On the Use of Derivatives in Ukraine

John P Crowley
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Executive Summary

Financial innovation is driven by need, usually as a solution to an economic problem. Derivatives are a classic example of a financial market response to a set of problems in the real economy. They are an important and constructive business tool to improve the predictability of many economic events, manage risk and safeguard investments.

Risk and uncertainty are disincentives to business expansion and investment. However they are rife in the volatility of currencies, commodities, interest rates and many other revenue and cost components. If that volatility can be muted, economic expansion, job creation and investment can be encouraged.

Such risks arise more broadly in Ukraine than in many other economies because of the role of international trade and therefore the value of the Hryvnia is conspicuous. More than 50% of the debts of Ukraine are denominated in US Dollars creating extreme exposure to exchange rates. Similarly visible is the cost of imported natural gas and to a lesser extent crude oil. These might not be as significant if Ukraine were not also so exposed on its outputs such as pig iron, wheat, corn and steel.

All of these risks could be hedged in the medium term by the use of derivatives. A derivative can allow a business or investor to contract for the opposite risk that is embedded in their business. The net result of the two mirror risks should be to reduce the volatility or unpredictability of the business or in a macro sense the overall economy. It should be understood however that a financial instrument is rarely an exact mirror of a business risk (unless it is also a financial instrument) and therefore an efficacy risk is attached to derivatives.

Derivatives can be structured around many tangible and intangible asset classes. Those applicable to Ukraine include currencies, interest rates, natural gas, crude oil, pig iron, wheat, corn, steel, fertilizer, rapeseed, equity indices, individual equities, credit risk, weather and electricity.

Trading of derivatives can be very liquid. For example CME-NYMEX crude oil trading routinely reaches USD 650 billion per month. S&P 500 equity index contracts have an aggregate notional value of USD 1.1 trillion.

While derivatives have evolved and grown substantially in recent decades they are not new. They have existed since at least the 17th century and exchange traded derivatives date to the 1860s. Since then they have broadened far beyond physical commodities to currencies, equities, interest rates and credit risk.

The size and breadth of the market combined with recent media attention give the impression that derivatives are complex. While some are structurally complicated they are typically straightforward. It is a contract between two parties the value of which is related to, or *derives* from, another specified asset. If I agree to sell you USD 1,000 anytime before December 31, 2009 for UAH 9,500 that agreement is a derivative because the final value will derive from the actual spot exchange rate on December 31. The underlying asset is the US Dollar. The notional amount is USD 1,000. The market value would be substantially less as it would cost you UAH 9,500 to exercise the derivative (utilize your right and buy the US Dollars). The value of the derivative before December 31 would be determined by trading in the market. However if the exchange rate on December 31 is say UAH 9.75 to the US Dollar then the derivative will be

worth UAH 250 at the close on December 31. The price you are willing to pay for the derivative (UAH 250) plus the cost to exercise (UAH 9,500) equates to the hypothetical December 31 spot price (9.75 times USD 1,000). Any lower derivative price would attract arbitrage. Current trading in London in the UAH:USD contract suggests 250 would be the value.

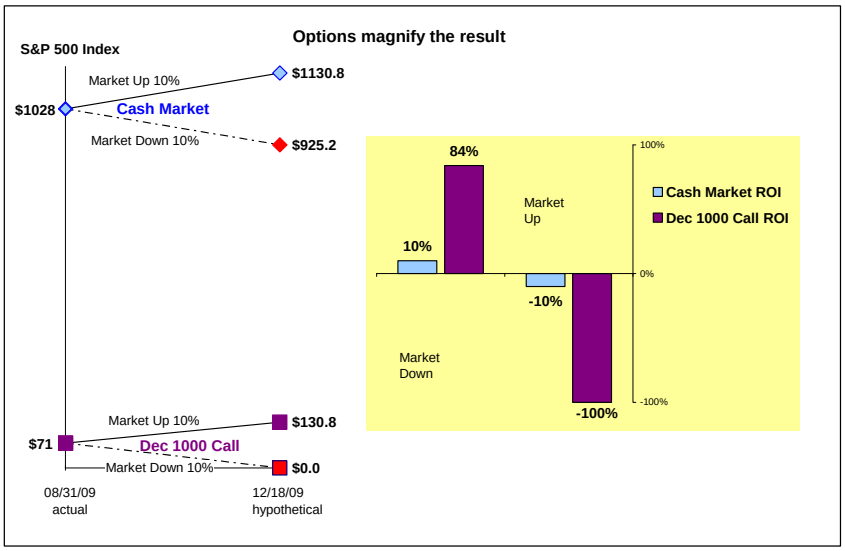
If you know you will have a need for US Dollars on December 31, such as to pay a debt or purchase natural gas, then the derivative is a hedge. That is you no longer have the risk that your US Dollar debt becomes more expensive as measured in Hryvnia so you are hedged. If you do not have such a liability or other need then your derivative purchase is speculating.

Derivatives can be designed along three broad structures; forwards, options and swaps. A forward is a contract to buy an underlying asset at a specific date at a specific price. Both sides agree to fulfill the agreement, one to pay, one to deliver the underlying asset. If the price and date are standardized then a forward can be traded on an exchange and is called a future.

An option is similar but gives one party the right, but not the obligation, to complete the underlying asset sale. A swap is a contract to exchange cash flow streams over a specified period.

If the underlying asset is a physical asset, such as oil or wheat, considerable detail must be established on an exact description including quality and delivery terms. Where the underlying is an intangible asset, such as currency or equity shares, the delivery mechanism is much simpler, usually electronic. If actual delivery is not intended or is restricted then a derivative can be structured as non-deliverable forward (NDF) and the parties settle the difference between spot market and strike price at expiry in an agreed currency, not in the underlying asset.

Where derivatives are meant as hedges the concept is that the derivative has the opposite risk of the existing business risk. By example, as a wheat farmer you already have the risk that the price of wheat will decline and buy a contract that increases in value as the price of wheat declines. If wheat prices go up the contract value goes down and vice versa. Because a derivative is designed to capture the change in value of an underlying asset, rather than the total value, it is more volatile. The change in value of the underlying asset represents a much larger percentage of the derivative because the derivative value is based on just the band of expected change rather than the entire value of the underlying asset. This is the embedded leverage of a derivative which exists even if borrowing is not used to enter the derivative. This concept is best described using an example.



In this chart the present value of the S&P 500 index and S&P 500 December 1000 call are actual trading results. In the theoretical case where the market increases by 10% the cash buyer (buying the index itself) earns 10% but the option buyer earns 84%. In the theoretical case where the market declines 10% the cash buyer loses 10% but the option buyer loses 100%.

This highlights the embedded leverage in a derivative. In the derivatives market both the gain and loss are greatly magnified relative to the same set of circumstances in the underlying market.

The fact that derivatives, whether used as a hedge or for speculation, are volatile does not discount their role in managing risk. The most basic component of a derivative is that it has two parties. For each party that enters a derivative as a hedge there is not always a party with the opposite risk such that the contract is a hedge for both. In order to encourage the market and offer greatest liquidity for those that are hedging it is useful to have the widest possible participation. Therefore speculators should not be barred from participating in the market except for reasons of credit quality.

The most pressing need for derivatives in Ukraine is for currency hedging. Approximately half of corporate debt in Ukraine is denominated in US Dollars. Problematic access to Dollars for repayment has already led to a wave of restructurings. Further because of the jump in the value of those debts as expressed in Hryvnia, corporate balance sheets are much more levered than they were. In addition nearly three quarters of sovereign debt is denominated in US Dollars.

As a trading power, Ukraine needs access to Dollars and Russian Rubles (RUB). Almost one third of Ukraine's trade is with Russia. Exporters and importers, as well as borrowers, need the predictability of what price they will pay or receive for those currencies. In addition to the volume of exchange needed it has been extremely volatile. The Hryvnia is 40% lower against the US Dollar than at the beginning of the crisis, and down 14% against the RUB this year.

Hryvnia forwards already trade in London but that market is not a solution for two reasons. First it is not available to domestic investors who would need offshore accounts to participate. Second because of currency restrictions in Ukraine the contracts are traded in non-deliverable structure (NDF) so the necessary conversion is not effected.

Prospects for currency derivatives trading are indicated by the success of RTS. There USD:RUB futures trading is currently averaging US $ 39 million per day.

While by traditional standards Ukraine overall is not a highly leveraged economy the cost of borrowing is still important. Applicable interest rates have two components, the risk free rate and the spread, or risk premium. Both have been volatile in Ukraine although much of the risk premium volatility has occurred in the last year. Derivatives to reduce volatility in the risk free rate or general level of interest rates in other currencies have a longer history. Because borrowing has a long term element derivatives of interest rates are ordinarily structured as swaps. By notional amount interest rate swaps represent approximately half of all OTC derivatives and their growth was little affected by the turmoil in the capital markets of 2008.

Derivatives on spreads, usually structured as credit default swaps (CDS), have a shorter history. These were much more volatile in 2008 and through 2009 and the market has shrunk in response. A market in Ukraine for CDS is unlikely to be very liquid in the near future.

By a very substantial margin natural gas is Ukraine's largest import. From even the general press in December of each year it is clear that the price at which Ukraine buys natural gas is critical to the economy. However, because of delivery constraints and the methodology for determining the actual price, this key economic input cannot be hedged. In a sense the annual fixed price and related term contract is a one year hedge for the direct participants.

Gazprom has stated its intention to align the Naftogaz contract with world prices but this has not yet happened. We calculate that the announced price for Russian gas to Naftogaz does not correlate with the global spot price over the last four years. It would be possible going forward to hedge this key component but only if the agreed price tracks the global price.

Crude oil, Ukraine's third largest import, is the most commonly traded derivative in the world. The price of oil is also highly volatile with crude trading over the last five years from a low of just 29% of its 2008 peak. Because of its economic importance, its volatility and its global commoditization oil would be an excellent candidate for derivatives trading in Ukraine. RTS weekly trading for example is currently running at RUB 3 billion per week in crude oil futures.

