FR 52188, 74 FR 52186, 74 FR 52207, 74 FR 52196, 74 FR 52198, 74 FR 52190, 74 FR 52192, 74 FR 52206, 74 FR 52208, 74 FR 52194, 74 FR 52210, 74 FR 52200 and 74 FR 52202)

Dear Mr. Stawick:

The Natural Gas Supply Association ("NGSA") appreciates the opportunity to comment on the Commodity Futures Trading Commission ("the Commission") October 9, 2009 Notice of Intent ("NOI") to determine whether 13 financially-settled natural gas contracts offered for trading on the Intercontinental Exchange, Inc. ("ICE") perform significant price discovery ("SPDC") functions.

Established in 1965, NGSA encourages the use of natural gas within a balanced national energy policy and promotes the benefits of competitive markets to ensure reliable and efficient transportation and delivery of natural gas and to increase the supply of natural gas to U.S. customers. NGSA's members produce and market approximately one-third of the U.S. natural gas supply. Representing many of the major natural gas market participants, NGSA has an interest in the outcome of this proceeding.

NGSA appreciates the Commission's efforts to ensure a robust and competitive marketplace. Nevertheless, NGSA is concerned that the contracts in question do not embody an appropriate combination of key characteristics, as defined by the Commission, necessary for final SPDC designation. While NGSA acknowledges that the CFTC has discretion in this regard, any unnecessary SPDC designations and associated position limits risk unintended consequences, particularly with regard to liquidity and cost, in an energy commodity market that is already one of the most efficient in the world. For the record of this proceeding and further Commission consideration, we are submitting an NGSA-commissioned analysis of physical natural

gas price formation and transparency in the U.S. by former Commissioner William Albrecht.

The Commodity Exchange Act (CEA) notes that, in order to establish whether a contract performs a significant price discovery function, the Commission shall consider as core principles price linkage, arbitrage, material price reference, and material liquidity for such a determination.[1] In considering these core principles, the Commission considers the following –

- Price Linkage: does the contract rely on a daily or final settlement price or other price of a contract listed on a DCM or DTEF?
- Arbitrage: is the price of the contract sufficiently related to the price of a contract listed on a DCM or DTEF to permit arbitrage on a frequent/recurring basis?
- Material Price Reference: are cash market bids, offers or transactions in a commodity based on—or determined by referencing—the SPDC prices on a frequent/recurring basis?
- Material Liquidity: is the volume of trading on the ECM sufficient to have an effect on contracts listed on a futures exchange?

As of this time, the Commission has applied these core principles to a single SPDC determination, the ICE Henry Hub "look-alike" swap. In that instance, the characteristics of that contract mirrored and were deemed to have potential influence on the NYMEX futures values and the underlying physical contracts traded at the benchmark Henry Hub pipeline confluence in Erath, La.

In the proposed contracts now under consideration, however, the swaps referenced have characteristics that are materially different than the previous designation. The contracts for which the Commission is proposing SPDC status generally contain a pricing term which consists of the Henry Hub NYMEX futures expiry price for the month and basis differential.[2] The basis differential is produced by reference to the price for a location published by a publication such as Platts *Inside FERC Gas Market Report*. Thus, the pricing mechanism for the floating price for a location downstream of Henry Hub is the NYMEX price for a month deducted from the Platts price for the affected location.

As a result, the fundamental variable market driven price is the NYMEX price. As the NYMEX price is a futures contract traded on a regulated exchange subject to reporting and position limits, the pricing for the "basis" location is materially dependent on the futures price and is derivative of it. The other element of pricing is the Platts price which is the product of a well vetted process to identify the price of transactions for the

[1] Commodity Exchange Act § 2(h)(7) // CFTC Commission Rule 36.3 (c)(3).
[2] See, for example, the Dominion –South Financial Basis Contract.

period at the location. The floating price (the difference between these two inputs) is the aspect of the contract that provides pricing mechanism to establish the relevant price that hedges the risk at the referenced location. It is not the trading of the contract itself.

Unlike the Henry Hub "look alike" contract (which has been found to be a SPDC), the "basis" contract is not the economic equivalent of the Henry Hub futures contract. Its purpose is to hedge price risk at a particular location by reference to the underlying price discovery contract for North American natural gas, the Henry Hub futures contract. Its price is largely determined by trading in the Henry Hub futures contract, not by trading in the "basis" contract.

