# New Financial Tools for Small Businesses: A Commitment Mechanism to Secure Funding

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*We suggest new tools for financing small business newcomers that struggle to overcome bank's unwillingness to finance their operations and clients fear that suppliers may choose willful litigation by breaching the contract. We suggest a commitment mechanism based on a commitment to a bank that makes the newcomer supplier's obligations reliable. We show how the purchase contracts and obligations to banks can be priced, and how the commitment mechanism may provide the banks new tools to spread the risk of newcomers' bankruptcy by selling the obligations as binary options in an options market or by securitization of the purchase contracts.*

## INTRODUCTION

Developing tools to overcome the severe financial problems of raising capital faced by *small businesses*[1] and specifically *newcomer* firms in their initial stages of formation and growth is the main concern of this paper. Every year, hundreds of thousands of small businesses trying to enter the goods markets face severe financial difficulties, where banks are unwilling to finance their activities. Newcomers' financial constraints reflect, as the literature show (for example, Board of Governors of the Federal Reserve System, 2007; Small Business Administration, 2009; Aghion, Fally & Scarpetta, 2007), their risky operation, lack of essential assets that can serve as collateral and most significantly lack of track records.

Empirical studies (for example, Dunworth & Rogers, 1996) have demonstrated that small businesses are highly involved in contract litigation. Jacobi and Weiss (2013) have explained that when firms face financial difficulties and are also considering to perform or to breach a contract, their subjective discount rates will be higher than the court-awarded interest rates on damages to customers. As a result, they may benefit from breaching and litigate just to gain from postponing his financial expenditures to a later period. This is termed *willful litigation*.

Jacobi and Sher (2015) explain that willful litigation imposes a negative externality on the buyer who takes this risk into account ex-ante at the contracting stage and offers the newcomer a much lower price than she would offer a well-established seller. This makes the newcomer's entry to the market and survival almost impossible.

To solve this problem they have suggested a *commitment mechanism*.[2] Under this mechanism, the seller undertakes an obligation to pay a bank (chosen by the parties) the amount of the buyer's damages if

the seller does not deliver the good on the delivery day in accordance with the contract and the law. The bank, in turn, undertakes to pay the buyer the amount of the buyer's damages if and when received by the bank unless the seller notifies the bank that he plans on suing the buyer, in which case the bank will hold the funds until the court rules.

With the mechanism, the seller can choose between two possibilities: to perform the contract or to breach. If he chooses to breach, he must immediately pay the bank the damages of the buyer. In case he fails to pay the bank, the latter immediately reports to loan officers and credit bureaus the newcomer's failure to pay the buyer's damages, and this dramatically increases the costs to the newcomer from willful litigation. In turn, this reputation effect of the mechanism makes the newcomer obligation to deliver the good reliable.

The mechanism substantially reduces the risk of willful litigation, and achieves two ex-post efficiency terms set in the article, allowing only efficient breach of contracts and unbiased division of contract profits. The main ex-ante impact of the mechanism is that the buyer can offer the newcomer a better price, allowing him to enter the market and survive. The mechanism differs from known tools as it does not impose any risk on the bank, and accordingly, the costs of the mechanism to the banking system are expected to be negligible.

We prove that a purchase contract can be priced as a *put option* to sell the good at an exercise price equal to the purchase contract price, together with a *binary option* that entitles its owner to receive expectation damages in case of non-delivery. We also show that the obligation to a bank is a theoretical equivalent to that *binary option*. Based on this analysis, we further develop tools for small business finance. We demonstrate how by pricing the *put* and *binary options*, the purchase contract can be better priced. This analysis further expands Jacobi and Sher's (2015) suggestion of the commitment mechanism, where banks use the better priced purchase contract to screen newcomers as collateral and to back the obligation assigned to it.

An options market can assist the banking system's funding and risks spreading. We first develop and discuss the conditions for using an options market together with the commitment mechanism to spread the risk of newcomers' bankruptcy by selling the obligations to a bank we use in the mechanism as *binary option*s. To achieve this objective the bank may buy from a market-trader a *binary option* to cover its risk from a specific obligation backing (to pay the promisee her expectation damages). Furthermore, if the bank is not backing the obligation, the promisee may buy the *binary option* and cover her risk.

Another possible supplemental tool to the commitment mechanism that we further consider in the article is the banking system funding newcomers businesses and spreading their risks of bankruptcy through purchase contracts securitization. With the commitment mechanism, newcomer's purchase contracts have a more accurate and high value, and this promotes the contracts securitization and newcomers' funding and establishment.

The rest of the article is organized as follows. The following section discusses the root causes of small businesses' financial constraints, the rationale for willful litigation and the influence of this risk on newcomers' ability to overcome entry barriers and survive in the markets. Next, we present the market structure and set the efficiency conditions for designing financial tools to eliminate the willful litigation risk and to improve small businesses' financial situation. The following section presents the commitment mechanism and explains how it can substantially mitigate the risk of willful litigation and help small businesses to survive; it further explains the bank's role in the mechanism. In the next section, we use option pricing theory to prove that the purchase contract can be priced as a put option with a binary option, and that the obligation to a bank we use in the mechanism is a theoretical equivalent to that binary option. We then set the equations for pricing those options and present new financial tools for screening newcomers by the banking system, using the purchase contracts as collateral obligations assigned to it. We discuss the conditions for the banking system using the commitment mechanism together with binary options market to spread the risk of newcomer bankruptcy; we further discuss of the possibility of newcomers funding and spreading the risk through their purchase contract securitization. Finally, we present our conclusions.

## LITERATURE REVIEW ON SMALL BUSINESSES' DIFFICULTIES

### The Financial Constraints

Small business and in particular newcomers face severe financial problems of raising capital. In the United State, for example, where small businesses account for 99% of all businesses, hundreds of thousands of small businesses try to enter the goods markets every year and approximately the same number fail. According to Small Business Administration data, one third of new small businesses fail within two years of establishment, and 56% fail within four, at least partly due to limited access to credit (Knaup, 2005).[3] Newcomers create new jobs with a disproportionate share, develop new intellectual property and contribute to market's competition.[4] Since newcomers are riskier, have shorter credit histories and less collateral to pledge as security, it is expected that banks would adjust their loan's rates (Board of Governors of the Federal Reserve System, 2007; Small Business Administration, 2009) but in general, banks are reluctant to finance their activities. This was empirically found to create *entry barriers* and to be the primary problem of small businesses in their first seven years (Aghion et al., 2007).[5]

The banks' reluctance to lend funds to newcomers even at high interest rates stem from asymmetries in information (Petersen & Rajan, 1994) caused by the absence of newcomers' track records. Banks require newcomers to submit plenty of information, for example, historical financial statements, that a newcomer is typically unable to supply (Fulmer, Gavin & Bertin, 1991-1992).[6]

Banks may require collaterals to secure loans. They distinguish between risky and less risky borrowers and require more collateral from the riskier borrowers (Leitner, 2006, p. 9-11). In the case of newcomers, since information is unavailable assessment of risk is difficult and applicants often lack substantial assets. Furthermore, newcomers usually do not have long-term relationships with banks, which would reduce the need for collateral (Berger & Udell, 1995; Leitner, 2006, p. 10).