Derivatives are also applicable to many of Ukraine's commodity exports. Pig iron, the largest export, is a relatively standardized product which could be contracted under a derivative. In fact there is no exchange trading of such futures but with the important role of Ukraine in conjunction with Russia trading could be centered here. As the cash price has been quite volatile in the last decade there might be good demand for such an innovation.

Ukraine is a major producer and exporter of grains as well including wheat, corn and barley. All of these products have experienced price volatility in the last two years. Grain futures have been exchange traded around the world for well over a century. Annual trading of wheat futures on Chicago Mercantile Exchange average more than USD 400 billion and trading in corn futures is even greater. A contract for a Ukrainian port delivery agricultural commodity (perhaps Kherson) would probably be very liquid as the demand is global. This would be particularly valuable to smaller growers that don't necessarily have access to foreign derivatives markets, as most large exporters do.

Another significant physical commodity, steel, is Ukraine's third largest export. Producers generally can not forecast the price for their output and the spot price for rolled steel plate, as a benchmark, has been volatile. In certain transformations there are futures on steel but they are limited. Since Ukraine and Russia together represent eight percent of world production an Eastern Europe delivery contract could trade in Ukraine and attract volume when global growth accelerates.

In terms of volatility Ukrainian equities have a dramatic history. In the last two calendar years the PFTS index has traded as low as 16% of its peak, more volatile than any other underlying asset class. Derivatives on equities and equity indices are among the most liquid contracts worldwide. However the liquidity of the underlying asset in Ukraine is quite low.

The average daily trading of equities on PFTS in July 2009 was only UAH 7.4 million. This low volume means that traders would be wary of relying upon the price determination of the index for the derivative contract expiration. Volumes for individual issues are far lower with the most active index component trading an average of UAH 700 thousand daily. Therefore derivatives on individual stocks would likely attract little interest in the near term.

It is possible to make an extrapolation of Russian equity derivatives trading to the Ukrainian market. Applying the RTS trading relationship to the combined PFTS and UX secondary equity trading implies daily equity derivatives trading of UAH 5.2 million per day.

As a security, a derivative carries all of the generic risks of contracts. Moreover a derivative introduces certain unique risks, in particular counterparty risk. Unlike other securities trading there is a credit risk introduced in the contract itself (in addition to any credit risk in the underlying asset). This is because a derivative trade has a term element before it is fulfilled. Therefore there is a continuing, sometimes long term, risk that the seller or buyer may default on its obligation, thereby making the derivative worthless. This is counterparty risk.

When derivatives are used to hedge there is a risk of lack of efficacy or mismatch. That is, some risks have a clear matching derivative, such as a US Dollar liability that can be offset by a US Dollar call option. However any number of mismatches can otherwise occur. For example a

wheat producer may forward sell wheat in a certain amount and then not produce that volume of wheat. A lack of efficacy is more common in tangible underlying assets because of changes in quality, production and transport. But there can still be problems with intangibles if expiry is not aligned for example.

Ukraine has an opportunity to benefit from some of the mistakes in other countries and design a market structure that mitigates the principal systemic risks of derivatives. It is not possible or desirable to eliminate risks of the derivative contracts themselves as they are designed to transfer risk which implies that some investors remove risks while others take risks. The aim is to have a functioning market which is sound and does not threaten the broader economy and actually increases economic activity by enhancing predictability.

This can be accomplished by requiring a common counterparty (CCP) to establish and maintain a higher standard of credit risk-taking as well as allowing ease of market regulation. From the perspective of the investor the counterparty risk is mitigated as the CCP has a known level of capital, a strategy dedicated to stability and credit requirements of its own. The counterparty risk is not eliminated but it is controlled and isolated.

The CCP controls its risk and therefore that of the market overall by setting position limits for each investor and requiring collateral. If an investor has a position that is losing value (for example selling future wheat when the spot market is rising) they can be required to deposit collateral to protect the CCP from default.

A stable functioning market will also benefit from a requirement that derivatives must be exchange traded unless an exception has been granted in advance. Exchange trading provides both the essential data to set collateral requirements and the exit mechanism for the offsetting position. Exchange rules would exclude the defaulting counterparty from further trading.

While the CCP benefits from exchange trading the exchange also gains from the CCP. A derivative is far less transferable when such a sale requires reconsideration of the counterparty. Ordinarily such a transfer would therefore require the permission of both sides. With a CCP the sale of a derivative does not entail a change of counterparty. This makes the investment much more liquid and should encourage trading and greater liquidity.

The requirement of exchange trading also incorporates into the market the exchange rules. These should only emphasize the integrity of the market and not act to quell the inclusion of speculation. It is in the interest of Ukraine and the market to have maximum liquidity in derivatives. It will provide the best pricing and encourage investment in the underlying assets which eventually will include government securities and equities.

In order to allow exchange trading it will be necessary for derivatives contracts to be somewhat standardized. That is not a particularly limiting requirement in that any underlying asset that can be delivered can sustain a derivative. At the present time that excludes only currencies; which could still be traded NDF.

The vast majority of derivatives contracts can and should be structured along standard terms in order to provide for the liquidity, trading rules and transparency of exchange trading. However there will be uncommon situations where unique terms are called for and innovation of structures and new underlying assets should not be discouraged. The regulator should be authorized to permit OTC contracts only on an exceptional basis with prior approval and with demonstration that the contract can not be suited to exchange trading.

I. Introduction

There currently is essentially no domestic derivatives market in Ukraine. Some commodities contracts are from time to time structured as forwards and occasionally a small currency forward contract is completed. We are aware of at least one interest rate swap which was entered earlier in 2009. None of these has been traded in a secondary market as far is known however. Most participants take the view that without legislation specifically permitting derivatives the contracts could be voided, potentially in an opportunistic way. It is likely however that major Ukrainian corporations and wealthy individuals have accessed the global derivatives markets, which include Hryvnia forwards.

To clarify the situation a draft law was proposed to the Verkhovna Rada on December 30, 2008; the draft law on derivatives # 3583. The draft was circulated to members on February 17, 2009. According to the Secretariat the draft has been assigned to Section II of the Rada agenda since that time. This indicates it is not ready for consideration and may need study and recommendation by the Finance and Banking Committee.

The draft law on derivatives is basically enabling legislation. It creates the concept of a derivative, and permits derivatives contracts to be issued on a broad basket of underlying assets. These include physical commodities, securities, currencies and interest rates. Derivatives are defined to incorporate most structures including forwards, futures, options, swaps and warrants. Importantly the draft allows for secondary trading of derivatives. The draft requires registration of the derivatives specifications with the Securities and Stock Market State Commission (SSMSC), and generally implies that the SSMSC would be the regulator for derivatives. In at least one part of the draft trading would be limited to licensed stock exchanges; in other parts trading would be only on licensed derivatives trade organizers.

Consideration of this draft and the limited market activity in derivatives in a country that could benefit from them, provides impetus to review the benefits of derivatives, their history, risks and market structures to mitigate that risk.

History

While derivatives have evolved and grown substantially in recent decades they are not new. The earliest recorded derivatives were rice futures in Osaka Japan in the 17th century. Until the 20th century derivatives were almost entirely based on agricultural commodities. Grain forwards were created in Chicago in the 1850s to, among other things, provide certainty to farmers on the price of their output. As a geographic center and transportation hub of the enormous Midwest agricultural belt of the United States, Chicago became the focus of financial innovation. The Chicago Board of Trade was the major spot market. Forward contracts were standardized in the 1860s which allowed for centralized trading in volume. In 1874 the Chicago Produce Exchange was established which became the Chicago Mercantile Exchange and now the CME Group, the largest derivatives exchanges (including NYMEX) by contracts, notional value and trading.

In the 1970s CME introduced the first currency futures and then interest rate futures. In the 1980s the Chicago Board Options Exchange introduced futures and options on an equity index for the first time. The S&P 500 index option has grown to be the most actively exchange traded derivative in the world. In the 1990s credit default swaps were introduced in London as an over-the-counter (OTC) contract with the first underlying credit as Exxon (now ExxonMobil).

Utilizing derivatives

A derivative is not necessarily a complicated instrument. It is a contract between two parties the value of which is related to, or *derives* from, another specified asset. The asset from which the derivative contract derives its value is referred to as the underlying asset. If I agree to sell you USD 1,000 anytime before December 31, 2009 for UAH 9,500 that agreement is a derivative because the final value will derive from the actual spot exchange rate on December 31. The underlying is the US Dollar. The notional amount is USD 1,000. The market value would be substantially less, as it would cost you UAH 9,500 to exercise the derivative (utilize your right and buy the US Dollars). The value of the derivative before December 31 would be determined by trading in the market. However if the exchange rate on December 31 is say UAH 9.75 to the US Dollar then the derivative will be worth UAH 250 at the close on December 31. The price you are willing to pay for the derivative (UAH 250) plus the cost to exercise (UAH 9,500) equates to the hypothetical December 31 spot price (9.75 times USD 1,000). Any lower derivative price would attract arbitrage. Current trading in London in the UAH:USD contract suggests 250 would be the value.

If you have a debt coming due at yearend that is denominated in US Dollars then your purchase of the above derivative would be a hedge. That is, you no longer have the risk that your US Dollar debt becomes more expensive as measured in Hryvnia, so you are hedged. If you do not have such a liability, then your derivative purchase is speculating. Similarly, if I do not have US Dollar assets or revenue to offset the derivative then I am speculating. As a derivative requires two parties then some speculating is probably necessary in order for trades to be entered.

Derivatives can be designed along three broad structures; forwards, options and swaps. A forward is a contract to buy an underlying asset at a specific date at a specific price. Both sides agree to fulfill the agreement, one to pay, one to deliver the underlying asset. If the price and date are standardized, then a forward can be traded on an exchange and is called a future.