The criteria the Commission is to use to consider whether a contract is an SPDC include whether the "extent to which, on a frequent and reoccurring basis, bids, offers, or transactions in a commodity are directly based upon, or are determined by referencing the prices generated by" the subject contract. While many contracts settle by reference to the Henry Hub futures contract, NGSA is not aware of any material use of a "basis" contract used as a price reference in any material way. As the settlement mechanism in the contract is Platts minus NYMEX Henry Hub, there is no reason commercial parties would need to reference the swap when they could reference the transparent and readily available price indicators: the NYMEX price and the Platts price.

Further, as opposed to the Henry Hub futures contract, the "basis" contracts do not, to NGSA's knowledge, have a material effect on other agreements, contracts, or transactions listed for trading "... on a designated contract market" as is required to be designated a SPDC. The "basis" contracts are derivative of the Henry Hub futures contract, not the other way around. NGSA is not aware of contracts which are derivative of the "basis" contracts.

It is important to keep in mind, as noted above, the ICE Henry Hub "look-alike" contract is already a SPDC, and provides the most direct market protection for the underlying physical transactions at the various locations. It is often the referenced price for negotiated contracts together with the Henry Hub fixed-price contract published in *Inside FERC* and other trade publications. Again, the Commission has already taken steps to secure the Henry Hub basis contract from excessive speculation risk. Without careful application of each of the SPDC core principles, premature SPDC designations risk hampering market development and expansion of potentially valuable risk-management tools. As can be seen from the foregoing, the subject contracts do not meet material elements of the SPDC criteria and do not merit SPDC status. Inappropriate SPDC designation would subject the contracts to unnecessary government interventions and could unintentionally result in inefficiencies and increased costs in the market.

As Dr. Albrecht notes, "a major challenge for regulators is to balance the benefits and costs of new rules and regulations, and recognize that a healthy market does not necessarily mean declining or less volatile pricing."

As shown above, the subject contracts do not merit SPDC status: such status would provide limited market value; and the imposition of such status could increase costs to market participants.

Respectfully submitted,

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PRICE TRANSPARENCY IN THE US NATURAL GAS MARKET

William P. Albrecht

July 14, 2009

EXECUTIVE SUMMARY

- The U.S. natural gas market has undergone significant changes since the deregulation of natural gas wellhead prices in 1989. It has evolved into a highly price transparent market, arguably the most price transparent commodity market in the world. This evolution has been driven by market forces, technology and governmental oversight.
- The U.S. natural gas market consists of two interrelated parts: the physical market and the financial market.
- The financial market is comprised of transactions involving financial instruments based upon the price of natural gas that do not typically result in delivery of the physical commodity. These instruments include exchange-traded futures and options and a wide variety of OTC swaps.
- The financial market provides real-time prices on a wide variety of natural gas derivatives that are available to all market participants.
- The physical market is comprised of transactions involving the actual commodity. Participants in this market can negotiate a fixed price for a transaction or they can use a price index that is based upon recent fixed price transactions.
- Efforts to use the number of fixed price transactions as a measure of market health or transparency are misguided. The important question is whether the there is enough price transparency to enable buyers and sellers to informed decisions in their transaction.
- An examination of the interaction between the physical and financial U.S. natural gas markets shows that there is enough transparency. In fact, the combination of transparency on both the physical and financial sides of the market makes the overall market close to being completely transparent.
- A significant amount of government oversight exists. Efforts to expand this oversight should be based upon a careful evaluation of likely costs and benefits.

The U.S. relies upon natural gas for about 25 percent of its energy needs and will likely rely even more heavily upon it in the future based on the current U.S. climate goals. It is essential, therefore, that the natural gas market be efficient in both the short run and the long run. Fortunately, over the past twenty years, the U.S. natural gas market has been transformed into an extremely efficient one.