### The Risk of Willful Litigation

Empirical studies have shown that small businesses are heavily involved in litigation in Contract Law (Dunworth & Rogers, 1996; Klemm Analysis Group, 2005).[7] Large firms, on the other hand, prefer to settle out of court (for example, Galanter, 1983; Blegvad, 1990; Bernstein, 1992). A possible reason that large firms avoid courts is their effort to protect their reputation (Macaulay, 1963).

Jacobi and Weiss (2013) have shown that willful litigation can occur when litigates' subjective discount rate is higher than prejudgment rate.[8] The cost of capital of small businesses and specially newcomers who face financial difficulties is expected to be higher than the court-awarded interest rates. Therefore, when they realize that the contract they signed becomes a loss contract and consider whether to take the loss and deliver of breach, their high cost of capital creates an incentive to deliberately breach and face litigation in order to gain from postponing payment of damage in hope that the court procedure will buy them sufficient time to establish themselves in the market.[9]

### How Willful Litigation Can Cause an Excessive Breach of Contract and Deviation from Contract Consent

Contract theory has suggested (for example, Shavell, 1980 and 1984; Macneil, 1981 and 1982) that if a liability rule protects the parties entitlements, such as expectation damages that awards the promisee (the innocent party in the general case) her losses from a breach, and if damages can be well determined by the court, the promisor will breach if and only if he will retain profits even after paying the promesee's damages and all attendant costs. Such breach is efficient since the gain to the breacher is higher than the innocent party's profit from performance. Notably, the division of value as agreed by the parties and determined in the contract is maintained, whether the breacher chooses to perform or to breach the contract.

However, as Jacobi and Weiss (2013) have demonstrated, when the promisor finds himself faced with a loss contract and must choose whether to breach or comply, he will compare the immediate cost of performance with *the present value* of the payment of damages in court (rather than simply comparing the nominal payments). As a result, a newcomer promisor typically has a high cost of capital and will often

benefit from breaching even if the contract is efficient. For him, willful litigation may serve the function of a buoy allowing him to stay afloat.

**How the Risk of Willful Litigation Increases the Financial Constraints**

The risk of willful litigation might have a profound effect on markets. Jacobi and Sher (2015) have demonstrated that willful litigation might exacerbate the small business's financial difficulties even more. A Buyer that needs a good for her business knows that well-established sellers' risk of willful litigation and risk of non-delivery are minor. In contrast, the risk of willful litigation and risk of bankruptcy by newcomer sellers are high. Therefore, ex-ante, at the contracting stage, the buyer requires a much lower price from a newcomer than she requires from a well-established seller. Hence, the profitability of the contract is low and banks that assess the potential survival of the seller are reluctant to finance the operation.

**Other Possible Reasons for Newcomers Seller's Willful Litigation**

Apart from high subjective cost of capital of newcomer sellers, there are other reasons for their willful litigation. These include different litigation costs (for example, Bebchuk, 1996) and asymmetric information regarding the buyer's losses (for example, Bebchuk, 1988; Katz, 1990; Grundfest & Huang, 2006). Another reason arises from the effect of the secrecy interest of contract law, presented by Ben-Shahar and Bernstein (2000). They explain that since the promisee does not want to reveal business data such as inventory size and labor costs, the promisor (the seller in our set) might breach excessively because he does not required to internalize all damages from breach. Whenever other reason for willful litigation prevail, the mechanism that we present next substantially diminishes the seller's incentive to breach excessively and extort value.

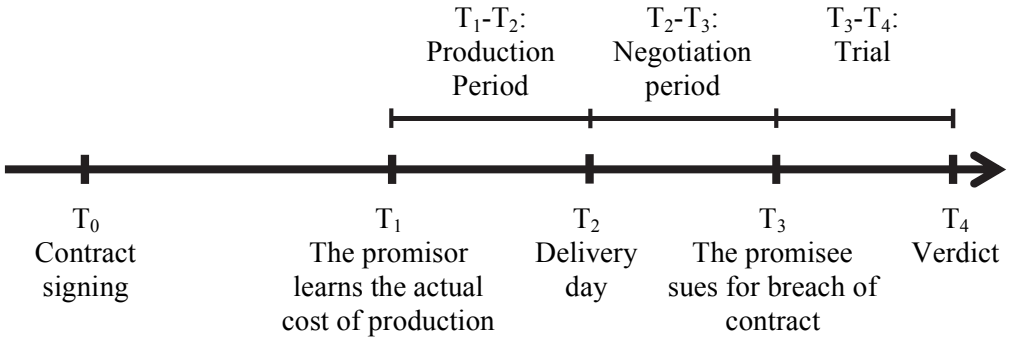
## MARKET STRUCTURE AND THE APPLICABLE LAW

**The Competitive Case**

We focus on newcomer sellers who manufacture and sell goods in markets where established sellers produce the same goods. Buyers know that established sellers have almost no risk of willful litigation and likewise minimal risk of bankruptcy and accordingly offer a contract price. Newcomers are enigma to market participants and buyers cannot screen between them according their risks. Therefore, they estimate the newcomers' probability of willful litigation and of bankruptcy to be relatively high.

We assume the parties sign the purchase contract in $T_0$, the value of the contract for the promisee (buyer) is known while there is uncertainty regarding the promisor's (seller's) costs. These are distributed normally with an expected cost known to the parties. The true costs to the promisor are materialized in $T_1$. The promisor then decides whether to perform in $T_2$ or breach. If he chooses the latter, the promisee files for a breach of contract in $T_3$. The timeline the promisor and promisee are facing is presented in *Figure 1*:

**FIGURE 1**
**TIMELINE**



In the United States, if a sale contract is breached, the law that determines the injured party's right to damages is the uniform commercial code (hereinafter: The UCC). Where a relatively competitive market for the good exists and the goods' price can be ascertained, the court will measure the buyer's loss from non-delivery by using the diminished-in-market-value method for measuring expectation damages. The buyer's damages will be set as the difference between the market price at the contractual time of tender and the (lower) contract price plus any incidental and consequential damages as determined by the parties at the time of contracting.[10]

**The Unique Good Bargaining Case**

In rare cases, the good in question is unique and there is no ascertainable market price for it. In this case, all the stated assumptions hold, except a buyer and a newcomer seller solely bargain over the contract price.

In such cases, the court may accept contract's proper liquidated damages provisions. The court will measure the buyer's damages from the breach using the lost-profit method as determined by the parties in the contract, which takes into account the surplus value the buyer expected to attain from performance.[11] In the absence of a liquidated damages provision, the buyer may prove her lost profits.[12]

## TERMS OF EFFICIENCY

**The Competitive Case**

In our model, the efficiency terms for designing financial tools to eliminate the risk of willful litigation are as follows: First, efficient breach of contract, meaning that delivery of the good according to the purchase contract will be exercised unless two conditions co-occur: when cost of production becomes certain, the promisor finds out that the cost is higher than the contract price ($P<Ct$) and also higher than the good's market price ($Pt<Ct$). Second, the division of value as agreed by the parties and stated in the contract is maintained even after the promisor learns the actual cost of production and realizes that his is a loss contract.