An option is similar but gives one party the right, but not the obligation, to complete the underlying asset sale. A “call” option is one where the buyer has the right to complete or not. A “put” option is one where the seller has the right, but not the obligation, to force the sale.

A swap is a contract to exchange cash flow streams over a specified period. Swaps are the structure most commonly used for interest rate derivatives, where one party accepts a floating rate stream in return for a fixed rate stream of payments.

Where the underlying asset is an intangible financial asset (equities, equity indices, currencies or anything that can exist in book entry form) the terms of a derivative can be straightforward. Where a physical commodity is underlying the contract, then considerable further definition is required. The derivative must spell out a more detailed description of the asset including quality, and delivery terms. For example the Euronext wheat contract incorporates 100 tons of wheat which may not have impurities of greater than 2% or moisture of greater than 15% by weight. The NYMEX natural gas contract requires fulfillment by delivery at Henry Hub, a gas pipeline junction in the US state of Louisiana. The Liffe cocoa contract spells out quality and determination processes and permits delivery to just eleven European cities.

Some derivatives contracts are structured as non-deliverable forwards (NDF) or futures. Under such a contract the seller does not actually deliver the underlying asset on which the derivative is based but instead pays the amount of the gain (market price less strike price), if any, to the buyer. This element must be a part of the agreed contract structure up front. This feature is most common where the specific delivery is not intended or where there are restrictions on the underlying asset. Hryvnia futures are currently structured as non-deliverable because of currency controls that make it very difficult to exchange US Dollars for Ukrainian Hryvnia. A

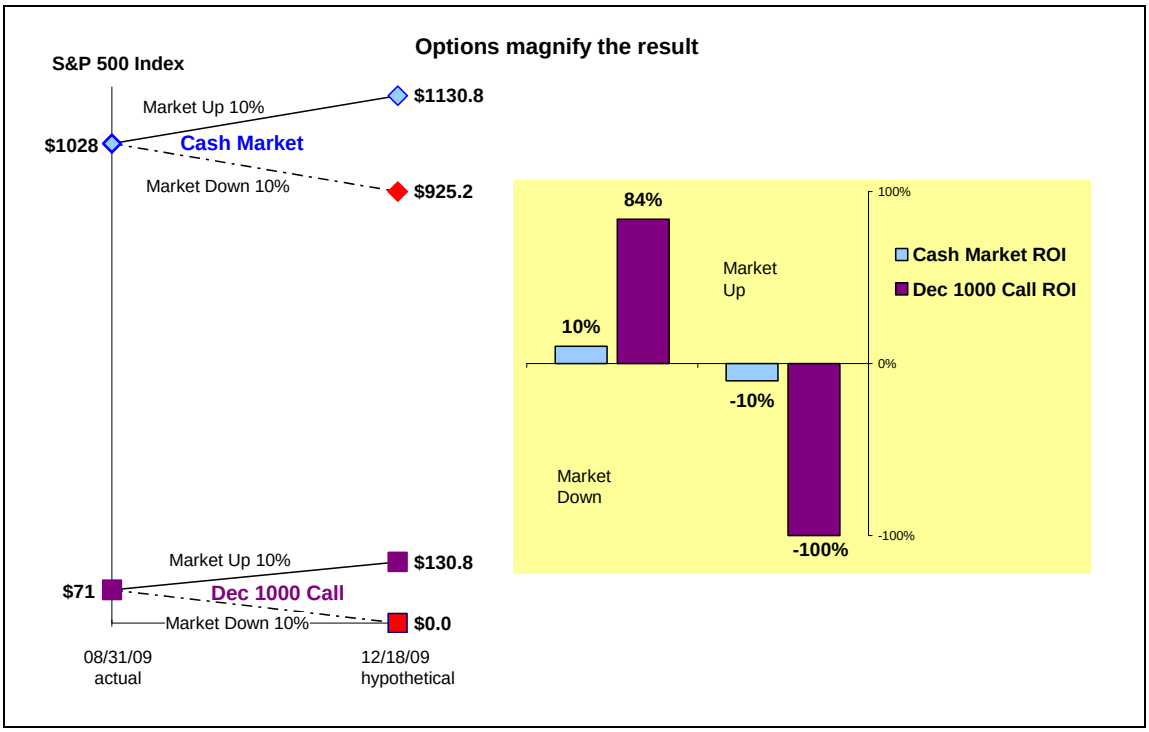
contract may be structured as NDF on natural gas if, for example a buyer wanted to hedge future costs of gas based on the most liquid market but then buy natural gas in another market because of location.

Once a derivative is designed and documented in the form of a contract it can be traded in the secondary market. Trading can be done either over-the-counter (OTC) or on an exchange and the same is true for primary issuance. Exchange trading requires a considerable amount of standardization of the contract terms in order that the contracts are fungible and to encourage volume. If an asset can be defined in a way that makes it consistent and available in volume then exchange trading becomes feasible. If the price fluctuates then trading becomes desirable both to the industrial customer (for hedging) and to the investor (for speculation).

Embedded leverage and volatility

By the nature of their structure derivatives are more volatile than the underlying assets for which they can act as a hedge. This is because derivatives are intentionally tied to the change in value of the underlying asset which is after all the risk they are aimed at offsetting. The change in value of the underlying asset represents a much larger percentage of the derivative because the derivative value is based on just the band of expected change rather than the entire value of the underlying asset. This is the embedded leverage of a derivative which exists even if borrowing is not used to enter the derivative. This concept is best described using an example.

The below chart indicates the hypothetical changes in value of a derivative at the expiry date of an actual exchange traded option under two different assumptions. This is not an estimate of the value of the derivative during the contract period but only at the expiry. In this case the underlying asset is the Standard & Poor's 500 Index which is a weighted equity index of 500 of the largest companies listed on US securities markets. The derivative is a call option on the S&P 500 index with an expiration of December 18 2009 and a strike price of 1000. That is, the contract gives the buyer the right to buy the index at 1000 in the amount of USD 100 per contract, so a notional value of US$ 100 thousand. The strike price (the price to actually buy the index upon expiry) would be set somewhat arbitrarily but the option price (the cost to buy the option now) is set by trading on the CBOE. Looking at the left area of the chart in the cash market the S&P 500 index is currently valued at 1,028 and on the Chicago Board Options Exchange the most recent price of the option is 71. The right section of the chart shows the effect of two hypothetical scenarios.



Now consider what might happen between now and December 18. If the global equity markets improve and the S&P 500 index trades up 10% then in the cash market the underlying asset will be at 1130.8. Excluding dividends this represents a 10% gain or a 35% annualized return on investment. During the life of the option the relationship between the underlying cash market (the index) and the derivative (the option) will move broadly in the same direction. The exact relationship will depend on the volatility of the markets and in a down market the parallel may disconnect because the option value can never go below zero (because you have the right but not the obligation to buy the index). However at market close on the date of expiry the option value will be exactly the difference between the strike price and the index value. If the index value is above the strike price you can execute the option and then immediately sell the index for the profit setting the final option value. In the scenario where the market increases by 10% scenario then the option value on December 18 will be 130.8, a gain of 84% or a 294% annualized return on investment.

In the scenario of the market declining and the S&P 500 index trading to 925.2, then in the underlying market you would have a loss of 10% or a -35% annualized return on investment. However in the derivative (the option) you now have the right to buy the index at a price higher than you can do so in the spot market. At close of business December 18 this option is worthless. Therefore the loss on the derivative is 100%.

This highlights the embedded leverage in a derivative. In the derivatives market both the gain and the loss are greatly magnified relative to the same set of circumstances in the underlying market.

As a hedge however the derivative has the opposite effect. In the example above you might be a pension fund that is contractually due to receive an annual employer's contribution at year end. If you wait for the funds and the market rises you have an opportunity cost of -10% but with the option you would still have a gain of 3.1%. If the market falls you gain 10% if unhedged and gain 3.1% if hedged. So derivatives, when used as a hedge, provide greater predictability and stability.

II. Nature and use of derivatives in Ukraine

Derivatives are an important, perhaps even essential, business tool. With globalization and greater velocity of capital the search for arbitrage by sophisticated investors extends price volatility to every corner of the world. Managing a business (or an economy) through such shifting conditions requires every advantage that can be obtained by rapid analysis and action, flexibility and the financial engineering that derivatives can provide.

Planning for and anticipating the future is at the core of any successful business. It is certainly necessary for any capital intensive project to have a good sense over time of sales in units, product prices and all costs including cost of labor, cost of inputs and cost of capital. But even trading businesses benefit from some certainty of revenues and costs. Banks and other financial services companies which are central to all economic activity are also exposed to volatility, as the recent crisis has shown.

Benefits for Ukraine

At a macroeconomic level Ukraine is clearly exposed to currency volatility, changes in the price of natural gas and interest rates (both the global level and local risk premium). Individual companies face risks in the price of steel, coal, fertilizer, wheat, corn, rye, and rapeseed. All of these risks can be hedged to some extent, at least over the medium term.

The tool to hedge these risks is the derivative. By entering a derivative contract with the opposite dynamic of the embedded risk that a business already has, it can lessen or manage that risk. A company that mines and sells coal has the embedded risk that coal prices decline. It can enter a derivative contract to short coal in similar volume and the embedded risk is offset by the acquired risk. Coal futures are rarely available beyond three years and actual sales volumes may be different from the notional amount of the derivative. So derivatives generally do not eliminate a risk, they only decrease it.

Across a range of output and input variables, derivatives can therefore make a business much more predictable. This can encourage investment, hiring and innovation. When a company is more certain of its future it can justify deploying assets for growth and is likely to benefit from a lower cost of capital, offering further incentive to investment. In parallel this can lead to increased employment, search for new markets and research and development.