The catalyst for this transformation was the 1989 deregulation of natural gas wellhead prices. This action allowed prices to be determined by market forces (the interaction between supply and demand). Today, the U.S. natural gas market, unlike any other natural gas market in the world is very competitive, liquid, transparent and efficient. Natural gas prices over the long-term reflect supply and demand, leading to efficient use of natural gas by all sectors of the economy. Price deregulation has benefitted producers, consumers and the economy as a whole.[1]

Despite tremendous market-driven enhancements to transparency and efficiency in the market over the last 20 year, the performance of the natural gas market remains a point of considerable debate. This ongoing debate is driven largely by concerns related to the relatively high natural gas commodity prices in the summer of 2008, natural gas price volatility, and the influx of passive money investment in the U.S. natural gas futures market. These observations were not unique to the natural gas commodity market and in fact were characteristic of many energy and non-energy commodities. Many commodities exhibited bullish behavior during that time period driven partly by a weak dollar and a strong global economy. Nevertheless, the

[1] See Hayek (1945) and Grossman and Stiglitz (1980) (and many others) for a discussion of the role of markets and trading in generating the information necessary for efficient use of resources.

concerns with commodity prices in the summer of 2008 and recent years have led some to express concern about the degree of price transparency and speculation in the U.S. market for natural gas and to suggest regulatory and policy changes to improve the market.

The purpose of this paper is to address these concerns about transparency. In order to do this we begin with a brief look at the structure of the natural gas market.

Market Structure

The U.S. natural gas market is essentially comprised of two parts; the *physical* market and the *financial* market. The two parts serve different purposes, but they are closely related. The interaction of the two parts ensures that both reflect the same underlying fundamentals. The physical market is comprised of transactions involving the actual commodity (primarily methane). The financial market is comprised of transactions involving financial instruments that are based upon the price of natural gas, but typically do not result in delivery of the physical commodity.

The Physical Market

The physical natural gas market emerged decades ago and is simply a marketplace for the purchase and sale of natural gas. The Federal Energy Regulatory Commission (FERC) is obligated under the Energy Policy Act of 2005 (EPAct) to ensure that the U.S. natural gas market is competitive and efficient. The physical natural gas market is comprised of thousands of people buying and selling natural gas at locations all over the U.S. and the world. In these transactions, they arrange to move that natural gas from point A to point B for various purposes, but ultimately for consumption.

Unique relative to the rest of the world, U.S. market participants have the ability to store a large quantity of natural gas. Natural gas from storage is used to bridge the gap between daily production and daily seasonal consumption. Because there are specific operational limits on each storage facility [2] and because storage operators charge fees each month on the quantity of natural gas in storage, natural gas is typically not stored for more than a season. U.S. storage is most heavily relied upon in the ***winter***, to meet cyclical demand, thus, it is usually filled by November 1 and emptied by March 31 each year. Storage withdrawals are typically used to help meet peak season demand. Most natural gas storage capability is controlled by the local natural gas utilities.

Henry Hub in Louisiana is the delivery point for pricing the natural gas futures contract (discussed later), but it is only one of the many physical natural gas market centers in the U.S.

[2] Natural gas can be stored in several ways, including above ground in liquid form but the majority of storage capability is in depleted natural gas wells. Each storage facility has defining physical characteristics that are used to set safe limits for operating pressures, total quantities that can be stored, and the amount that can be injected and withdrawn each day.

Henry Hub is the nexus of 16 intra- and interstate natural gas pipeline systems that draw supplies from the on-shore and off-shore Gulf of Mexico production area. The pipelines serving the Henry Hub provide access to market areas throughout the U.S. East Coast, the Gulf Coast, the Midwest, and up to the Canadian border.

Prior to the prevalence of computers, this entire activity of buying and selling natural gas took place over the phone (e.g. a buyer calling a seller and arranging for delivery). As the market became more geographically diverse and interconnected, the need to standardize and computerize this activity emerged. The concept of the natural gas "bid week" emerged, and the market-driven, voluntary Gas Industry Standards Board (GISB), now the North American Energy Standards Board (NAESB), came into being to help ensure that buyers and sellers of natural gas spoke the same language. A 10 AM delivery of natural gas, for example, means 10 AM *Central* time. Bid week, the last five business days of the month, became the time for most of the physical purchasing and selling of natural gas. Although market participants can still transact at any time of the month, bid week became the time when the majority of physical transactions for the next month's delivery are consummated. A significant number of transactions are "fixed price" contracts in which the buyer and seller agree upon a price for gas to be delivered daily for the next month. Thousands of these transactions are reported to several publications which quickly convert these prices into monthly locational price indices that are available on the first business day following the last day of bid week. These indices, in turn, are used as the basis for pricing for those firms that do not choose to enter into fixed price contracts (or are prohibited from using them by state or local regulators).

