

Economics

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THE ROLE OF PREPAYMENT IN THE STRUCTURE OF DEFERRED PRICING FORWARD CONTRACTS: CREDIT AND PRICE RISK ANALYSIS

***Summary.** The article examines how prepayment affects the structure of forward contracts with deferred pricing. This tool allows you to distribute credit and price risks between the parties. The analysis shows that prepayment reduces the risk of non-payment for the recipient, but at the same time increases the likelihood of non-repayment of funds and creates liquidity constraints for the payer. And in the case of an "open price", it can increase the conflict of interests around its fixation. The findings can be used to develop prepayment conditions, types of collateral, and price fixing rules to increase the stability of transaction execution.*

***Key words:** forward contract, deferred pricing, prepayment, credit risk, price risk, counterparty risk, default risk, credit exposure, scenario analysis, risk management, enforcement of obligations, liquidity, price fixing window, basis risk.*

Relevance of the study. The relevance of this study is because during the period under review, global commodity markets were characterized by high price volatility, uncertainty in logistics, and rising turnover financing costs. In such conditions, supply chain participants strive to simultaneously fix physical volumes and maintain pricing flexibility, shifting the moment of price fixing closer to the time of delivery or sale. That is why deferred pricing designs have

become widespread, and prepayment has become an important factor affecting both payment discipline and the stability of transaction execution.

Prepayment in such contracts plays a dual role. On the one hand, it can serve as a tool to ensure and provide additional motivation to fulfill obligations, reducing the risk of supply disruption and maintaining the production cycle. On the other hand, prepayment creates credit exposure for the party making the down payment. This, in turn, increases the importance of the counterparty's legal and financial reliability, as well as the quality of contractual terms on collateral, refund, and the consequences of violating deadlines. Deferred pricing, which is typical for such contracts, preserves price risk for the parties until the price is fixed. The presence of an advance payment can change the behavior of participants when choosing the moment of fixation, increasing conflicts of interest and increasing the likelihood of opportunistic strategies.

As a result, a comprehensive analysis of the relationship between credit and price risks, based on the concept of prepayment, acquires important scientific and practical significance for the development of sustainable contractual models aimed at reducing the likelihood of default, conflicts and unforeseen losses.

The purpose of the study. The purpose of the study is to develop a model that will allow a comprehensive assessment of credit and price risks in forward contracts with deferred pricing. We will also propose criteria for determining the economically reasonable share of prepayment based on the transaction parameters and the counterparty's profile.

Materials and research methods. The study used open standards and reference materials related to the documentation of commodity over-the-counter transactions. Statistical data on exchange-traded derivatives, open data on the dynamics of global commodity prices, and reports on margin practices under market stress were also analyzed.

The methodological basis of the research includes:

- Comparative legal and economic analysis of the "supply – price fixing – calculation" schemes;
- Scenario analysis of possible price trajectories until the price is fixed;
- Credit exposure assessment using the PD/LGD/EAD framework used in supervisory approaches to credit risk.

The results of the study. In applied economics and trade practice, a forward contract is considered as a bilateral agreement on the future supply of a certain quantity of goods on pre-agreed terms. In the documentation used in financial markets for physically deliverable commodity forwards, special attention is paid to the basic structure of obligations: one party undertakes to deliver the goods on a pre-agreed date, and the other party undertakes to pay the forward price, which is either fixed at the time of the transaction or determined by a pre-fixed formula. The key aspects of a forward contract are the conditions for the transfer of ownership, the distribution of the risk of accidental loss or damage to goods during transportation, quality inspection, and the consequences of non-delivery or non-acceptance of delivery. These terms legally transform the price agreement into a feasible logistical and settlement scheme [4].

In modern commodity circulation, especially in the markets of agricultural products and raw materials, various contractual models are often used. Under these models, delivery and transfer of ownership can take place even before the final price is determined.