With financial innovation the types of risks that can be offset using derivatives has expanded. This reduces the overall risk of an enterprise, an industry or an economy. Derivatives have broadened far beyond the original wheat contract to other agricultural commodities, coal, steel, oil and gas, currencies, interest rates, equities and equity indexes, and credit risk.

Use of derivatives can be a stabilizing influence on a business or an economy. While derivatives had very much the opposite effect in the 2008 financial crisis, that is in part because of the structure of the derivatives market and the default of a large market participant. Those risks can be mitigated through careful market structure and regulation.

Ukraine and companies based here have a particular exposure to certain risks that could be muted through the use of derivatives. Not all risks can be measured in such a way as to be captured by a contract and intangible assets are more easily defined and hedged. Even the man in the street can identify currency volatility as the major risk in Ukraine. As of May 2009 50.5% of the debts of non-financial corporations in Ukraine were denominated in the US Dollar. For the government and banks it was even higher. As the Hryvnia has lost more than 40% of its value against the US Dollar in the last year, such Dollar denominated debts are daunting. In addition the country is exposed to fluctuations in oil and gas prices, its largest imports. Natural

gas has been very volatile in the last year, ranging from USD3.20 to nearly $13 per million British Thermal Units on the NYMEX. However it must be noted that the price of natural gas to Ukraine is not set directly in the open market. Ukraine's largest export, ferrous metals (iron and steel), has also been volatile with rolled steel plate ranging from USD 847 per ton to $1,307 per ton on LME just during 2008.

In addition Ukraine is a major exporter of cereals, oil seed and urea, all of which are traded commodities. Many of the major economic accounts of the country could be hedged over some period of time. Hryvnia derivatives essentially do not exist because of the inability to settle due to exchange controls. If the exchange controls were lifted the government and major corporate borrowers could probably hedge their US Dollar debt exposure. Machinery cannot be hedged as the product cannot be defined in a standardized fungible way, and natural gas imports cannot be exactly hedged because transport constraints do not allow access to the global market. Gas imports could be inexactly hedged, which may be worth considering.

Market prospects

While a derivative market in Ukraine will initially be illiquid, derivatives markets worldwide generally have grown rapidly and many contracts are very liquid. The CME-NYMEX Light Sweet Crude futures contract is the most liquid derivative contract in the world. Trading averages 11.4 million contracts per month representing 11.4 billion barrels or approximately USD 650 billion. Open interest (the total number of contracts outstanding) is 1.2 million, representing aggregate notional value of USD 72.2 billion.

Derivatives on other asset classes can also be very active and liquid. For example NYMEX natural gas contracts open interest have an aggregate notional value of USD 24.3 billion. Futures on EUR:USD open interest on CME total USD 16.9 billion. Aggregate contracts for corn on the CBOT currently have a notional value of USD 15.4 billion and for wheat futures a total value of USD 9.7 billion. Equity indices are particularly liquid because of the fungible nature of the underlying asset. S&P 500 contracts alone have an aggregate notional value of USD 1.1 trillion.

Equity index and single stock contracts are not limited to New York and London. The RTS, in Moscow, was recently ranked the ninth largest derivatives exchange in the world by number of contracts. Open interest contracts in the RTS index total RUB 35.4 billion, while the notional amount of contracts in individual stocks is RUB 4.3 billion for Gazprom and RUB 3.5 billion for Sberbank. In addition currency futures on the US Dollar (USD:RUB) alone total USD 485 million.

The Bank for International Settlements estimates that the total notional amount of all derivatives contracts globally at December 31, 2008 was USD 592 trillion and that the value of the contracts themselves totaled USD 33.9 trillion.

Versatility and utility

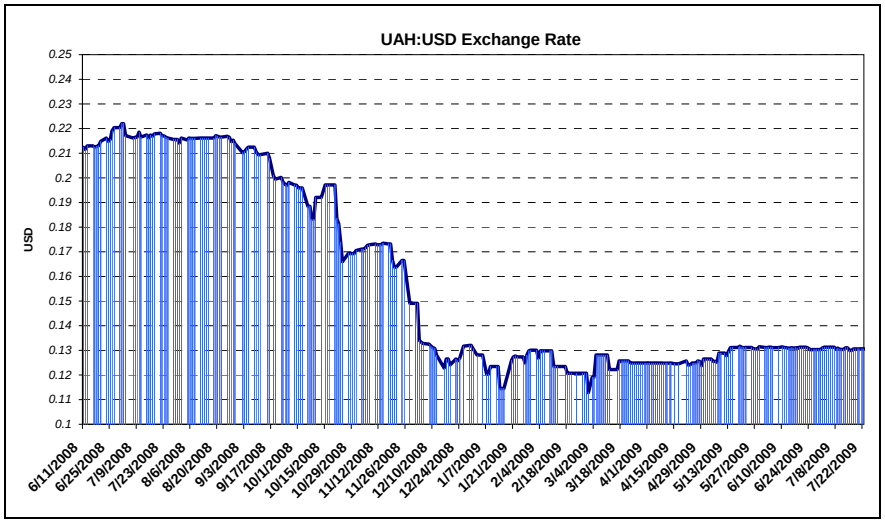
Derivatives have been designed around a range of asset classes thereby permitting companies and investors to hedge many of their most significant risks. The following analysis is ranked by the significance of the underlying asset to the Ukrainian economy with the greatest risk (currency fluctuation) first. Not all risks can be hedged inasmuch as not all risks can be measured or even identified. Further many exposures can not be commoditized as they are not inherently fungible. Ukraine's second largest import for example is machinery and equipment which incorporates such a disparate number of often specialized products that it can not be hedged.

In some cases risks are partially offset by other exposures. For example a borrower with US Dollar liabilities may have revenue generated in the same currency. However if those revenues are regularly converted to Hryvnia, to pay wages for example, this offset does not necessarily act as a hedge. Further there is likely to be a mismatch of timing if nothing else. Revenue is irregular and changeable while a debt maturity is fixed as to both amount and timing.

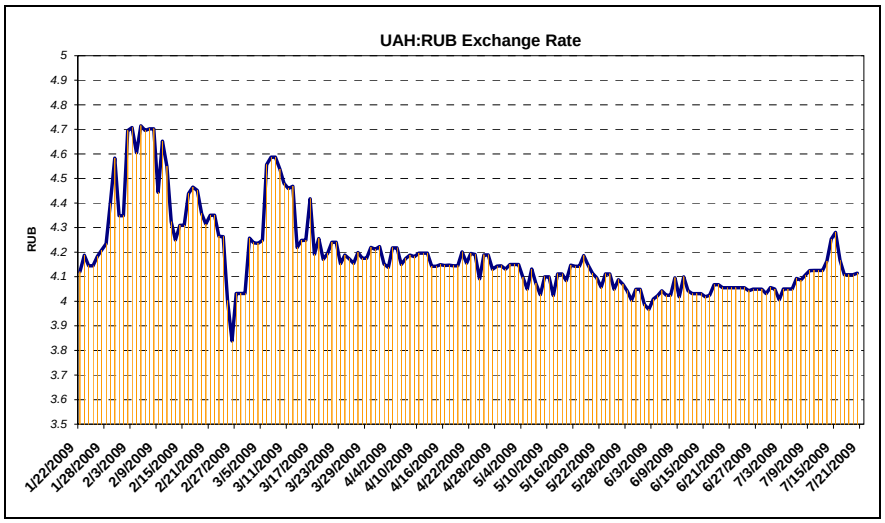
Currencies

Ukraine is an important trading power especially in ferrous metals and agricultural products. Globally in cross border trade the most common settlement currency is the US Dollar. However the largest individual trading partner for Ukraine is Russia, currently at about RUB 950 billion, representing 29.9% of total trade.

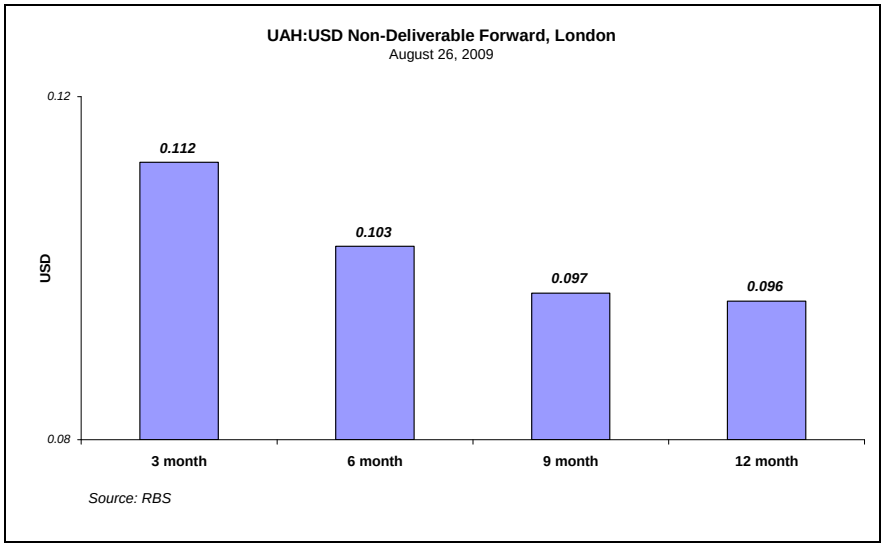
The exposure on the national debt is also significant. As of May 31, 2009 the total of public and government guaranteed debt was UAH 201.8 billion. Of this total, UAH 145.2 billion or 72% was denominated in a currency other than the Hryvnia (predominantly US Dollars). The private sector is nearly as much at risk, as 50.5% of the debts of non-financial corporations in Ukraine were denominated in the US Dollar. The chart below demonstrates the extreme volatility of the UAH:USD exchange rate over the last year and one half.