The combined requirements can be presented as a set of three scenarios. First, if the cost of production is lower than the contract price ($Ct<P$), a state of a profit contract obtains: the promisor will deliver the good and the promisee pay the contract price. Second, if the cost of production is higher than the contract price but lower than the market price ($P<Ct<Pt$), a state of loss contract obtains, but the promisor will still deliver the good and the promisee pay the contract price. Third, if the cost of production is higher than the contract value and the market price ($P<Pt<Ct$), a state of inefficient contract obtains: the promisor will not deliver the good but rather pay the promisee the expectation damages ($D=Pt-P$).

To conclude, the two ex-post goals of the proposed mechanism in the competitive case are set according to the three scenarios in the table below.

**TABLE 1**
**PROMISEE AND PROMISOR CONTRACTUAL RIGHTS IN THE COMPETITIVE CASE**

| | | **Profit Contract** | **Loss Contract** | **Inefficient Contract** |
|---|---|---|---|---|
| | | ***Ct<P*** | ***P<Ct<Pt*** | ***P<Pt<Ct*** |
| **Promisee** | **Receives** | *Pt* | *Pt* | *D=Pt-P* |
| | **Pays** | *-P* | *-P* | *0* |
| | **Total** | *Pt-P* | *Pt-P* | *Pt-P* |
| **Promisor** | **Receives** | *P* | *P* | *0* |
| | **Pays** | *-Ct* | *-Ct* | *-D=-(Pt-P)* |
| | **Total** | *P-Ct* | *P-Ct* | *-D=-(Pt-P)* |

### The Unique Good Bargaining Case

Where the good in question is unique and there is no ascertainable market price for it, the efficiency terms are as follows: First, efficient breach of contract, meaning that delivery of the good according to the purchase contract will be exercised if and only if the value of the contract to the promisee is higher than the good's cost of production on delivery day ($V>C$). Second, as in the competitive case, the division of value as agreed by the parties and determined in the contract will be maintained even after the promisor learns the actual cost of production and has to decide whether to deliver.

The combined requirements can be presented as a set of three scenarios. First, if the cost of production is lower than the contract price ($C<P$), a state of a profit contract obtains: the promisor will deliver the good and the promisee pay the contract price. Second, if the cost of production is higher than the contract price ($P<C$), a state of loss contract obtains: the promisor will still deliver the good and the promisee pay the contract price. Third, if the cost of production is higher than the contract value ($C<V$), a state of inefficient contract obtains: the promisor will not deliver the good but rather pay the promisee the expectation damages as determined in the contract ($D=V-P$).

To conclude, the two ex-post goals of the proposed mechanism in the bargaining case are set according to the three scenarios in the table below.

**TABLE 2**
**PROMISEE AND PROMISOR CONTRACTUAL RIGHTS IN THE BARGAINING CASE**

| | | Profit Contract | Loss Contract | Inefficient Contract |
|---|---|---|---|---|
| | | ***Ct<P*** | ***P<Ct<V*** | ***P<V<Ct*** |
| **Promisee** | **Receives** | *V* | *V* | *D=V-P* |
| | **Pays** | *-P* | *-P* | *0* |
| | **Total** | *V-P* | *V-P* | *V-P* |
| **Promisor** | **Receives** | *P* | *P* | *0* |
| | **Pays** | *-Ct* | *-Ct* | *-D=-(V-P)* |
| | **Total** | *P-Ct* | *P-Ct* | *-D=-(V-P)* |

## A COMMITMENT MECHANISM TO ELIMINATE THE RISK OF WILLFUL LITIGATION

### The Mechanism and How It Can Eliminate the Risk of Willful Litigation and Assist the Small Businesses Survival

Jacobi and Sher (2015) have suggested a new financial tool that the parties can adopt in their sales contracts. This tool will guarantee that the seller will not breach a contract simply in order to postpone financial expenditures to a later period. Under this mechanism, the seller undertakes an obligation to pay a bank (chosen by the parties) the amount of the buyer's damage if he does not deliver the good on the contractual delivery day. The bank, in turn, undertakes to pay the buyer the amount of the buyer's damages if and it receives the money from the seller.[13]

If the seller fails to pay the bank, the bank advises loan officers and credit bureaus of the newcomer's failure to pay the buyer's damages to the bank. This dramatically increases the costs of willful litigation to the newcomer and substantially reduces its incentive to choose this rout. Therefore, the newcomer's obligation to deliver the good becomes reliable, buyers agree to pay higher price and banks are less reluctant to finance that business. By substantially reducing the risk of willful litigation the mechanism achieves the two ex-post efficiency's terms we set above, allowing only efficient breach of contracts and unbiased division of contract profits.

### The Bank's Role and the Newcomers' Reputation Effect

The newcomer's path to finance highly depends on his reputation in the banking system with which he hopes to have a long-standing relationship. Small businesses usually borrow from one bank, making this dependency even higher (Kallberg & Udell, 2003). Furthermore, loan officers of different banks informally transfer loan information between themselves, making it almost impossible for a small business to replace its lender in case of bad credit history (Brown & Zehnder, 2010).[14]

Banks use of *credit bureau* reports in assessing loan applications and also provide loan information, including negative information, to *credit bureaus* (Brown & Zehnder, 2010). In the United States, the market for business loan information, including small business credit reporting, is dominated by Dun & Bradstreet Corporation (D&B). D&B collect information, inter alia, on payment history of loans, found to be the most important factor in lenders' decisions, on bankruptcy proceeding filings, and on lawsuits and UCC filings. This linkage to the information sharing system dramatically increases the newcomer's costs of willful litigation and of refusing to pay the bank according to the proposed commitment mechanism. For the newcomer, these high costs are plausibly much higher than any expected gains from one-time willful litigation, making the commitment credible at negligible costs.

The mechanism, different from other financial tools, inter alia, letters of credit or bank guaranties, does not impose any risk on the bank. As stated above, the bank transfers the damage payment from breach to the buyer *only if and when* it is received the money from the seller. Thus, it simply acts as a clearing-house. Therefore, the costs of the mechanism to the banking system are expected to be negligible, there will be no need for collateral and the bank fees for such a service are expected to be affordable to all.

## USING OPTION PRICING THEORY TO REDEFINE THE PURCHASE CONTRACT AND THE MECHANISM'S OBLIGATION TO A BANK AS AN OPTION

### The Competitive Case

Using *option pricing theory*, Mahoney (1995) analyzed the purchase contract as a spot sale of the good in question from seller to buyer with a call option to buy back the good with the strike price of expectation damages.[15] Actually, a purchase contract for a good is basically a *forward*[16] owned by a promisee for physical delivery from the promisor, with a *call option*[17] owned by the latter to buy back the contract at a strike price equal to the amount of expectation damages (when this is the remedy) on the contractual delivery date.

Using *option pricing theory*, and in order to mimic the cash flows of the purchase contract and of the obligation to a bank included in the commitment mechanism, we present an alternative theoretical equivalence to a purchase contract between promisor and promisee based on a *package of options*.

The package is made up of two types of options written between a bank we add to the analysis as a clearing-house and one of the parties as follows.[18] Type A – a *put option* entitles its holder to sell the purchase contract's good to the option writer at the purchase contract price ($P$) on delivery day ($T_2$). Type B – *a price-difference binary option*[19] (a call option[20]) entitles its holder to receive payment in the amount of the purchase contract's expectation damages ($D=Pt-P$) if the promisor does not deliver the good on delivery day ($T_2$).[21] As mentioned above, the *binary option* is a theoretical equivalent to the obligation to a bank we use in the proposed mechanism.