The essence of deferred pricing is to separate three main aspects of the transaction in time: physical (volume, specification, place and date of delivery), price (rules and time of price fixing) and settlement (payment schedule, deductions, fees, possibility of prepayment or partial payment). Therefore, when we talk about such forward contracts, it is more correct to consider them not as a "variant of the usual forward", but as a combination of three elements:

1. Obligations for the delivery and acceptance of goods.
2. Rules for price fixing in the future.

3. A payment scheme that may include prepayment as a form of financing or securing fulfillment of obligations.

In grain marketing textbooks, a delayed pricing contract is described as a supply agreement in which the buyer can choose a moment to determine the price. In this case, the product is considered the property of the buyer, and the seller bears the costs of its storage and maintenance, being able to wait for a better price, but without a guarantee that such an opportunity will appear [6].

The table below shows the key differences between the typical designs that are most often used as "building blocks" in the development of deferred pricing forward contracts.

Table 1

Comparison of contractual structures at the time of delivery and the time of price setting

Construction	Delivery / transfer of ownership	The moment of setting the price	What is essential for risk
The forward	Future delivery on agreed terms	The price is agreed upon at the conclusion	The main uncertainty is the issue of fulfillment of delivery and acceptance obligations, as well as the financial stability of both parties in the period before delivery.
Delayed price / Price-later	Delivery and transfer of ownership take place upon delivery of the goods to the buyer	The price is set later, at the seller's choice; often linked to the current local price with deductions/fees	There is a risk of price changes before it is fixed, which creates additional difficulties for the buyer. In addition, the buyer assumes the credit risk, since the seller actually "credits" him until the final payment. It is also worth considering the possible costs of services and storage.

Deferred pricing (as a marketing alternative)	Delivery to the buyer, the price must be set before a certain date	The price is usually linked to the local purchase price; partial payments are possible upon delivery	Partial payment reduces the seller's need for liquidity, but does not eliminate the risk associated with the counterparty, including the risk of its insolvency.
Basis contract (in the educational interpretation)	Delivery with transfer of ownership	The basis is fixed in advance, and the moment of fixing the futures component is selected later	The risk of a price change is divided into components, and until it is fixed, only one of them remains either the risk of a price change or the risk of a change in the value of the underlying asset.

Source: author's development based on [3]

Since with deferred pricing, the price remains open for a certain period, the question arises: when do the parties consider the transaction to be "economically closed"? At the time of delivery, at the time of price fixing, or at the time of full payment. Prepayment (or partial payment upon delivery) in this context becomes not just a technical detail, but also an element of risk redistribution. If the payment is postponed to a later date (before or after the final price is set), the party transferring the goods has a credit position to the buyer. If, on the contrary, a substantial prepayment is made before delivery, the paying party has a credit position, since it finances the future delivery and depends on the counterparty's ability to fulfill the physical obligation. In any case, prepayment in such contracts is closely related to the terms of the transfer of ownership, the distribution of the risk of loss and the consequences of non-performance. This is explicitly stated in the disclosure of information about physically deliverable commodity forwards.

These issues are becoming especially important from the point of view of institutional investors, given the rapid turnover of the futures markets. These markets determine price benchmarks and serve as the basis for formula and index pricing. According to the FIA's annual statistics for 2020, the global volume of trading in stock futures and options has reached record levels. The report also

provides a breakdown by region and the value of open interest at the end of the year.

The following figure shows the key indicators of global derivatives trading.