The financial and economic damage that can come from exchange rate volatility is already being seen across the country. Banks are restructuring their own debts as exemplified by the recent successful renegotiation of the terms of the Alfa-Bank Ukraine bonds and the ongoing discussions about Naftogas. XXI Century was also forced to restructure the terms of its Eurobonds. In the case of most corporate bonds the Hryvnia market value of their debts was marked up approximately 40% by year end 2008, while their mostly Hryvnia denominated revenue was stagnant or even reduced by economic conditions.



The effect of currency fluctuation on the current trading account was similarly problematic. Ukraine's largest trading partner is Russia so as the chart above indicates an importer from Russia would have experienced a 14% variation in cost from peak to trough just during this calendar year. Similarly an exporter would have faced volatility in its revenues. These measures apply to Ruble denominated transactions and as most commodities are priced and settled in US Dollars the volatility is far greater.



The above chart indicates the trend in UAH:USD non-deliverable forward trading in London. There are about five banks, mostly in London, which will act as brokers in Hryvnia forwards. The leading banks are Morgan Stanley, Royal Bank of Scotland and BNP Paribas. The market is very thin with daily volume of no more than $5 million and little liquidity beyond three months. Nevertheless it is possible with patience to find a counterparty for up to twelve months. The good news is that the market was becoming more optimistic, or perhaps less pessimistic, until about one month ago about the Hryvnia outlook. The bad news is that it currently indicates a yearend exchange rate of 9.75. While this would lead to further pain in the Ukrainian economy, it suggests that those with Dollar liabilities or Hryvnia assets should seriously consider hedging. Currently such hedges are not available to domestic investors and the offshore market does not offer a good solution. This is because the London market is by necessity in a non-deliverable (NDF) structure. As the Hryvnia is not readily convertible to US Dollar, the forwards are not settled in Hryvnia, so going long the Hryvnia in the NDF market does not actually provide Hryvnia. More importantly to take the short position against Hryvnia you must first have Dollars to trade, which as a Dollar borrower (i.e. net short the Dollar in the real economy) is the opposite of your real position.

The London Hryvnia NDF futures market highlights that derivatives are available to some Ukrainian investors. Investors with offshore operations or accounts may and do participate in derivatives markets elsewhere. Therefore the expertise to trade derivatives already exists in Ukraine. But those offshore hedges are denied to purely domestic businesses and domestic investors. Further, the Hryvnia futures market is not necessarily a good solution because it must be settled in US Dollars. In the case of other underlying asset classes the delivery terms reduce the efficacy of the hedges (see **Unique risks of derivatives** below).

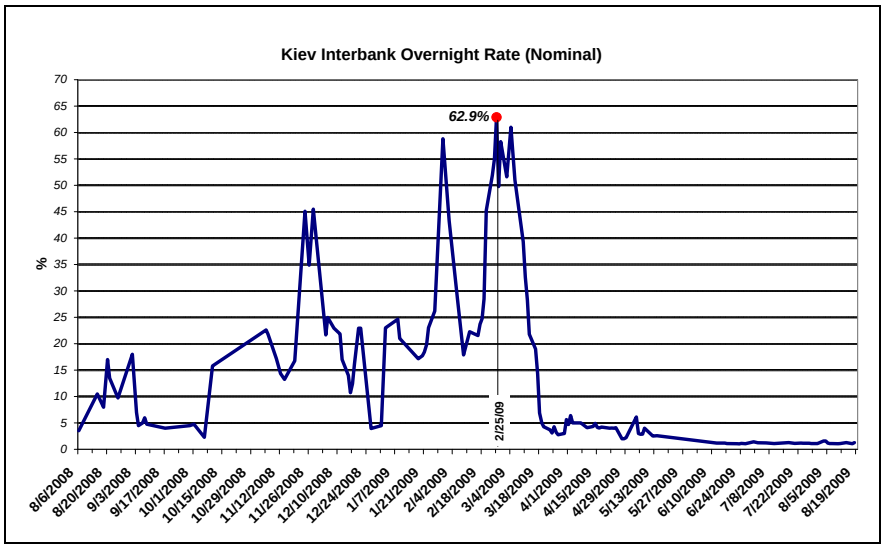
Real currency derivatives are probably the most important financial innovation that should be introduced to Ukraine. The magnitude of the exposure through debt instruments makes the US Dollar exchange rate one of the most important determinants of Ukraine's economic success. At least for the next few years until those debts are repaid and replaced by borrowing in another currency Ukrainian borrowers, including the government, will be at risk for exchange rate volatility. In fact if deliverable forwards were available it would facilitate borrowing in the Hryvnia. That is if Dollar, Ruble or Euro investors can hedge their currency exposure they would be much more interested in buying Hryvnia denominated assets.

In addition to the financial engineering advantages of currency derivatives, there is indication that trading volumes would provide for a profit opportunity. In the closest parallel Russian trading in the Ruble:Dollar spot market and derivatives market offer a forecast for Ukraine. On MICEX daily spot Dollar trading averages USD 6.8 billion while the RTS currency derivatives against the Dollar average US$ 39 million daily. Dollar spot trading in Ukraine at the NBU currently averages UAH 1.52 billion. Extrapolating the Moscow relationship to Kiev implies Dollar:Hryvnia forward trading of UAH 9 million daily. This compares favorably to the current trading volumes on both the PFTS and UX, suggesting currency derivatives alone could be as much as equity trading and likely as profitable.

Interest rates

Changeable inflation and currency fluctuations have led to volatility of interest rates in Ukraine in the last two years. The applicable interest rate to a corporate borrower (and similarly to the lender or investor) has two components: the general level of interest rates (the risk free rate) and the spread (the risk premium charged for a particular risk). In major markets both components can be hedged but the general level is usually more volatile and has a longer history of hedging.

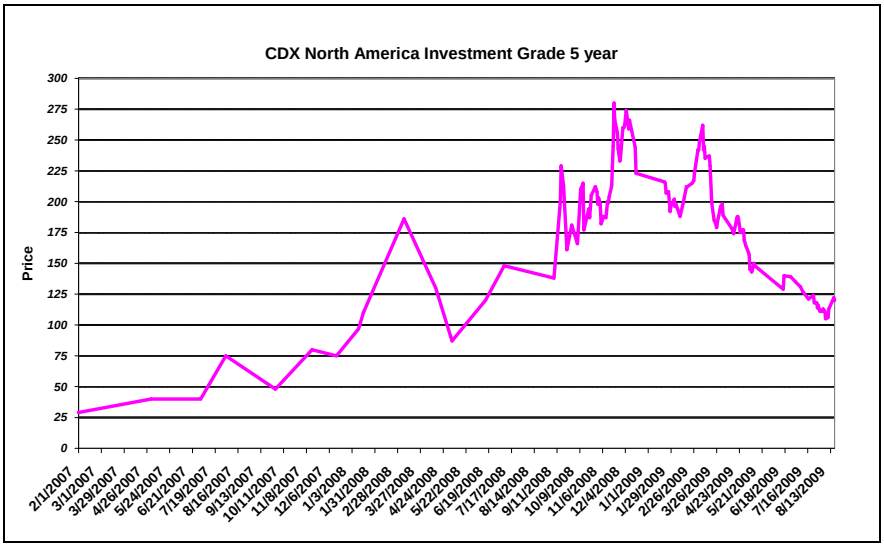
Because the capital markets in Ukraine are so illiquid there are few benchmarks of either the underlying level or spreads for borrowing rates. Both are essentially incorporated into the interbank lending rate as the rate applicable to domestic banks. The chart below shows the overnight Kiev interbank rate for the last two calendar years. The rate was 1.45% at the beginning of 2008, spiking several times during the global crisis and then reaching a high of 62.9% on February 25, 2009. It has since declined again to 1.1% most recently.



Borrowing rates are usually hedged with swaps because the risk exposure is essentially continuous rather than at a point in time. Swaps allow transfers of flows (streams of interest payments for example) rather than discrete assets (cash for wheat for example). However it is possible to create a structured derivative such as a future on a swap (see **Standard Contract Terms** below).

In a basic interest rate swap a borrower with a floating rate loan pays the counterparty at an agreed fixed interest rate, and the counterparty pays the floating rate (they are not taking each others liability just the interest rate risk). This provides a hedge on the level of interest rates or the base rate. Many Ukrainian borrowers have floating rate liabilities and because of the fairly common put feature in corporate bonds some form of interest rate reset is nearly universal. At year end 2008 there were US$ 328 trillion in notional amount of interest rate swaps globally, so this is still a very liquid market. The market value of the contracts is estimated at US$ 17 trillion.

It is also possible to hedge (or speculate) on the borrowing spread over the floating base rate (usually LIBOR in US Dollar denominated loans). This can be done through credit defaults swaps (CDS). A CDS is ordinarily an annual payment (therefore a flow) payable for the right to put a bond or loan at par value. Because the CDS market was a major component of the 2008 financial crisis (one of the biggest writers of CDS puts was AIG) the structure of the market is changing.