From these two types of options, we have constructed a *four-option package* that mimics the cash flows of a purchase contract, and of the promisor's obligation to a bank. The package is made up of the Type A and B options, and two identical options written between the bank and the promisee, as follows: (1) the promisor holds a *put option* (Type A) which allows him to sell the good to the bank; (2) the bank holds a *price-difference binary option* (Type B) that entitles it to receive payment in the amount of expectation damages from the promisor; (3) the bank holds a *put option* (Type A) entitling it to sell the good to the promisee; and (4) the promisee holds a *price-difference binary option* (Type B) that entitles it to receive payment in the amount of expectation damages from the bank.

The above analysis leads to several insights:

*Lemma 1* – The four-option package, if being held by the promisor, promisee and bank, meets both ex-post requirements: efficient breach of contract and secure division of value as agreed by the parties and determined in the contract.

*Lemma 2* – A purchase contract to deliver a specific good at a specified price ($P$) on delivery day ($T_2$), without its other provisions, is identical for the promisor in terms of its cash flows and delivery of goods to his positions in the four-option package, as defined above, if held by the promisor, promisee and bank.

See Appendix C for proof *Lemmata 1 and 2*.

**The Unique Good Bargaining Case**

In the bargaining case, the same package of options written between the bank and the contracting parties leads to the same outcomes of efficient breach of contract and maintenance of the original contractual consent, with only minor changes.

First, the four-option package is modified only in one parameter: in Type B the expectation damages payment is constant, as the court measures it using the loss-profit method: $D=V-P$. This is a *cash-or-nothing binary option* (call option),[22] and it is a theoretical equivalent to the obligation to a bank we use in the proposed mechanism in the bargaining case.

Second, the division of states is identical with the same outcomes, except that the payment under the Type B option is constant, at $D=V-P$ (instead of $D=Pt-P$). In this case, the *cash-or-nothing binary option* will be exercised if the cost of production exceeds the purchase contract's value to the promisee ($V<C$), leading to the promisor deciding not to deliver the purchase contract's product.

*Lemma 3* – Lemmata 1 and 2[23] also hold in the bargaining case with a *cash-or-nothing binary option*, with a payment of $D=V-P$ instead of *a price-difference binary option* with a payment of $D=Pt-P$. See Appendix D for proof.

## USING THE MECHANISM AND OPTION PRICING THEORY TO PROMOTE THE FINANCING OF SMALL BUSINESSES

**Pricing the Purchase Contract and the Obligation to a Bank**

With the commitment mechanism, the banking system could better price the purchase contracts. As shown above (in *lemma 2* for the competitive case and in *lemma 3* for the bargaining case), the value of a purchase contract is the value of a *put option* (to sell the same good with an exercise price equal to the purchase contract price) minus the value of a *binary option* (entitling the bank to receive expectation damages if the promisor does not deliver).

$$PUR = PUT - BIN \tag{1}$$

In the competitive case, *a put option* for selling the good can be priced using the *Black-Scholes formula* (for a European-style option),[24] as follows.

$$PUT = Pe^{-rT}[1 - N(d_2)] - P_0[1 - N(d_1)] \tag{2}$$

where:

$$(2.1)\ d_1 = \frac{ln\left(\frac{P_0}{P}\right)+(r+\frac{\sigma^2}{2})T}{\sigma\sqrt{T}};$$

$$(2.2)\ d_2 = d_1 - \sigma\sqrt{T},$$

and $P$ is the purchase contract's price (which is the option's exercise price), $P_0$ is the good's price at time $T_0$ (contract signing and option issuing), $r$ is the risk-free interest rate, $T$ is the time to expiration ($T=T_2-T_0$), and σ is the standard deviation of the good's prices.

*A binary option* for the competitive case can be priced by multiplying the estimated probability that the promisor's production costs exceed the good's market price (Prob.($C_t$>$P_t$)) by the expected difference between the good's market and contract prices:

$$BIN=Prob.(Ct>Pt)(E(Pt)-P) \quad (3)$$

In the bargaining case, *a put option* for selling the good can be priced using the *Black-Scholes formula*, by pricing a similar good that has a relatively competitive market and its price can be ascertained. Assuming that the cost of production has normal distribution, *a binary option* for the bargaining case can be priced using the *Black-Scholes formula*,[25] as follows.

$$BIN = De^{-rT}[N(d_2)] \quad (4)$$

where:

$$(4.1)\ d_1 = \frac{ln\left(\frac{C_0}{V}\right)+(r+\frac{\mu^2}{2})T}{\mu\sqrt{T}};$$

$$(4.2)\ d_2 = d_1 - \mu\sqrt{T},$$

and D is the expectation damages as determined in the purchase contract, $P$ is the contract price, $V$ is the contract value for the promisee ($V=D+P$), $C_0$ is the production cost at time $T_0$ (contract signing and option issuing), $r$ is the risk-free interest rate, $T$ is the time to expiration ($T=T_2-T_0$), and μ is the standard deviation of the production cost.

**A Better Pricing Enhances Small Businesses' Funding**

After the bank has determined the value of the purchase contracts and the value of the obligations assigned to it by the newcomer (valuated as *binary option*s), it would have a better tool for assessing the value of the assets and the amount of exposure the newcomers have. The value of the assets is mainly the value of the purchase contracts, and the volume of those contracts' risk could be defined by the value of the *binary option*s assigned to the bank. This analysis provides the bank a powerful tool for distinguishing between promising and less promising newcomers. It may consider approving a credit line to the promising newcomer using the contract as collateral. Among other factors, the bank can determine a loan-to-value (hereinafter: LTV) ratio, $k_1$ ($0<k_1<1$) that can be used as a yardstick in arriving at a decision to approve this loan.[26]

Furthermore, with the mechanism another financial tool that the bank may adopt is backing the obligation assigned to it to the promisee. As part of the credit line granted to the promising promisor, and to the latter's and the promisee's request, the bank may back the obligation to the promisee to pay her all or some of the expectation damages ($D=Pt-P$ in the competitive case or $D=V-P$ in the bargaining case), even if the promisor does not pay expectation damages to the bank. For its decision the bank can determine, if the ratio between the value of the obligation to a bank used in the mechanism (calculated as a *binary option*) that is backed and the value of the purchase contract is low enough to meet the bank's standards (LTV ratio<$k_1$).

This financial tool shifts risks from the promisee to the bank and in turn, the promisee may agree to a further increase of the purchase contract price. The bank is expected to charge a commission suitable to its risks. With a full obligation backing, from the promisee's point of view, all reducible risks are eliminated, namely the risk of willful litigation is eliminated by the obligation and the risk of bankruptcy is eliminated by its backing. In this case, the promisor could get a contract price equal to the market price in the competitive case or the best possible profits in the bargaining case! Without the proposed mechanism, only a well-established promisor with good enough collateral and reputation can secure those prices or profits.

## THE CREATION OF AN OPTIONS MARKET FOR THE OBLIGATION TO A BANK AS A BINARY OPTION

### Traded Binary Options as a Financial Tool

As we prove above, the obligation the promisor assigns to a bank according the proposed mechanism is a theoretical equivalence to the promisor selling to the bank a Type B *binary option* entitles the latter to receive payment in the amount of the purchase contract's expectation damages if the promisor does not deliver the good on delivery day. If the bank is backing the obligation, it is a theoretical equivalence to the bank selling to the promisee the same Type B *binary option*.