In addition to the publications' monthly indices, several publications survey the market for daily transaction prices that are used to form and publish a daily index that is made available the morning of the next business day. Participants in the natural gas market have the ability to buy and sell natural gas throughout the day as well. This system of index price formation and discovery is unique to the U.S. natural gas market and contributes substantially to price transparency and competitive pricing. In short, the U.S. natural gas market has extensive physical market data that provide unparalleled transparency for the monthly and daily natural gas markets at dozens of different market locations throughout the U.S.

The Financial Market

The financial market consists of transactions in futures, options, swaps and similar financial instruments based upon natural gas prices.[3] The largest volume of such transactions occurs in the New York Mercantile Exchange (NYMEX) natural gas futures contract. (Average daily trading volume was just over 153,000 contracts in 2008.)

The futures market is the generic (or standard) contract for *price insurance* on a particular commodity. Shortly after the deregulation of wellhead prices, NYMEX formed the natural gas futures contract *based on* the way the physical natural gas market was already working. Instead of buying or selling natural gas on a real-time or next month basis, the NYMEX futures contract provides market participants with the ability to buy or sell a ***contractual*** right to buy or sell a standardized amount of natural gas at a particular point in the future at a

[3]Kyle (1985) provides a very useful conceptual overview of the activity in such a financial market.

standardized location. The standardized contract[4] is for 10,000 MMBtu delivered or sold at Henry Hub the next month or any month during the next ten years or more. This translates to approximately 333 MMBtu every day the next month, enough natural gas to serve about 1200 households.[5] An end user that has agreed to buy natural gas at an indexed price for a year, for example, may choose to buy a futures contract to hedge (or protect itself) against a price increase. An increase in prices would then provide a gain on the future to offset the increase in cost of the index purchase. The consumer normally would not take the future to delivery since their physical requirement is satisfied by the index purchase.[6]

The futures market mirrors the existing and most prevalent physical market practice of buying natural gas in one month for delivery every day the following month at one of the larger physical market centers, the Henry Hub. NYMEX, with the oversight of the Commodity Futures Trading Commission (CFTC), established the third business day prior to the end of the month in which the contract expired as the final settlement day for the futures contract to allow time for settlement and verification. This means that holders of a futures contract at the time of contract settlement become obligated to buy or sell (depending on the contract) 10,000 MMBtu of natural gas the following month at Henry Hub. Unlike the physical market, the futures market allows for price discovery across time since entities are buying price insurance for what may be years ahead. Although the futures contract provides an excellent means to ensure price insurance for a future period, it does not necessarily reflect what the actual price

[4] Standardized contracts increase transaction speed (since parties do not have to negotiate a series of ever changing specifications) but they do not allow for customization.
[5] While this sounds like a large quantity, consider that today's typical 500 MW natural gas fired power generator requires approximately 84,000 MMBtu (more than 250 standard contracts) to run for one day.
[6] Less than one percent of all futures transactions result in an actual physical transaction.

will be in the physical market. It is simply a tool available within the market for making standardized transactions that provide the right to a certain commodity price at a certain point in the future.

The futures market is only a part of the financial market for natural gas. There are also exchange-traded options as well as numerous over-the-counter (OTC) natural gas financial instruments. These OTC instruments can be broadly categorized as basis swaps, index swap futures, and swing swap futures.[7] Hundreds of these are cleared on NYMEX and the Intercontinental Exchange (ICE). This means the prices of these transactions are readily available on NYMEX or ICE electronic screens. The number of such instruments keeps growing. In March 2009, for example, ICE began clearing an additional 22 natural gas swaps. Thus, market transparency grows steadily as more instruments are developed due to the efforts of market participants and the evolving technology that permits and encourages enhanced transparency. The ability for market participants to enter into non-standardized, non-cleared transactions is an equally important feature of the market that fosters liquidity, allowing market participants an opportunity to recognize factors other than cash as collateral.