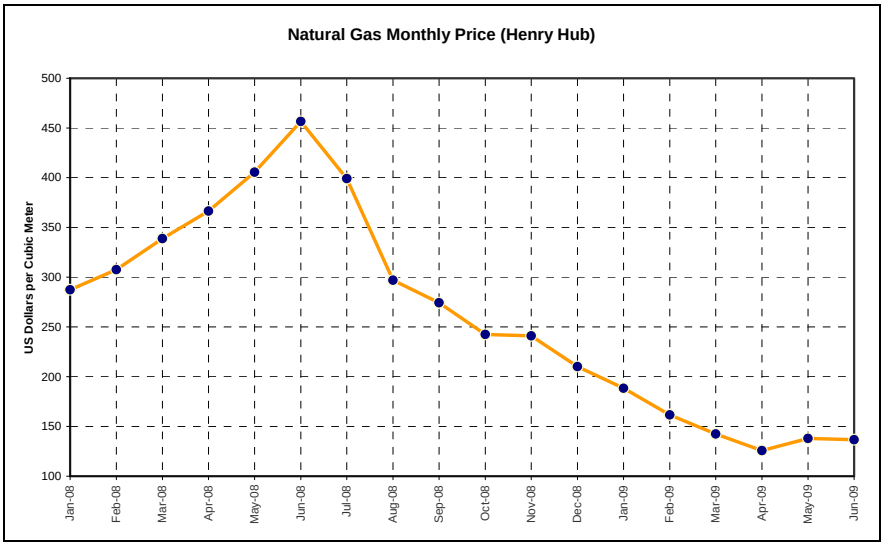


For new issue bonds or loans the spread is highly correlated to CDS prices (the annual payment or premium). Therefore with a CDS put an investor is protected (assuming no counterparty default) from a change in the market perception of the spread of a given bond or loan. The chart above indicates the volatility of spreads as measured by the North American Investment Grade CDX index. Because of the turmoil last year little in new CDS contracts were written in the fourth quarter and the global notional amount of CDS declined from US$ 33 trillion in June 2008 to US$ 26 trillion at year end 2008. For related reasons the market value increased from US$ 1.9 trillion in June to US$ 3.7 trillion in December reflecting the increased value of risk taking.

Natural gas

By a very substantial margin natural gas is Ukraine's largest import. From even the general press in December of each year it is clear that the price at which Ukraine buys natural gas is critical to the economy. However because of delivery constraints and the methodology for determining the actual price, this key economic input cannot be hedged. In a sense the annual fixed price and related term contract is a one year hedge for the direct participants.

Natural gas prices have been volatile globally with a low price in the last five years at just 26% of their October 2005 peak. Even in the last two calendar years the average spot price has been unpredictable as seen in the chart below. Consequently natural gas financial derivatives would be a valuable benefit to Ukraine in providing a dependable input price for business decisions.



In order to truly hedge the natural gas exposure it would be necessary to access the global markets. This access would have to be physical not just financial. Ukraine would need to connect with the African pipeline, Enrico Mattei, and/or construct LNG regassification terminal(s). As this has not happened presumably it is not economically justified and in any case not the subject of this report.

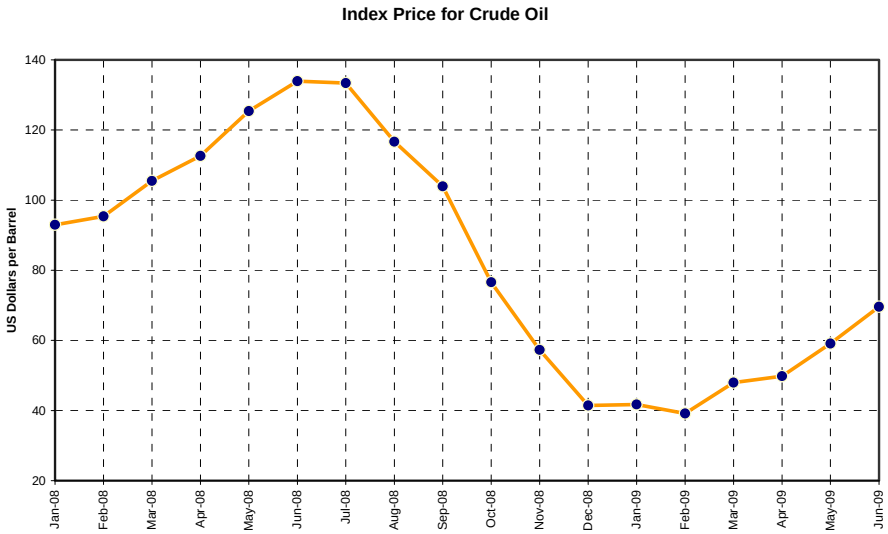
It may however be possible to construct an imperfect hedge of natural gas for the direct customer, Naftogaz, and for end users. Exact hedges are not always available for physical commodities because of delivery and are not always available for intangible assets because of controls or lack of demand. In such cases investors will often utilize proxy contracts. An example would be a rancher that raised and slaughtered bison, a popular beef substitute in the US. He could sell feeder cattle futures on CME as an asset that moves somewhat in tandem with bison meat prices. A bison meat decline in the spot market might be offset by a gain on the feeder cattle contract in the futures market. However the negotiated price of natural gas to Ukraine has a very poor correlation with the world price. Using the International Monetary Fund average annual global price and the published Naftogaz prices for 2006-present produces a

correlation coefficient of only -0.489. Therefore on a historic basis this does not appear to offer an effective hedge, although as the announced intention is to move toward world spot prices this hedge could work going forward.

Crude oil

Ukraine's second largest import is finished machinery which clearly cannot be hedged. However its third largest import, crude oil, is the most common commodity derivative in the world. Through May imports of crude oil totaled US$ 834 million according to the State Statistics Committee of Ukraine. In value this represents a 51% decline in part due to economic contraction but mostly because of global price trends.

Oil and its refined products have traded over a significant range for the last five years. At the lowest point in July 2004 prices were at 29% of the July 2008 peak. The chart below indicates the volatility of crude oil (as measured by an index of Brent, West Texas Intermediate and Dubai) on global markets just in the last two calendar years.

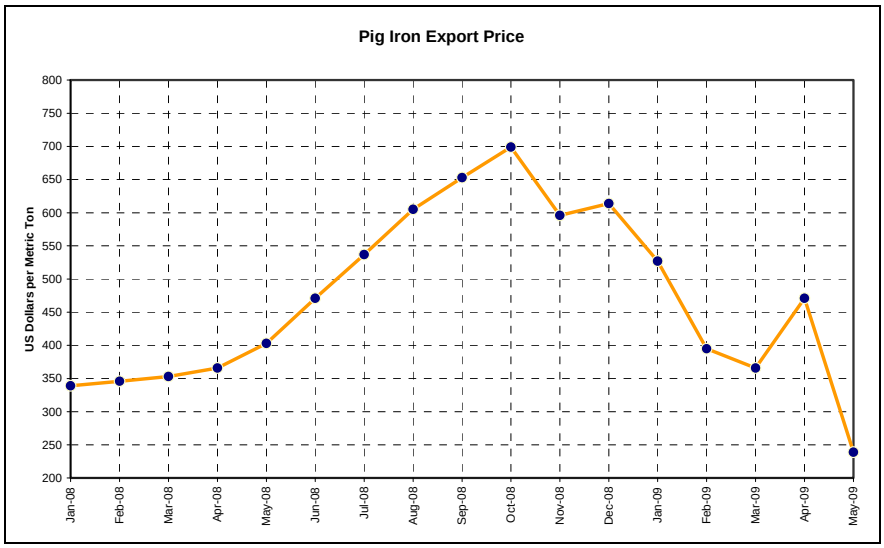


Contracts for oil in either deliverable of NDF structure could be very liquid in Ukraine. There is an active spot market on Ukraine Interbank Currency Exchange which routinely trades over UAH 500 million per session. On the RTS weekly trading volume in oil derivative contracts is currently running at a notional value of RUB 3 billion. This represents approximately 8% of Russia's weekly exports. Based on Ukrainian imports this suggests that derivative trading volume of oil contracts alone could be more than UAH 1.2 billion annually. This would nearly rival the volume of the existing PFTS equity trading.

Ferrous metals

Industry in Ukraine can also greatly benefit from price stability in its output products. Many of the goods that are produced here are highly commoditized and therefore can be readily structured into derivatives.

In 2008 Ukraine was the sixth largest producer of pig iron in the world, just behind the United States and ahead of highly industrialized Korea. It is the largest export of the country representing just under US$ 4 billion through May. The need for price protection becomes clear in the chart below as just in the last two calendar years the price has varied almost 100% from the January 2008 low of US$ 339 per ton and in early 2002 it traded at US$ 95 per ton.

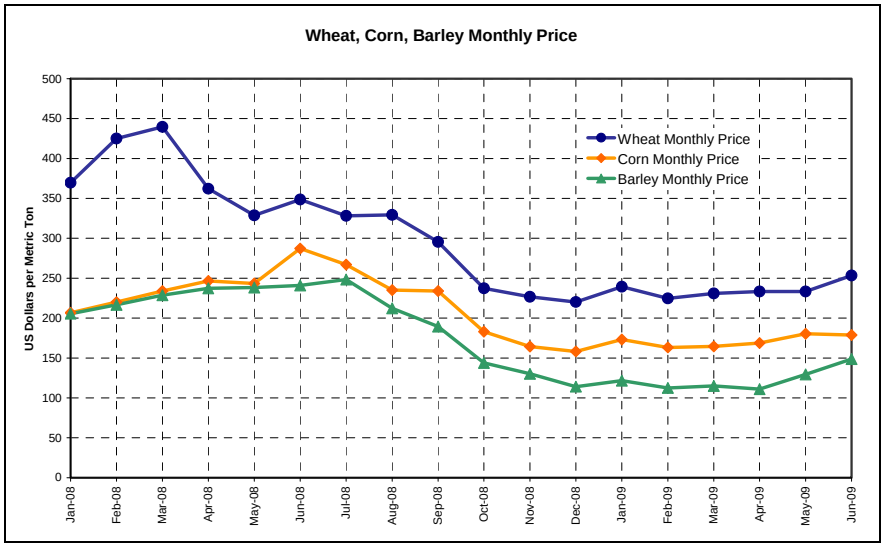


Derivatives do not currently trade on pig iron on any major exchange. However as Ukraine and Russia together represent nearly 10% of the world market a contract with an eastern European rail or shipping port delivery term could set a market. A Kherson, Mariupol, Odessa or Sevastapol pig iron contract could be the standard measure of this industrial product similar to the NYMEX Light Sweet crude or ICE Brent crude oil contracts.