We also explained that for the promising newcomers and for the promisee, the bank backing of the obligation is a powerful mean of finance. If the bank buys a Type B *binary option* from the promisor (by accepting his obligation), it eliminates the risk of willful litigation. By issuing the same *binary option* to the promisee (by backing the obligation), the bank accepts the risk of the newcomer promisor's bankruptcy that until this transaction the promisee bears. Hence, the issuance of the option by the bank dramatically reduces the transaction costs of the purchase contract. This allows the parties to sign a contract with essentially no risk of willful litigation or bankruptcy. In this case, the bank bears the risk of promisor's bankruptcy.

A trade in those Type B *binary option*s would allow the bank to spread the risk of promisor's bankruptcy and enable a better risk management for the parties in the good's markets and a reduction in transaction costs.[27] Notably, during the last few years, a vast trading of exotic options and particularly of *binary option*s provides proper tailoring of risk exposure.[28]

### Binary Options Market's Feasibility

The process of Type B *binary options*' issuance could be performed by an option's trading system. The bank may sell the option received from the promisor to an options trader. The promisee may issue the same option to her options trader or to a bank that may sell it to a market-trader. If a trade in this type of *binary options* would prevail, the parties to purchase contracts would be able to fully hedge the risk of seller's bankruptcy. Through this system, the specific risk of sellers' bankruptcies could be shared with the options market's participants.

However, typically, the options market hedgers initiate the options creation independently from any connection to another hedger that is stated in an opposite exposure or from a specific contract between them. Usually, hedgers in opposite states appeal autonomously according their free discretion to market-traders to write a specific option. In the case of Type B *binary options*, the promisor should originally write a *binary option* to pay the bank the amount of the buyer's damages if the seller does not deliver the good on the delivery day in accordance with the contract and the law. This connection to the specific purchase contract makes the commitment mechanism efficient and should be maintained in an option trading system. This connection also makes the creation of a Type B *binary options* market relatively difficult.

A key element of the commitment mechanism is that if a newcomer chooses to breach the purchase contract, he must pay the bank the damages of the buyer, and if he fails to make the payment, the bank reports this failure to loan officers and credit bureaus. Therefore, it is essential to the mechanism's effectivity that the bank remains the beneficiary of the promisor's obligation. With an options market, and the bank backing the obligation assigned to it to the promisee (to pay her all or some of the expectation damages even if the promisor does not pay expectation damages to the bank), the bank would be permitted to buy from a market-trader a Type $B_1$ *binary option*. A Type $B_1$ *binary option* is an adjusted Type B *binary option* entitles its owner, in this case the bank, to receive expectation damages from the market-trader if the seller fails to pay, to cover its risk from a specific obligation backing without waving its duty to report the promisor's payment failure.

With an options market, even without the bank backing the obligation assigned to it to the promisee (to pay her expectation damages), the later may cover her risk of the newcomer promisor's bankruptcy by buying from a market-trader a Type $B_1$ *binary option*, entitles the promisee to receive expectation

damages from the market-trader if the promisor fails to pay. The parties may adopt to their purchase contract an obligation of the promisee to buy this option, with a premium paid to the market-trader and an adjusted better contract price that take into account the premium and the elimination of the bankruptcy risk.

Notably, this form of options system practically replaces the financial tool of the bank backing the obligation assigned to it to the promisee, even if the bank still adopt it. With an options market, and the bank or the promisee buying a Type $B_1$ *binary option*, entitles its owner to receive expectation damages from the market-trader if the seller fails to pay, all risks are assigned from the banking system and the goods markets to the options market. This mechanism would efficiently spread the risk of newcomers' bankruptcy, although it might mitigate the bank incentive to perform adequate due-diligence to screen between more or less risky newcomers. When the bank bears other risks emerging from financing the newcomer's business this incentive may be recovered.

Another incentive that should be considered is the promisor's incentive to perform the purchase contract. With an options market, a theoretical moral hazard problem occurs:[29] if the promisor will be able to buy a Type $B_1$ *binary option*, entitles him to accept expectation damages from the market-trader if he fails to pay, he might buy the option and prefer to breach a losing contract. However, even without prohibiting the newcomer's participation in buying Type $B_1$ *binary option*s, his involvement in the market is unlikely since the option's premium he has to pay is expected to be higher than the expected loss from performing a losing contract. If the premium is low enough, the newcomer buying the option will serve as an efficient and legitimate insurance of the risk of the losing contract and this is another advantage of the options market.

## HOW CAN THE MECHANISM PROMOTE THE SECURITIZATION OF THE SMALL BUSINESSES' PURCHASE CONTRACTS

### A Possible Securitization Advantages

Among the proposed mechanism goals, are creating value to the newcomer promisor's purchase contract and pricing it accurately, in turn enabling him a bank's loan backed with the contract. Those goals are correlated with those of the securitization process. Securitization in its wider form is a financial design, a process that provides a mechanism for pooling together financial assets and selling them together as securities. This financial tool could be formed in different structures. One of them is an asset-backed-security (ABS) where the financial asset that is being formed in the process of securitization is backed by loans, leases, credit cards debt, receivables or other assets (which are not mortgages or real estates). Where the financial asset that is being formed by the process of securitization is backed by mortgages or real estates, it is named: mortgage-backed-security (MBS). In today's capital markets the term securitization is mainly used to describe the process of asset securitization, namely creating ABS and MBS (for example, Kothari, 2006, p. 1-38; McDonald, 2013, p. 834-5).

The process of creating ABS involves a transfer of assets from the originator who owns them to a trustee, a special purpose entity (SPE) or company that pools the assets of different types and from many originators. The SPA issues to investors the asset-backed securities, namely, special bonds backed by the assets and loans directly to the originators (for example, Kothari, 2006, p. 9-17; Fabozzi & Kothari, 2007, p. 3-10). In case of newcomers businesses, ABS may be created using the newcomers purchase contracts' entitlements, including their financial claims from the purchase contracts. Another possible securitization process is the bank financing the newcomers business using the purchase contracts as collateral, and as is common in mortgage-backed-security (MBS) market, the bank may cover his risk by assigning the liens on the purchase contract to the SPE. The later pools the liens, issues liens-backed securities to investors, and pay the loan returns to the bank.

Securitization can potentially enables newcomers promisors a direct access to capital markets, usually at lower cost, and can help transform the promisors loans, backed with the liens on the purchase contracts first created by the loaning bank into cash. It enables the banks to primarily finance the newcomers

businesses funded by capital market investors or by immediately receive loan returns and investing in new loans therefore promoting economic growth.

With the commitment mechanism, newcomers' purchase contracts have a more accurate and high value and a higher contractual certainty as to promisee's payments, and this promote the contracts securitization. In turn, a possible securitization of the promisors' loans backed by the purchase contracts can assist the banking system spread newcomers' risks through the capital market and therefore strengthens the proposed mechanism positive effects.