All of these instruments (exchange-traded and OTC) are used to protect against unwanted risk. (They provide insurance.) And, as is the case for futures, they can be used to attempt to profit from expected price changes (speculation) or from misaligned prices (arbitrage). Some market participants use these instruments only for insurance. Others use them only for speculation. Many of the transactions are by commercial users who use them for

[7] Basis swaps are used to manage the difference between the price at a particular location and the price at Henry Hub. Index swaps manage the difference between the monthly and daily index at a particular point. Swing swaps manage exposure to the *Gas Daily* price at a location.

both purposes. These users buy and sell in the physical market and use the financial market to hedge unwanted risk. They also use the financial market for arbitrage when prices within or across the markets are misaligned. Some market participants do nothing but arbitrage among different parts of the financial market (say, June and September futures). Because of the transparency of both financial and physical markets, arbitrage quickly and efficiently keeps prices in all markets aligned. Abnormal relationships among different markets are quickly corrected unless there are supply and demand reasons for such differentials.

Price Transparency

Some buyers have argued that price transparency is low because natural gas price indices are based on incomplete access to information regarding the number of trades and the terms of such trades. In this paper deals, transparency means price transparency.
To remedy this, they have asked FERC to mandate price reporting or collect information so that the ratio between fixed and indexed priced transactions can be determined.[8] Those suggesting this approach, however, have lost sight of the big picture and are asking the wrong question. The important question is not whether a certain percentage of sales is at a fixed price. It is whether there is enough price transparency for market participants to make well-informed decisions when buying and selling. It is clear that, in the U.S. natural gas market, the answer is yes.

Over the last 10 years, this transparency has grown to a level that is unrivaled by other commodities. In the physical market, a number of publishers follow rigorous FERC established procedures for the collection and publication of volume and price information for transactions

[8] Post Technical Conference Comments, Docket No. AD06-11, American Public Gas Association, November 1, 2006.

occurring at a great many points across the U.S. This pricing information is available for daily and monthly transactions. This pricing information is provided to the publishers by many voluntary market participants who follow equally rigorous FERC established procedures for the reporting of this data. Violations of these reporting and publishing procedures are subject to stringent enforcement action from FERC. The integrity of this structure has been well-established for over five years and pricing information is available within the market for more than 25 Bcf per day[9], an amount equal in size to one-third to one-half of total U.S. natural gas consumption. This level of transparency stems from only one of many natural gas price index publishers that are among the numerous sources providing price transparency to the market.

In the financial market, the NYMEX and ICE electronic platforms provide real time transparency for futures, options and a large (and growing) number of swaps. This growth is driven by the private sector. Transparency in the financial market is driven by improved technology and increased market participant demand for better or additional risk management tools.

The combination of the transparency on both the financial side and the physical side makes the overall U.S. natural gas market very transparent, arguably the most transparent commodity market in the world. The information available about prices and fundamentals from all sources enables all markets participants to make informed decisions about buying and selling in both the physical and financial markets. Given the high level of transparency that

[9] See http://www.naturalgas.org/business/marketactivity.asp, Platts Inside FERC Bidweek Natural Gas Price Survey Statistics.

already exists, however, there is some question as to whether any benefits of the new regulations will be significant and whether they will be worth the cost.

Other Commodity Markets

Just as transparency has increased in the U.S. natural gas market so it has in other commodity markets. There has been some move toward increased transparency in European natural gas markets, but they fall far short of the U.S. market on both the physical side and the financial side. The commodity markets that are closest in transparency to the U.S. natural gas market are the U.S. markets for oil and grains (corn, wheat, soybeans). These grain markets are generally considered very transparent; for years many have considered them the most transparent commodity markets in the world. Arguably, this is no longer the case. Let us see why.

As with natural gas, there are also physical and financial markets in grain. In recent years, the physical markets in grains have not been as transparent as the physical market in natural gas. Elevator grain price bases (the difference between the futures prices and the cash price paid to the farmer), for example, have not been as transparent as gas prices. The latter have been available on a real time basis for several years on NYMEX and ICE (financial markets) for many locations, thereby providing information to physical market participants. The elevator bases, however, while publicly quoted, were not as readily available. This is now changing with the introduction of CME cleared basis swaps in corn, soybeans and wheat (approved by the CFTC on March 20, 2009). The introduction of these instruments will, in time, significantly enhance physical grain market transparency. There remain, however, significant differences between grain and natural gas swaps. The grain basis swaps are based upon regional price

indices rather than individual elevator prices. The natural gas basis swaps are based upon specific locations, thus providing a higher degree of transparency. Not all delivery points for natural gas have exchange-cleared basis swaps, but many additional delivery points are traded with OTC basis swaps.