Agricultural commodities

Through May Ukraine exported just under US$ 1.4 billion in cereals, its second largest export by value. For the nine months through March, Ukraine was the worlds leading producer of barley at 5.3 million tons, the third largest producer of corn at 4 million tons, and the fifth largest producer of wheat and wheat products at 10 million tons.

Because of production risks agricultural commodities are extremely volatile. This is in part why wheat was one of the earliest commodities to trade in a derivatives structure. Over the last five years world wheat prices have varied so much that at its low in August 2004 it was at just 32% of its high in March 2008. Similarly barley prices in September 2004 were only 34% of their high in July 2008. And global corn prices ranged from a low in October 2004 of 32% of their high in June 2008. As can be seen in the charts below, even over the last two calendar years barley prices have been as little as 45% of their high, wheat at 50% of the high and corn at 55% of its high price.

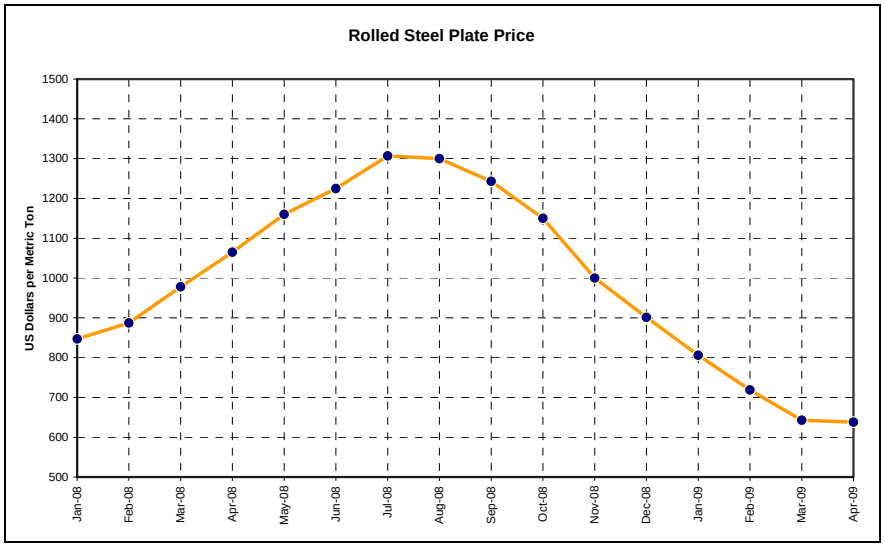


All of the grain commodities are traded in liquid derivatives on global markets. CME tends to dominate agricultural commodities futures trading with annual trading of wheat representing approximately US$ 443 billion in notional amount, and annual trading of corn representing nearly US$ 1.2 trillion in notional amount. Trading on the Intercontinental Exchange in barley is currently averaging US$ 10.4 billion in notional amount.

After currencies, agricultural commodities offer the greatest protection to the Ukrainian economy in terms of need, efficacy and volume of trading. We estimate that the wheat harvest alone is approximately US$ 4.0 billion for both export and domestic use. While exporters theoretically have offshore hedging opportunities the domestic producers do not. The relationship of futures trading to the cash market in the US is that daily futures trading represents 16% of the annual harvest during 2008. That suggests that the daily notional amount of wheat futures trading in Ukraine could be US$ 640 million when the market matures. Considering the export market there could be international demand for a Kherson Grain Terminal delivery wheat contract.

Steel

Steel and steel products are the third largest Ukrainian export. In 2008 Ukraine was the seventh largest steel producer in the world, just behind Germany. Through May of this year exports totaled US$ 809 million. The price of steel is highly sensitive to global economic activity, and consequently it has been very volatile in the last year. Utilizing rolled steel plate as a benchmark for steel the price just in the last two calendar years hit a trough of just 49% of its July 2008 peak.



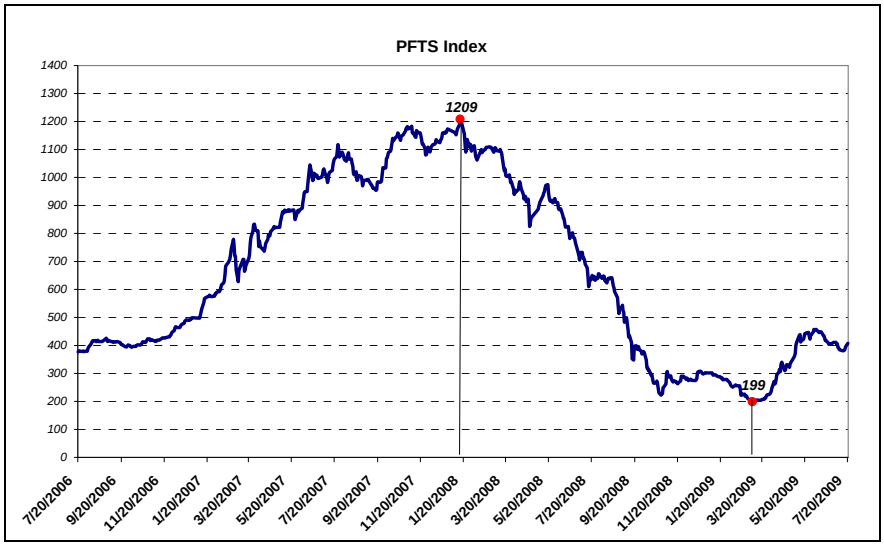
The volatility of this key output since January 2008 can be seen in the chart above. Even beyond the recent economic turbulence the price has been unstable. Over the last ten years the global price at its nadir (2001) was just 30% of that at its peak.

Futures on steel are traded on the London Metals Exchange but these are rebar steel contracts. Rolled steel is not traded on a futures exchange. However as Ukraine and Russia account for 8% of the world volume an Eastern Europe delivery contract could attract volume when global economic growth accelerates.

Equities and equity indices

After 2008 no one can fail to recognize the volatility of equities. Stock markets around the world soared in 2007 and plummeted in 2008 without exception. The most widely known

Ukrainian index, that most quoted by domestic and international press, is the PFTS index. It is a market capitalization weighted index of twenty of the major and most liquid Ukrainian companies. Four stocks represent 43% of the index; Zakhidenergo, Ukrnafta, Motor Sich and Ukrtelecom. In the last two calendar years the index has traded as low as 16% of its peak, more volatile than any other underlying asset class.



The table above indicates just the recent volatility of the PFTS index. In a fourteen month period the index traded at a low of 199 on March 6, 2009 and a high of 1209 on January 15, 2008. Ordinarily such mercurial performance would encourage hedging and benefit a derivatives market which after all requires volume to cover costs. Similarly there will be no speculation where there is no profit opportunity; traders want volatility. The market mechanics however are undone by a lack of volume.

The most recent report from the SSMSC indicates exchange trading during July of UAH 1.3 billion. However much of that was fixed income trading. The secondary equity trading on PFTS in July was UAH 177 million or UAH 7.4 million per trading day. This means that a trader could probably move the market, not to say manipulate it, on any given day with as little as UAH 2 million (US$ 250,000). Because a high proportion of trades don't settle it would be possible to influence the index for less and perhaps no cash at all. Expiration day of futures and options would probably experience greater volume and therefore it would be harder to move the index. But the specter of rigging would likely deter any trading in index derivatives.

There are several reasons for the limited volume on the PFTS, with competition from UX being one. Volume on UX in July was UAH 175 million, but in February, even before UX began trading, the PFTS only traded UAH 95.6 million in equities, UAH 4.8 million per day.

Individual stock derivatives are even more problematic. The average daily volume of trading on PFTS for July in shares of Zakhidenergo was UAH 0.7 million, in Ukrnafta UAH 0.7 million, in Motor Sich UAH 0.2 million and in Ukrtelecom UAH 44,000. The trading volume in the underlying individual equities does not allow a transparent pricing mechanism for a derivative.

It is possible to make an extrapolation of Russian equity derivatives trading to the Ukrainian market. RTS equity derivatives trading (index and individual stock but mostly index) averages RUB 29.8 billion daily. Daily trading volume on the underlying equities on MICEX averaged RUB 88.1 billion during 2008. Applying that same relationship to the combined PFTS and UX secondary equity trading implies daily equity derivatives trading of UAH 5.2 million per day.

III. Unique risks of derivatives

As a security a derivative carries all of the generic risks of a security of which enforceability of contracts is probably the foremost. Moreover a derivative introduces certain unique risks in particular counterparty risk. Unlike other securities trading there is a credit risk introduced in the contract itself (in addition to any credit risk in the underlying asset). This is because a derivative trade has a term element before it is fulfilled. In spot trading for example, particularly if settled by delivery versus payment, the concern about the reliability of the seller becomes ephemeral immediately upon settlement. In most derivatives the seller is obligated to perform at a future date and in many contracts the buyer has a commitment to complete. Therefore there is a continuing, sometimes long term, risk that the seller or buyer defaults in its obligation thereby making the derivative worthless. This is counterparty risk.

Counterparty risk can be managed for individual contracts in several ways. First a trader can make a credit decision on who they are willing to enter in to contracts with based on typical lending standards. However creditworthiness can change over time and some derivatives have very long terms, though most exchange traded contracts do not exceed one year. Further as an individual trader you may not know the total other derivative exposure of your counterparty. That is, a creditworthy counterparty can quickly become a problem if they have taken a substantial position in trades that go wrong. Further if the positions are short there is no limit on their losses (in a long position the underlying asset can not go below zero). This is compounded by the embedded leverage described above and can be further aggravated by use of explicit leverage.

When a counterparty takes substantial positions in a losing derivative or a portfolio of derivatives that are highly correlated it poses a systemic risk. If many market participants believe themselves to be hedged against a significant risk and the counterparty defaults they all are immediately encumbered by that risk again. If the perceived hedge has induced them to take greater risks the problem is magnified. The process of investors unwinding risks in a short time in great quantity can have severe broader consequences. Long Term Capital Management, Lehman Brothers and AIG are examples of individual traders that became systemic risks.