**Possible Securitization Difficulties**

The securitization process creates macroeconomic and microeconomic high costs and risks (for example, Kothari, 2006, p. 1-38, 97-104, 231-4; Schwarcz, 2009, 2012). Inter alia, securitization creates moral hazard problem by allowing the banking system to wave its exposure to risky businesses and to shift it to capital market's investors without adequate professional due-diligence.

Notably, this moral hazard problem is inherent to securitization in general. The commitment mechanism is not intended to shift the newcomers' risks over the banking system's shoulders. To overcome the latter's unwillingness to finance newcomers' businesses and to initiate the process of newcomers' screening and finance, it is necessary that the mechanism would enable the bank to act as a clearing-house, with negligible costs and risks.

## CONCLUSIONS

In order to further develop tools based on the commitment mechanism, we use *option pricing theory* to determine the purchase contract and the commitments values. We prove that a purchase contract can be priced as a *put option* with a *binary option*, and that the obligation to a bank we use in the mechanism is a theoretical equivalent to that *binary option*. Using the *Black-Scholes option pricing formula*, we demonstrate how these options and therefore the purchase contract can be priced. We explained that higher and more accurate value to the purchase contract, and accurate value to obligation to a bank as a *binary option*, could provide additional advantages to the bank: a better screening between newcomers and better assessment of the newcomer's risk. To the promising promisors the bank may provide a credit line using the purchase contracts as collateral. The bank may also back the obligation assigned to it.

We further show that the commitment mechanism, together with the pricing of the purchase contract as a combination of put and *binary option*s, may give rise to two financial markets. First, an options market that can spread the risk of newcomers' bankruptcy by selling the obligations to a bank we use in the mechanism as *binary option*s. Second, a purchase contracts securitization market that may directly fund newcomers' businesses and spread their risks of bankruptcy. With the commitment mechanism and the establishment of an option market or a purchase contracts securitization market, newcomer sellers would be able to more effectively overcome entrance barriers to goods markets, survive and compete.

## ENDNOTES

1. The United States Small Business Administration (SBA), authorized by the Small Business Act [Public Law 85-536, as amended]. A small business is defined either in terms of the average number of employees over the past 12 months, or average annual revenues over the past three years. Inter alia, a small business should be a concern that is organized for profit, and is independently owned and operated. See Small Business Administration (a). For most manufacturing industries, with many exceptions, the criterion is 500 employees. See Small Business Administration (b); Small Business Administration (2012).

2. Commitment means, in Schelling's well-known words (Schelling, 2006, p. 1), "becoming committed, bound, or obligated to some course of action or inaction or to some constraint on future action. It is relinquishing some options, eliminating some choices, surrendering some control over one's future behavior. And it is doing so deliberately, with a purpose. The purpose is to influence someone else's choice".

3. For similar results, see Bartelsman, Haltiwanger & Scarpetta (2004). Bartelsman, Haltiwanger and Scarpetta analyzed data from industrialized and developing countries regarding the process of market entry and exit,

namely creative destruction and found that about 20% of newcomers in the entire US business sector fail within two years, about 40% within four, and less than 50% survive beyond the seventh year.

4. For small businesses' importance to economic growth see, for example, the Economic Report of the President (2011, p. 26-7).

5. In Aghion et al.'s (2007) research, small businesses' liquidity constraints were described as costs imposed on newcomers and not on well-established firms in the market, namely entry barriers. For further explanation of the term entry barriers and for the possibility of viewing financial constraints as entry barriers, see, for example, Varian (2010, p. 415-7); and McAfee, Mialon, & Williams (2004).

6. Fulmer et al. (1991-1992) reports a survey of 266 commercial loan officers in American banks. It was found that among numerous information requirements, all the lenders require new borrowers to submit historical financial statements, including balance sheet. Ninety percent of lenders require a statement of cash flows, and 75% of them require three years of annual historical financial statements. Inter alia, 70% of lenders have a policy requiring a CPA firm report on historical financial statements. Lenders also examine qualitative variables, for example, condition and quality of assets and character of management. Most banks have formal loan policies and for most lenders, a combination of multiple factors affects the loan decision.

7. A comprehensive survey (Dunworth & Rogers, 1996) of contract litigation in New York during the period 1971-1991 showed that Fortune 500 companies during that period (1905 firms) were involved in only 21% of all contract litigation, despite being the source of 65-80% of the country's GDP in any given year; the other 79% involve private individuals and small businesses.

8. Nelson (1990) used the gap between the prejudgment interest and the market interest rates to explain the significant increase in litigation during the 1970's.

9. Data on United States Federal courts shows that the median period of time that passes between filing a suit and the start of a trial is 21.6 months, and the median length of the trial until the end of the dispute (including those cases that end in settlement) is an additional 8.7 months. This does not include appeals. See Klemm Analysis Group (2005, p. 3).

10. Buyer's remedies for breach of contract are defined in the UCC §2-711-§2-716. For a detailed analyzes of buyer's remedies for breach of contract, see American Law Institute & National Conference of Commissioners on Uniform State Laws (2013-2014, §2-711-§2-716); White & Summers (2010, p. 272-340).

11. See American Law Institute & National Conference of Commissioners on Uniform State Laws, id. at §2-718(1)).

12. Lost profits are available under UCC Section 1-305(a) as applied in Nobs Chemical, U.S.A., Inc. v. Koppers Co., 616 F.2d 212, 1980 U.S. App. LEXIS 17920, 28 U.C.C. Rep. Serv. (CBC) 1039 (5th Cir. Tex. 1980)).

13. The wording of the mechanism is presented in Appendix A.

14. Information sharing between lenders reduces lenders' selection costs by allowing them to more accurately predict loan defaults (Barron & Staten, 2003), and it even disciplines borrowers to pay loans (Brown & Zehnder, 2007).

15. For a similar use of option pricing theory, see Ayres & Talley (1995).

16. A forward is a contract obligating the buyer to purchase an underlying asset at a future price and date. See, for example, McDonald (2013, P. 25-35); Bodie, Kane & Marcus (2014, P. 771).

17. An option is a contract where its owner (the option promisee) has the right, but not the obligation, to buy (call option) or sell (put option) an underlying asset at an agreed price (strike price) during a certain period of time (American-style option) or on a specific date (European-style option). See, for example, McDonald, Id. at 35-45; Bodie et al., Id. at 51-2, 679-89.

18. The package is also presented in Table 3, infra, in Appendix B.

19. A binary option, also known as a digital option, is a type of option that has a payoff of a fixed amount or nothing. Binary options are type of exotic options, which differ from ordinary call or put options. For terminology and explanation of the types of binary options, see, for example, McDonald (2013, P. 663-7, 883-8).

20. A call binary option would pay out if the underlying asset's market price were at or above the exercise price at expiration. See, for example, McDonald, Id..

21. The event where the promisor does not deliver the purchase contract's product represents the state where the cost of production exceeds the contract and market price ($P<Pt<Ct$) – inefficient contract.

22. A cash-or-nothing binary option (a binary option for the bargaining case), is identical to a price-difference binary option (a binary option for the competitive case) except that the payment is specific.

23. Lemma 1 - That the package achieves both ex-post requirements: efficient breach of contract and the secure of the contract division of value; and, Lemma 2 - That the purchase contract is identical for the promisor in its cash

flows and delivery of goods to the positions as follows: buying (long) the same put option as in the competitive case together with selling (short) a cash-or-nothing binary option with a payment of D=V-P.