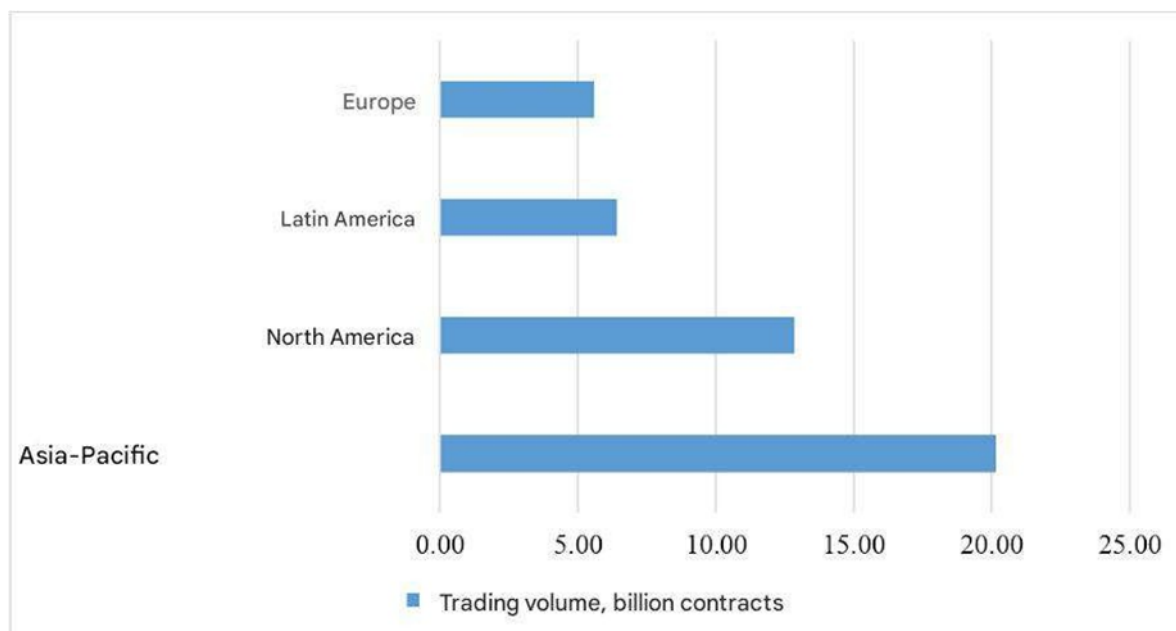


Fig. 1. Selected indicators of global derivatives trading [5]

Prepayment in deferred pricing forward contracts is an effective way to redistribute credit risk by determining who finances each other and when. If the payment is made before delivery, the risk of default on delivery and/or refund of funds falls on the payer. However, if the payment is postponed for the period after the transfer of the goods and before the final price fixing, the credit burden falls on the supplier, who actually credits the settlement. To formalize credit risk, it is advisable to use generally accepted risk components: PD (probability of default), LGD (default losses) and EAD (exposure at the time of default). These components are widely used in banking and supervisory approaches to credit risk assessment [2].

This logic is particularly evident in the context of the practice of margin derivatives. Under stress, changes in market prices quickly lead to the need for collateral, which can be compared to a "forced prepayment" to reduce the current credit burden. For example, international authorities regulating payments and

markets noted that in March 2020, variation margin requirements issued through clearing houses (CCPs) reached significant levels in just one day. In addition, the cumulative requirements for the initial margin have increased significantly over the month [7].

With deferred pricing, the risk of price changes persists until it is fixed. Therefore, time becomes a key factor: the longer the fixation period and the higher the volatility of the underlying asset or the local price, the wider the range of possible financial results.

Prepayment does not change the very existence of price risk, but only changes its distribution and incentives for the behavior of the parties. If the advance is significant, the party receiving the prepayment may be more interested in maintaining the volume (to reduce the risk of delivery disruption). At the same time, the payer has a more urgent need to manage the "open price" on time (due to frozen liquidity). This increases the role of contractual rules: acceptable fixing dates, a transparent price source, restrictions on postponement of fixing, as well as balancing mechanisms (for example, mandatory fixing by a certain date) to reduce the risk of conflicts in the face of unfavorable market movements.

A comprehensive assessment of deferred pricing forward contracts takes into account that credit and price risk are interrelated through the future price, which remains uncertain until it is fixed. As long as the price is not set, not only the potential profit or loss changes, but also the economic exposure between the parties. In the event of a counterparty default, losses depend on the current value of the obligation and payments already made.

It is convenient to separate two scenarios within a single model:

1. A price scenario that describes how the benchmark or price formula changes before the fixing date.
2. A credit scenario that shows what happens when obligations are defaulted on different dates.

The consequences are then assessed through standard credit risk components: the probability of default, default losses, and exposure on the default date.