One mitigation for counterparty risk is to interpose a common counterparty (CCP) in to all derivative trades. This is discussed below in **Market structure**.

To supplement the credit decision a derivative investor can also require collateral, or margin, to partially secure the counterparty performance obligation. As discussed above in **Embedded leverage and volatility** the value of the derivative represents just a portion of the trading range of the underlying asset. Therefore the security can be a small fraction of the notional amount of the contract as well. As the seller still has the underlying and the buyer still has the cash in the notional amount there is no need to secure that portion of the derivative. Collateral becomes necessary from the seller to the extent the underlying increases above the strike price or from the buyer to the extent the underlying falls below the strike price. In an option because one side has no obligation there is no need for such protection but there is still exposure to the other side. Determining the appropriate amount of margin and arranging custody are discussed below in **Market structure**.

When derivatives are used to hedge there is a risk of lack of efficacy or mismatch. That is some risks have a clear matching derivative. For example if a Eurozone company with mostly Euro denominated revenue has a US Dollar denominated debt with a maturity of June 2010, there is a Liffe contract that allows them to short the Euro over that period. The derivative contract loses value as the USD debt declines in Euros and gains value as the debt increases in Euros.

However any number of mismatches can otherwise occur. For example a wheat producer may forward sell wheat in a certain amount and then not produce that volume of wheat. In addition to their business problem they then have what has become a speculative position on wheat. A lack of efficacy is more common in tangible underlying assets because of changes in quality, production and transport. But there can still be problems with intangibles if expiry is not aligned for example. Most exchange traded contracts have quarterly expirations so in the Eurozone example if the loan maturity date was May 31, 2010, there could be a timing mismatch. When a derivative on a particular underlying asset is used as a proxy for something else, as discussed above in **Natural gas,** there can be a serious mismatch. Long Term Capital Management famously used proxies with very high correlations to the risk they were trying to hedge but anomalous market conditions changed the correlation and the fund was forcibly liquidated.

Market structure

Ukraine has an opportunity to benefit from some of the mistakes in other countries and design a market structure that mitigates the principal systemic risks of derivatives. It is not possible or desirable to eliminate risks of the derivative contracts themselves as they are designed to transfer risk which implies that some investors remove risks while others take risks. The aim is to have a functioning market which itself is sound and does not threaten the broader economy and actually increases economic activity by enhancing predictability.

Mandatory Common Counterparty (CCP)

Requiring use of a common counterparty (CCP) should establish and maintain a higher standard of credit risk-taking as well as allowing for ease of market regulation. Under such a structure after the two investors agree the price of the derivative, TWO contracts are entered. The buyer agrees to buy from the CCP and the seller agrees to sell to the CCP. The two contracts are mirrors of the other so that so long as neither defaults the CCP is exactly hedged. From the perspective of the investor the counterparty risk is mitigated as the CCP has a known level of capital, a strategy dedicated to stability and credit requirements of its own. The counterparty risk is not eliminated but it is controlled and isolated.

Without a CCP investors could enter many contracts with multiple counterparties and the full extent of their risk taking would be very difficult to measure. AIG is a good example of this agglomeration of contingent liabilities. Each of its counterparties knew only a small piece of the risk they had assumed. However with a CCP as the counterparty to all derivatives a record of the exposure of every investor exists in one place. That allows the CCP (and the regulator) to calibrate permitted levels of risk in line with credit policies, identify and limit exposure concentrations and manage collateral. By requiring use of the CCP the regulator is also protecting the credit standards of the CCP. In other words another counterparty can not draw market share by offering looser credit standards.

The CCP controls its risk and therefore that of the market overall by setting position limits for each investor and requiring collateral. If an investor has a position that is losing value (for example selling future wheat when the spot market is rising) they can be required to deposit collateral to protect the CCP from default. The investor may have other trades that are gaining value (which the CCP would know and be the counterparty to) and those trades could be the collateral. Otherwise the CCP would require cash or government securities be deposited to secure its exposure.

Counterparty risk is not eliminated, as the market participants still rely on the CCP and the CCP itself has the counterparty risk of all market participants. However the CCP can be ensured by establishing it with a reasonable capital base, limiting its activity to holding mirror positions and disciplined application of credit policies. This requires that the CCP have the ability to exit

positions when the mirror position defaults and have a market to value positions and update calculations of required collateral. Exchange trading can serve both of these goals.

Exchange Trading only (with narrow exceptions)

Exchange trading and a common counterparty can each support the success of the other. By requiring exchange trading, the regulator can assist in maximizing liquidity in the market. This provides the market, the regulator and the CCP with the best price discovery of the derivatives. With this information the CCP can constantly update collateral requirements on the declining positions of its counterparties. Then if a counterparty does not meet a collateral requirement (margin call) the CCP can declare a default and using the exchange it can sell the mirror contract to minimize its loss. Exchange trading provides both the essential data to set collateral requirements and the exit mechanism for the offsetting position. Exchange rules would exclude the defaulting counterparty from further trading.

While the CCP benefits from exchange trading, the exchange also gains from the CCP. A derivative is far less transferable when such a sale requires reconsideration of the counterparty. Ordinarily such a transfer would therefore require the permission of both sides. With a CCP the sale of a derivative does not entail a change of counterparty. This makes the investment much more liquid and should encourage trading and greater liquidity. In turn this facilitates the operation of the credit controls of the CCP.

The requirement of exchange trading also incorporates into the market the exchange rules. In addition to the credit policies and discipline of the CCP the derivatives exchange itself has controls. These include standards for membership and trading such as settlement processes, trading rules and minimum capitalization. As a disinterested party but a beneficiary it may make sense for the exchange to own the CCP. This would also provide a simple structure for the potential further mutualization of counterparty risk; if a loss exceeds the capital of the CCP ownership of the exchange could act to allocate the loss.

Trading rules and membership requirements of the exchange act as a control on the market. In order to maintain the integrity of the system the CCP must have visibility into its counterparties. The most important criterion for membership from that perspective is the creditworthiness of the member. The exchange member must then vouch for its clients with a guarantee of performance. This could create pockets of counterparty risk (in the members) which must be monitored but with collateral on deposit with the CCP the system should be sound.

If the members and their clients are financially sound there is no reason to limit their activities except as to concentration of exposure. That is the CCP as a lender has an appropriate role in limiting the total net positions of any one counterparty. However there is no reason to limit speculation per se. It is in the interest of Ukraine and the market to have maximum liquidity in derivatives. It will provide the best pricing and encourage investment in the underlying assets which eventually will include government securities and equities.

Standard Contract Terms

In order to allow exchange trading it will be necessary for derivatives contracts to be somewhat standardized. That is not a particularly limiting requirement in that any underlying asset that can be delivered can sustain a derivative. At the present time that excludes only currencies; which could still be traded NDF.

Each contract should represent a given notional amount, for example a wheat contract might incorporate 5,000 bushels which is the standard CBOT futures contract. For physicals it is necessary to define the quality and establish a process for judging quality. Delivery terms also

must be specified usually with a central physical delivery point where there is storage availability. Even in the case of intangibles the underlying asset must be explicit, the PFTS index at the close of trading as posted on their website for example. In the case of NDF the Hryvnia would ordinarily be the form of settlement in Ukraine.

The expiry date and settlement date will drive the price and volume of the contract. Expiry is the date at which the final value is determined from trading in the underlying cash market. For example Brent crude futures are valued from the Intercontinental Exchange (ICE) closing spot price on the day of expiry as published the following day. Settlement of the future is the day after expiry. To encourage volume in individual contracts there are usually a limited number of expiry dates, commonly the third Friday of the third, sixth, ninth and twelfth months. The nearest contract is usually the most liquid.

The derivative contract would also spell out sellers and buyers rights as to whether it is a future or it is a call option or put option.

Finally to facilitate trading the derivative contract would have an identifying name and symbol convention that indicates in a shorthand all of the above terms.

The vast majority of derivatives contracts can and should be structured along standard terms in order to provide for the liquidity, trading rules and transparency of exchange trading. However there will be uncommon situations where unique terms are called for such as a future on a commodity for which there is no liquid spot market (Soyuz Russian border delivery natural gas). And innovation of structures and new underlying assets should not be discouraged. This will sometimes call for over the counter (OTC) trading. The regulator should be authorized to permit OTC contracts only on an exceptional basis with prior approval and with demonstration that the contract can not be suited to exchange trading. OTC derivatives could be further discouraged by denying them access to the CCP and with a higher margin requirement. Both are justified on economic grounds; the CCP needs exchange trading to monitor value and the lack of exchange trading makes margin levels just an estimate.

IV. Conclusion

The Ukrainian economy is exposed to a number of identifiable and quantifiable risks. Of these, currency volatility is the greatest exposure both for trading and the national balance sheet. But there is also risk in the price of inputs, oil and gas, and products such as iron, steel, wheat, barley and corn.

Derivatives can bring some predictability to these key economic components. As a business or economic tool derivatives can be useful, effective and invaluable. The certainty and liquidity that a derivatives market can provide can lower cost of capital and expand the economy.

While derivatives have sometimes mutated to extreme complexity, they are generally straightforward and designed to solve an identifiable problem for business. They therefore have a stabilizing influence where used as a hedge. Where they have contributed to problems, particularly in 2008, the systemic threat has been primarily concentration not necessarily speculation itself.

Because of Ukraine's important role in international trade, particularly iron and steel and agricultural commodities, it could be a hub of financial innovation in the related derivatives. Designing a market structure that learns from the lessons of others could be both sound and profitable. The key components of this plan would be:

- Mandatory common counterparty (CCP)
- Restricted to exchange trading (with narrow exceptions)
- Standard contract terms

to allow for currency derivatives

- Unrestricted currency exchange

This strategy could provide for price stability, investment and economic growth and enhanced international competitiveness.