24. See Bodie et al. (2014, P. 737-46); McDonald (2013, P. 349-53).

25. For the pricing of a cash-or-nothing binary option (a binary option for the bargaining case) using the Black-Scholes formula, see, for example, Reiner & Rubinstein (1991); McDonald, Id. at 663-5).

26. A loan-to-value ratio (LTV ratio) is a key factor for risk assessment of lending with collateral that banks and other lenders use to approve a loan with a pledge on an asset, for example mortgage. The ratio examined is the ratio between the value of the loan and the value of the asset that back the refunds. High LTV ratio means higher risk, and banks determine standards for LTV ratio for a case of different collaterals that enable them to determine the maximum credit they are willing to grant against given collateral. For further discussion of LTV ratio and its use by banks and other lenders, see Lin (2014); Jokivuolle & Peura (2003).

27. Except risk management and a tool to reduce transaction costs, derivatives and options also are used as a tool of speculation and arbitrage profits and to circumvent regulatory restrictions, including a tool for tax planning. For a discussion on the uses of derivatives and options, see, for example, McDonald (2013, p. 11-3); Bodie et al. (2014, p. 678-721).

28. See, for example, McDonald, Id. at 409-33; Bodie et al., Id. at 709-10. The trade in binary or digital options, a type of exotic option is permitted and regulated since 2008 (See Securities and Exchange Commission, Release No. 34-57744).

29. For a discussion of moral hazard problem's creation by a hidden action of one side to a contract see, for example, Varian (2010, p. 724-725); Cooter & Ulen (2012, p. 48-9); Kreps (1990, p. 577-624).

## REFERENCES


Aghion, P., Fally, T. & Scarpetta, S. (2007). Credit constraints as a Barrier to the Entry and Post-Entry Growth of Firms. *Economic Policy*, 22(52), 731-79.

American Law Institute & National Conference of Commissioners on Uniform State Laws (2013-2014). *Uniform commercial code: Official text and comments*, St. Paul, MN: Thomson Reuters.

Ayres, I. & Talley, E. L. (1995). Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade. *Yale Law Journal*, 104(5), 1027-117.

Barron, J. M. & Staten M. (2003). The Value of Comprehensive Credit Reports: Lessons from the U.S. Experience. Manuscript, available at: http://www.privacyalliance.org/resources/staten.pdf.

Bartelsman, E. J., Haltiwanger J. & Scarpetta S. (2004). Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries. Discussion Paper No. 04-114/3, Tinbergen Institute, available at: https://www.econstor.eu/handle/10419/86370.

Bebchuk, L. A. (1996). A New Theory Concerning the Credibility and Success of Threats to Sue. *Journal of Legal Studies* 25(1), 1-25.

Bebchuk, L. A. (1988). Suing Solely To Extract a Settlement Offer. *Journal of Legal Studies*, 17(2), 437-49.

Ben-Shahar, O. & Bernstein, L. (2000). The Secrecy Interest in Contract Law. *Yale Law Journal*, 109(8), 1885-925.

Berger, A. N. & Udell, G. F. (1995). Relationship Lending and Lines of Credit in Small Firm Finance. *Journal of Business*, 68(3), 351-81.

Bernstein, L. (1992). Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry. *Journal of Legal Studies*, 21(1), 115-57.

Blegvad, B.-M. (1990). Commercial Relations, Contract, and Litigation in Denmark: A Discussion of Macaulay's Theories. *Law and Society Review*, 24(2), 397-412.

Board of Governors of the Federal Reserve System. (2007). Report to the Congress on the Availability of Credit to Small Businesses. Available at: http://www.federalreserve.gov/boarddocs/rptcongress/smallbusinesscredit/sbfreport2007.pdf.

Bodie, Z., Kane, A. & Marcus, A. (2014). *Investments* (10th Global ed.), McGraw-Hill Education.

Brown, M. & Zehnder, C. (2007). Credit Reporting, Relationship Banking, and Loan Repayment. *Journal of Money, Credit and Banking*, 39(8), 1883-918.

Brown, M. & Zehnder, C. (2010). The Emergence of Information Sharing in Credit Markets. *Journal of*

*Financial Intermediation* 19(2), 255-78.
Cooter, R. & Ulen, T. (2012). *Law and Economics* (6th ed.), Boston; Pearson Education, Inc.
Diamond, D. (1991). Monitoring and Reputation: The Choice between Bank Loans and Directly Placed Debt. *Journal of Political Economics*, 99(4), 688-721.
Dunworth, T. & Rogers, J. (1996). Corporations in Courts: Big Business Litigation in U.S. Federal Courts, 1971-1991. *Law Social Inquiry*, 21(3), 97-592.
Economic Report of the President (2011). Available at: https://www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2011.
Fabozzi, F. J. & K. Vinod (2007). Securitization: The Tool of Financial Transformation. *Journal of Financial Transformation*, 20, 33-45.
Fulmer, J. G., Gavin, T. A. & Bertin, W. J. (1991-1992). What Factors Influence the Lending Decision: A Survey of Commercial Loan Officers. *Commercial Lending Review*, 7(1), 64-70.
Galanter, M. (1983). Reading the Landscape of Disputes: What We Know and Don't Know (and think we know) about our Allegedly Contentious and Litigation Society. *UCLA Law Review*, 31, 4-71.
Grundfest, J. A. & Huang, P. H. (2006). The Unexpected Value of Litigation. *Stanford Law Review*, 58(5), 1267-336.
Jacobi, O. & Sher, N. (2015). A Commitment Mechanism to Eliminate Willful Contract Litigation. *Review of Law and Economics*, 11(2), 231-66.
Jacobi, O. & Weiss, A. (2013). The Effect of Time on Default Remedies for Breach of Contract. *International Review of Law and Economics*, 35, 13-25.
Jokivuolle, E. & Peura, S. (2003). Incorporating Collateral Value Uncertainty in Loss Given Default Estimates and Loan-to-value Ratios. *European Financial Management*, 9(3), 299-314.
Katz, A. W. (1990). The Effect of Frivolous Lawsuits on the Settlement of Litigation. *International Review of Law and Economics*, 10(1), 3-27.
Kallberg, J. G. & Udell, G. F. (2003). The Value of Private Sector Credit Information. *Journal of Banking and Finance*, 27(3), 449-69.
Klemm Analysis Group (2005). Impact of Litigation on Small Business. No. 265 SBA Research Summary.
Knaup, A. E. (2005). Survival and Longevity in the Business Employment Dynamics Data. *Monthly Labor* Review, 128(5), 50-6.
Kothari, V. (2006). *Securitization - The Financial Instrument of the Future* (3rd ed.), Singapore: John Wiley & Sons.
Kreps, D. M. (1990). *A Course in Microeconomic Theory*, Princeton: Princeton University Press.
Leitner, Y. (2006). Using Collateral to Secure Loans. *Business Review*, Q2, 9.
Lin, L. (2014). Optimal Loan-to-Value Ratio and the Efficiency Gains of Default. *Annals of Finance*, 10(1), 47-69.
Macaulay, S. (1963). Non-contractual relations in business: A preliminary study. *American Sociological Review*, 28(1), 55–67.
Macneil, I. (1981). Economic Analysis of Contractual Relations: Its Shortfalls and the Need for a 'Rich Classificatory Apparatus'. *Northwestern University Law Review*, 75(6), 1018-63.
Macneil, I. (1982). Efficient Breach of Contract Circles in the Sky. *Virginia Law Review*, 68(5), 947-69.
Mahoney, P. G. (1995). Contract Remedies and Options Pricing. *Journal of Legal Studies*, 24(1), 139-63.
McAfee, R. P., Mialon, H. M. & Williams, M. A. (2004). What Is a Barrier to Entry?. *American Economic Review*, 94(2), 461-5.
McDonald, R. L. (2013). *Derivatives Markets* (3rd ed.), Boston: Pearson.
Petersen, M. A. & Rajan, R. G. (1994). The Benefits of Lending Relationships: Evidence from Small Business Data. *Journal of Finance*, 49(1), 3-37.
Nelson, W. E. (1990). Contract Litigation and the Elite Bar in New York City, 1960-1980. *Emory Law Journal*, 39(2), 413-62.
Reiner, E. & Rubinstein, M. (1991). Breaking Down the Barriers. *Risk*, 4(8), 28–35.