These recent developments in grain markets illustrate several important points about commodity markets. One is that they are dynamic and constantly evolving as trading technology evolves. A second is that change is primarily driven by market participants, not regulators. A third is that the physical and financial markets are indeed part of the same market. These developments also illustrate the difficulty of comparing transparency across markets in such a dynamic environment.

From the perspective of public policy, it does not really matter whether the U.S. natural gas market is more or less transparent than other markets. (Just as it does not matter whether index prices are derived from a large number of fixed-price transactions.) The real issue is whether the level of transparency in a particular market is sufficient to provide participants with the information they need in order to make informed decisions. Are prices available in real time and do they reflect supply and demand? In the natural gas market, the answer is yes. It is doubtful whether there are any regulatory steps that will increase transparency and whether these steps will have significant enough benefits to justify their costs. [10]

To sum up, the critical point with respect to transparency is that there are many thousands of market participants and they have prompt access to prices in the physical

[10] There is one regulatory change that would improve the market. State and local regulators should ease their restrictions on the use of futures and other financial instruments by natural gas utility companies.

market and real time access to prices in the financial markets. In the physical market, participants can use this information as the basis for negotiating a fixed price transaction or they can base the price upon an index that is based upon fixed price transactions. In the financial market, they can use this information to buy, sell, hedge, speculate and arbitrage over time and location. The combination of transparency on both the financial side and the physical side make the U.S. natural gas market very close to being completely price transparent.

Conclusion

Markets are not perfect and do not always perform as desired; such is the nature of any real world institution. Unfortunately, if a market does not perform precisely as some wish, there is frequently pressure on regulators to change the rules. But they cannot make things perfect. Nor should they try to satisfy everyone who complains. This is often very difficult to do when faced with strong political pressure to do something about some perceived inefficiency or unfairness or undesired pricing level. There is, therefore, the very real danger that overzealous regulation will generate inefficiencies that will then be used to justify more regulation. Thus, a major challenge for regulators is to balance the benefits and costs of new rules and regulations and recognize that a healthy market does not necessarily mean declining or less volatile prices.

It was inevitable that a change as dramatic as price deregulation of the U.S. natural gas market and the ensuing evolution of the natural gas market would generate losers as well as winners. That is simply the result of a market that works. Certainly, continued regulatory oversight is appropriate and some increased regulatory oversight may be desirable; but we

should also realize that regulation often does not lead to a better use of resources. In his classic article, *The Theory of Economic Regulation*, Nobelist George Stigler (1971) shows that the primary effect of regulation is usually reduced competition. In fact, although well meaning, many of the proposed actions to address concerns regarding fixed price transactions in the natural gas market would actually reduce competition and efficiency.

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ABOUT THE AUTHOR

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EDUCATION

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Assistant Professor of Economics, University of Iowa, 1965-1970

Associate Professor of Economics, University of Iowa, 1970-1982

Legislative Assistant to Senator Dick Clark, January-December, 1974

Professor of Economics, University of Iowa, 1982-2007

Associate Dean, College of Business Administration, University of Iowa, 1984-1988

Visiting Professor, University of the Andes, Merida, Venezuela, Spring 1986

Commissioner, Commodity Futures Trading Commission, 1988-1993

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Justice Professor of International Business, University of Iowa, 2000-2007

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William P. Albrecht, "The Development of Derivative Products in Asian Capital Markets", ASAF Electronic Journal, February 2001, pp. 8-13.

CURRENT RESEARCH

Regulation of Financial Services

Financial Markets and Economic Development

OTHER ACTIVITIES

Candidate for U.S. Congress, 1970

First Vice President, Midwest Economic Association, 1981-1982

Weekly television commentary, "Money Talk," 1985-86

Board of Directors, Iowa Insurance Education Fund, Inc., 1986-1988

Board of Directors, University of Iowa Community Credit Union, 1987-1988

Publisher's Advisory Board, Futures, 1993-1994

Chairman, Task Force on Derivatives, International Organization of Securities Commissions, 1993-1994

Director, Derivatives Project, Emerging Markets Committee, International Organization of Securities Commissions, 1994-1996

Global Scholar, University of Iowa, 1996-98

Consultant to World Bank and governments on the regulation of futures and options markets

Catalyst Institute Scholar, 1996-1999