Prepayment in this context plays the role of a kind of regulator, determining the time schedule of payments. The larger the prepayment amount and the earlier it was deposited, the lower the risk of non-payment for the recipient upon completion of the transaction. However, for the payer, this means an increased probability of non-repayment of funds in case of default, as well as the risk of freezing liquidity for the period before delivery or settlement. This aspect becomes especially important in contracts with deferred pricing, since prepayment can be made before the price is fixed, which creates the risk of price uncertainty. In such circumstances, price fluctuations affect both the future estimated amount and the motivation of the parties when choosing the moment of fixation (for example, the desire to postpone fixation in the hope of a more favorable price level). As a result, "purely price" uncertainty is easily transformed into a credit-behavioral factor.

The practical importance of joint analysis is well demonstrated by the experience of the derivatives markets. In these markets, credit exposure is regulated using margin mechanisms that reduce current credit risk. However, they can cause drastic liquidity needs during periods of strong market fluctuations. IOSCO's open materials on margin practices during the period of market stress in March 2020 noted very large margin variation challenges through central counterparties and a noticeable increase in initial margin requirements during the month. For forward contracts, prepayment and collateral rules play a similar role: they reduce the risk of "non-receipt of money or goods," but require well-thought-out liquidity management and legal security of payment [1].

In practice, in order to choose the "optimal" share of prepayment, you need to consider not one specific number, but a range of values. This range must meet several criteria:

1. Limit expected credit losses by reducing or redistributing risk between the parties.
2. Do not create excessive pressure on liquidity in case of unfavorable price scenarios.
3. Be consistent with legal payment protection mechanisms, such as refund terms, collateral, set-off procedure, and consequences of default.

Thus, prepayment becomes part of the overall risk design of the contract. Its share and payment schedule should be linked to price fixing windows, pricing rules and mechanisms to ensure that, in case of sudden price changes, the contract remains feasible and financially stable for both parties.

Conclusions. Thus, prepayment in deferred pricing forward contracts does not just play an auxiliary role in calculations, but becomes the most important aspect determining the risk architecture of the transaction. Prepayment allows the parties to assess the risks associated with late receipt of payment in different ways. For the recipient of the advance, it reduces the likelihood that the payment will not be made, but at the same time increases the risk of non-repayment of funds for the payer and increases the requirements for his liquidity for the period until the final settlement. In the case of an "open price", prepayment also affects price risk, changing the parties' incentives to choose the moment when the price is fixed. This, in turn, can lead to conflicts and opportunistic behavior in the face of unfavorable market dynamics.

Thus, in order to use prepayment effectively, it is necessary to carefully set up the contract. It is important to coordinate the amount and schedule of the advance payment with the price fixing period, a transparent source of quotations, terms of security, rules of offset and refund, as well as with possible consequences in case of violations. In practice, the optimal prepayment percentage is determined not as a single value, but as a range that allows achieving a balance between expected credit losses, price uncertainty and the allowable burden on the

liquidity of the parties. This, in turn, increases the overall stability of the forward transaction execution.

References

1. Call for comments on margining practices during the March 2020 market turmoil. URL: <https://www.iosco.org/news/pdf/IOSCONEWS621.pdf>
2. CRE32 – IRB approach: risk components. URL: https://www.bis.org/basel_framework/chapter/CRE/32.htm
3. Crop Marketing Terms | Ag Decision Maker. URL: <https://www.extension.iastate.edu/agdm/crops/html/a2-05.html>
4. Disclosure Annex for Commodity Derivative Transactions. URL: <https://globalmarkets.cib.bnpparibas/app/uploads/sites/4/2021/05/isda-commodity-derivatives-disclosure-annex-04-2013.pdf>
5. Global futures and options trading reaches record level in 2020. URL: <https://www.fia.org/fia/articles/global-futures-and-options-trading-reaches-record-level-2020>
6. Introduction to Grain Marketing. URL: https://www.canr.msu.edu/farm_management/uploads/files/E3416_Intro_Grain_Mkt_AA.pdf
7. Press release: Call for comments on margining practices during the March 2020 market turmoil. URL: <https://www.bis.org/press/p211026.htm>