Schelling, T. C. (2006). *Strategies of Commitment and other Essays*, Cambridge, MA: Harvard University Press.
Schwarcz, S. L. (2009). The Future of Securitization. *Connecticut Law Review*, 41(4), 1313-25.
Schwarcz, S. L. (2012). The 2011 Diane Sanger Memorial Lecture: Protecting Investors in Securitization Transactions: Does Dodd-Frank Help, or Hurt?. *Louisiana Law Review*, 72(3), 591-603.
Securities and Exchange Commission. Release No. 34-57744, File No. SR-ODD-2008-01. Available at: http://www.sec.gov/rules/sro/occ/2008/34-57744.pdf.
Shavell, S. (1980). Damage Measure for Breach of Contract. *Bell Journal of Economics*, 11(2), 466-90.
Shavell, S. (1984). The Design of Contract and Remedies for Breach. *Quarterly Journal of Economics*, 99(1), 121-48.
Small Business Administration (a). Am I a Small Business?. Available at: https://www.sba.gov/contracting/getting-started-contractor/qualifying-small-business.
Small Business Administration (b). Guide to Size Standards. Available at: http://www.sba.gov/content/guide-size-standards.
Small Business Administration (2012). Table of Small Business Size Standards Matched to North American Industry Classification System Codes. Available at: https://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf.
Small Business Administration (2009). The Small Business Economy: A Report to the President. Washington, D.C.: SBA. Available at: https://www.sba.gov/advocacy/small-business-economy.
Varian, H. R. 2010. *Intermediate Microeconomics* (8th ed.), W. W. Norton & Company, Inc.
White, J. J., & Summers, R. S. (2010). *Uniform Commercial Code* (6th ed.), St. Paul, MN: West Academic Publishing.

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## APPENDICES

### Appendix A

*The Commitment Mechanism*

1. The seller undertakes an obligation to pay the bank the amount of the buyer's damages if the seller will not deliver the good on the delivery day in accordance with the contract and the law.
(a) The buyer's damages will be set as the difference between the market price at the contractual time of tender and the contract price or, if such a market price does not exist, as the buyer's lost profit due to the breach, equal to _____, plus any incidental or consequential damages of _____. The lost profit and incidental and consequential damages will be determined by the parties at the time of contracting.
(b) The parties may determine an earlier or later date for calculating the market price of the good.
2. The bank undertakes to pay the buyer the amount of the buyer's damages if and when received by the bank, unless the seller notifies the bank that he plans on suing the buyer, in which case the bank will hold the funds until the court rules.

### Appendix B

**TABLE 3**
**THEORETICAL EQUIVALENT TO A PURCHASE CONTRACT BETWEEN THE PROMISOR AND PROMISEE BASED ON THE FOUR-OPTION PACKAGE – THE COMPETITIVE CASE**

| Option Type | Long / Short | Asset / Occurrences | Price | Essence |
|---|---|---|---|---|
| A – put option | Promisor-Bank | Asset: Delivery of Good | The bank pays: $P$ | Asset Delivery |
| B – price-difference binary option (call) | Bank-Promisor | Occurrences: The promisor does not deliver the good* | The promisor pays: $D=Pt-P$ | Expectation Damages |
| A – put option | Bank-Promisee | Asset: Delivery of good | The promisee pays: $P$ | Asset Delivery |
| B – price-difference binary option (call) | Promisee-Bank | Occurrences: The promisor does not deliver the good* | The bank pays: $D=Pt-P$ | Expectation Damages |

* Cost of production exceeds contract and market price ($P<Pt<Ct$) – inefficient contract.

## Appendix C

*Proof of Lemmata 1 and 2*

The promisor holds a *put option* written by the promisee. Similarly, the promisor is a writer of a *binary option* held by the promisee. Furthermore, the promisee and promisor receive the exact same good and cash flows under any occurrences. If the promisor, promisee and bank hold the positions according to the four-option package, the exercise of options on delivery day ($T_2$), after the promisor finds out the cost of production and has to perform the contract, leads to the following outcomes. First, if the cost of production is lower than the purchase contract price ($Ct<P$) (a profit contract), the promisor will exercise the Type A option (sell the good to the bank), gain $P-Ct>0$, and since the bank does not exercise the Type B *binary option*, the promisor pays nothing to the bank. The bank simultaneously exercise its Type A option (sell the good to the promisee), cover $P-Ct$ paid to the promisor, and since the promisee does not exercise its Type B *binary option*, the bank pays her nothing.

Conversely, if the promisor finds out that the cost of production is higher than the contract price ($P<Ct$) (a loss contract), he will have to choose between exercising the Type A option (sell the good to the bank) and lose $Ct-P$, and allow the bank to exercise its Type B *binary option* (allowing it to charge him with $D=Pt-P$) and lose $D=Pt-P$. The promisor will choose the first and perform the contract if and only if his loss from performance is less than his loss from allowing the bank to exercise its Type B *binary option*. Therefore, the promisor will perform the contract if and only if his loss is less than $D= Pt-P$, which is precisely the social goal – to perform if $Ct<Pt$ and not to perform if $Pt<Ct$.

Hence, the four-option package, achieves both efficiency and distributional effects, and its cash flows and delivery of goods is identical to those of the basic two-option package. *Q.E.D.*

## Appendix D

*Proof of Lemma 3*

The only change in the states after the promisor finds out the cost of production and has to perform as the contract obliges, is that if the promisor finds out that the cost of production is higher than the contract price ($P<C$) (a loss contract), the promisor will have to choose between exercising the Type A option (sell the good to the bank) and lose $P-C$, and allows the bank to exercise the Type B *binary option* (allows it to charge him with $D=V-P$) and lose $D=V-P$. The promisor will choose the first and perform the purchase contract if and only if his loss from performance is less than his lost from allowing the bank to exercise the Type B *binary option*. Therefore, the promisor will perform the purchase contract if and only if his loss is less than $D=V-P$, which is precisely the social goal in the bargaining case (to perform if $C<V$ rather than if $V<C$).

Hence in the bargaining case the four-option package held by the promisor, promisee and bank, achieves both efficiency and distributional effects, and its cash flows and delivery of goods are identical to those of the basic two-option package. *Q.E.D.*